A National, Collaborative Analysis of the NCMP Process with Parents, Carers and Other Stakeholders

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Abstract

Background

Despite the overall importance of the National Child Measurement Programme (NCMP), there is increasing criticism from academics, media, and parents regarding the programme. For example, negative parental reactions and experiences with the result letters were evidenced by Falconer et al. (2014) or Nnynazi et al. (2016). These experiences need to be urgently reviewed, especially among parents who received the result that their child was classed with overweight or very overweight status. In addition, reviews of the NCMP, such as those by Shucksmith et al. (2008) or Mooney et al. (2010), are dated as they focused on the system operating under Primary Care Trusts while the current NCMP operates under Local Government Associations (LGA).

Research aims

The thesis aimed to answer these calls as part of the research aim to conduct a national, collaborative analysis of the NCMP process with parents and other stakeholders. This thesis aimed to 1) understand and gain insights into the NCMP and specifically the result letters, and use these insights to develop a new version of the letters, 2) understand how the newly developed letters (experimental) perform in comparison to the standard letters (control) developed from PHEs' (Public Health England; now Office for Health Improvement and Disparities) templates and used across LGAs in England; and finally, 3) understand how parents perceived the standard and the new letters. The aims described above were explored using a mixed-method design across three studies. The design accounted for multiple stakeholder perspectives and was suitable given the applied nature of the research.

Study 1

Study 1 analysed responses to an online survey disseminated to representatives of 92 LGAs and 300 result letters from 115 LGAs. The analysis revealed that 86% of representatives of sampled LGAs commissioned providers to deliver the NCMP, 86% shared the results with parents, 71% proactively followed up, and 80% offered services in the area. The analysis of the result letters revealed a systematic pattern of six themes occurring in the standard letters, precisely, 1. Opening phrases; 2. Sharing results; 3. Educating and informing; 4. Appeal to action or change, 5; Ensuring privacy, and 6. Concluding with pleasantries. These moves involved various strategies, of which strategies to instruct parents and incite behavioural actions were some of the most referenced. This finding was interesting because it expanded the initial communicative purpose of the letters from only "sharing the results" to providing lifestyle intervention. Further analysis of language inside the standard letters revealed that most letters were less complex and uncomplicated. The unique tokens (TF-IDF; term frequency – inverse document frequency) analysis confirmed a high prevalence of medicalising language prevalent within the standard letters addressed to parents of children with very overweight and overweight status. These letters included terms such as "type 2 diabetes" or "high blood pressure", which was not present in the letters addressed to parents of children with other statuses. In addition, the analysis computing a signed two-by-two association score (keyness) across weight categories confirmed the focus on weight medicalisation across the letters addressed to parents of children with the status of overweight or very overweight.

Study 2

Study 2 analysed the user experience of 86 parents with the standard (control) and the new result letters (experimental). The evidence from this study showed that the result status inside of the letters determined parental experiences with the result letters. This was most pronounced in the participant's impression (as measured by the User Experience Questionnaire) when the result classed children with any other than a healthy weight status. Specifically, their impression was – 2.24 lower than when the result inside of the letter was healthy status [SE = 0.29, 95% CI – 2.81 to -1.67, $p < 0.05$, Adj. $R2 = 0.46$]. Similar patterns occurred across other factors of user experience to a lesser extent. The impact of enhancing the result letters and re-developing them was impossible to determine conclusively due to insufficient sample size. However, the findings suggested that the standard result letter was not performing well among parents of children assigned a status outside the healthy weight category. In addition, the study provided valuable methodological contributions in identifying the challenges of similar projects. The study also demonstrated the feasibility of embedding a short feedback questionnaire (such as the User Experience Questionnaire) in the letters to measure parental experiences with the NCMP.

Study 3

Study 3 explored the experience of 20 parents receiving both versions of the NCMP letters (the new aka experimental versus the standard aka control) as part of the semi-structured interviews. The majority of interviewed parents who received the letter that classified their child with non-healthy weight status reported they preferred the new version over the standard. Specifically, when these parents evaluated the very overweight or overweight version, they favoured the experimental over the standard version. Parents rationalised this as preferences for less threatening language, neutral tone, weight neutral and non-medicalising language, and the letters that appear supportive. However, parents who received the version with the healthy weight status felt more neutral about both versions and occasionally felt that the standard version appeared more positive because it used the term "healthy" weight.

Discussion

The present research utilised novel methods and provided the much-needed update of the evidence on the NCMP operation, investigated the role of language in the result letters and the overall framing of the result letters, and provided evidence that medicalising and fear appealing language is identifiable across the letters. These findings directly affect all engaged stakeholders, especially PHE and LGAs. Accordingly, several recommendations are provided: a) PHE and the Department of Health and Social Care should provide sensitive, neutral, or slightly positive templates and avoid medical terms such as cardiovascular disease or cancer, b) different delivery methods from no delivery to e-delivery or selective delivery should be explored, c) parents need letters that are further tailored to the individuality/needs of their children; finally, d) when recruiting parents, the most direct and personalised routes are the most appropriate.

Student Declaration

I can confirm that the thesis is my own work; and that all published or other sources of material have been acknowledged in the notes to the text or the references. I can confirm that the thesis has not been submitted for a comparable academic award.

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List of Publications

- Čadek, M., Flint, S. W. & Tench, R. (2020) Delivery of the National Child Measurement Programme in England. Public Health Nutrition, pp. 1–21.

List of Presentations

- Čadek, M. & Flint, S.W., Tench, R. (2019). The impact of weight stigma on the healthcare practitioner-patient relationship. UKCO, Newcastle upon Tyne, England United Kingdom, September 2019.
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Martin Čadek, January 2022

1 Introduction and Review of Literature

The present section will introduce the context of the National Child Measurement Programme (NCMP) in England and scope the relevant literature to provide a succinct account of the background evidence. The focus was to present international and national research relevant to the topics covered in the three studies presented in this thesis.

The introduction aims to deliver three objectives that are presented below.

1. Discuss and introduce the topics related to the NCMP, such as childhood weight reference standards, the prevalence of children living with overweight in England, and role language in programmes such as the NCMP.
2. Overview of the historical development of the NCMP and its process.
3. Scope national and international research relevant to parental opinions of measurement programmes and letters delivering results about their children' weight.
4. Provide a rationale for the research developed in this thesis.

1.1 Childhood Weight Reference Standards

The growth reference standards define what can be considered a "healthy weight" status for a child of a given age in a broad medical sense. The NCMP utilises the British 1990 growth reference standard developed by Cole et al. (1995) or simply the UK90 BMI (Body Mass Index) Chart to derive the classifications commonly known as "Very Overweight", "Overweight", "Healthy Weight" and "Underweight" in the letters delivered to parents (Cole et al., 1995; Public Health England, 2020c).

However, other standards exist and can be used. The two noteworthy international standards are the WHO (World Health Organization) and the IOTF (International Obesity Taskforce) standards. The WHO provides standards for ages 5 – 19 years and the IOTF for ages 0 – 18 or 0 – 25 years (Monasta et al., 2011; Nilsen et al., 2016).

One of the key differences between the IOTF, WHO, and UK90 is the suitability to use the standards in an international context. Although the former two allow this, the letter is suitable for the context of the UK. Another difference is that the UK90 and the WHO uses the deviance (SD) from the optimal growth, while the IOTF relies on the BMI to determine the optimal growth. The discrepancies between the standards are illustrated below for each of the corresponding categories:

Underweight: Is a BMI of ≤ -2 SD and if the BMI is ≤ -2.66 SD and a "Very Thin" category (Cole et al., 1995; Public Health England, 2020c). In comparison, the WHO defines grades of underweight as Thinness Grade 1 is defined as >-2SD ≤ -1SD below normal weight (the IOTF as BMI >17 ≤ 18.5), Grade 2 is >-3SD ≤ -2SD (the IOTF as BMI >16 ≤ 17) and Grade 3 is ≤-3SD (the IOTF as BMI ≤16) (Nilsen et al., 2016).

Healthy weight: As defined by the UK90 BMI charts and the NCMP Operational guidelines, healthy weight is a BMI between > -2 to 1.33 SD (Cole et al., 1995; Public Health England, 2020c). The WHO standard for BMI is > 1SD and < + 1SD and the IOTF is >18.5 <25 (Nilsen et al., 2016).

Overweight and **Very Overweight**: Overweight is any BMI ≥ 1.33 SD, and if the BMI is ≥ 2 SD, then the UK standards speak of clinical obesity, and if ≥2.66 SD, then of severe obesity (Cole et al., 1995; Public Health England, 2020c). In comparison, the WHO defines grades of overweight as ≥+1SD <+2SD above normal weight, obesity is ≥+2SD <+3SD and severe

obesity is ≥+3SD; for the IOTF overweight is ≥25 < 30, obesity ≥30 < 35 BMI, and severe obesity ≥35 BMI (Nilsen et al., 2016).

A longitudinal study by Li et al. (2016) compared the WHO, the IOTF and the CDC (Center for Disease Control and Prevention) standards regarding their inter-rater reliability to classify healthy weight, overweight and obesity classes. The authors recruited a US nationally representative sample of 2323 adolescents with an average age of 16.19 years (10^{th} US grade). Li et al. reported that the standards had a high degree of inter-rater reliability with one another as measured by Cohen's Kappa (the lowest measured was Kappa > 0.89 or > 91.35% of agreement). However, they also found that the CDC reference standard was the most conservative while the IOTC and WHO were nearly identical, concluding that these differences were negligible.

Others authors compared the IOTC, the WHO and the French classification systems in terms of their inter-rater reliability for overweight and obesity classes (Kêkê et al., 2015). A study by Kêkê et al. (2015) used a sample of 1382 children (671 boys) aged between 4 to 12 years (average of 8.4, SD 1.7). For overweight status, the authors have found strong agreement between the IOTC and French classification (French & IOTC, κ = 0.91); however, the WHO (French & WHO, κ = 0.44 and IOTC & WHO, κ = 0.55) classification differed from the former two. For obesity, the authors have found perfect agreement between the IOTC and French classification (French & IOTC, κ = 1.00) and improved inter-rater reliability between the WHO and the former (French & WHO, κ = 0.71 and IOTC & WHO, κ = 0. 71). The authors summarised the evidence with the statement that they would recommend the IOTF to be used in population studies in France as it tends to have an acceptable agreement with both the WHO and the French systems (Kêkê et al., 2015).

Nilsen et al. (2016) has compared the WHO, the IOTF and Swedish national standards. It is one of the few studies that have also compared these standards among children with underweight or thinness and children with overweight (Nilsen et al., 2016). The sample comprised 4518 children (52.2% boys and 47.8% girls) aged between 7 – 9 years who were selected from a stratified sample of 94 schools where the measurements occurred (ibid). The study findings showed variability between the prevalence of a given weight status based on the classification criteria used. The IOTF growth reference resulted in the lowest prevalence of thinness and overweight (including obesity and severe obesity). According to the IOTF cut-offs, 7.5% of boys and 6.9% of girls would be classed as one of the three grades of thinness, and 16.5% of boys and 18.2% of girls would be classed with overweight (including obesity and severe obesity). Meanwhile, the WHO standard would classify 10.4% of boys and 8.7% of girls in the thinness classes and 25.7% of boys and 23.7% of girls with the overweight classes (Nilsen et al., 2016). The Swedish national standards were closer to the WHO (given they use similar cut-off points). However, the authors showed evidence of variance of nearly 10% between the IOTF and the WHO standards and recommended using WHO standards because of the IOTF backtracking problems.

In comparison to the standards above, the standards used for the NCMP are the UK90 standards. Therefore, it might not be accurate to compare data from the NCMP standards and that of other countries in Europe that opted-in for the WHO standard as part of their surveillance initiatives (Whiting et al., 2020). Furthermore, England is not part of global surveillance programmes, notably the WHO European Childhood Obesity Surveillance

Initiative (COSI)[1] , which makes the comparison with other countries challenging despite the robustness of the NCMP data.

1.2 Prevalence of Childhood Underweight, Overweight, and Obesity in England

The prominent reason that the NCMP was established were the concerns over the relatively high prevalence of children living with obesity in England (Lake, 2009; Lobstein et al., 2003). From 2006/07 to 2019/20, childhood overweight and obesity prevalence has increased from 31.6% to 35.2% among Year 6 and from 22.9 to 23.0 among the Reception year (NHS[2] Digital, 2020). Furthermore, earlier evidence suggests that it has been increasing since 1974 (Stamatakis et al., 2005).

At the inception of this project in 2016/17, the NCMP reported that 9.3% of children in the Reception year and 19.8% of children in Year 6 were classed with obesity in England, and the trend had increased compared to previous years (Buttriss, 2017; NHS Digital, 2016). As of 2016/17, 9.6% of children were with obesity in the Reception year and 20% of children with obesity in Year 6 (NHS Digital, 2017). Data from 2019/20 shows that there were 9.9% of children living with obesity in the Reception year and 21% in Year 6 (NHS Digital, 2020). This suggests an increasing prevalence of childhood obesity across both age groups.

Although the focus here is primarily on children within the overweight and obesity ranges, it is noteworthy to mention that the prevalence of underweight was 1% for the Reception year and 1.3% for the Year 6 in 2016/17. In 2020, 0.9% of Reception year and 1.4% of Year 6 children were in the underweight range.

1.2.1 Children with overweight and obesity statuses

In 2016, Simmonds et al. (2016) posed the question, “Is childhood obesity a risk factor of its own because it is likely to track into adulthood? “ in their systematic review and meta-analysis. Simmonds et al. (2016) researched traditional sources of academic publishing (e.g., peer-reviewed journals) without language restrictions and selected longitudinal cohort studies with over 1000 participants who successfully followed up participants into adult life. The results showed that children with obesity were five times more likely to have obesity in adulthood with the pooled relative risk of 5.21 and CI 4.50 - 6.02. The authors also found that 70% of adolescents with obesity transitioned to adults with obesity (i.e., after 30 years old), and 55% of children with obesity remained to have obesity as adolescents. However, while obesity tracked with relative risks into adulthood (see above), it remained primarily a condition that started in adult life because 80% of adults with obesity (aged > 30 years) did not have obesity in adolescence. Finally, clear limitations of the study were high heterogeneity of collected studies (I^2), i.e., > 63% and reliance on childhood BMI which showed to be a poor predictor of obesity in adults because of low sensitivity (ibid).

In another systematic review, Llewellyn et al. (2016) have posed a slightly different question regarding the use of BMI to measure childhood obesity to predict obesity-related morbidities in adult life. Llewellyn et al. (2016) summarised previous systematic reviews as establishing a positive association of childhood BMI with adult diabetes and hypertension. However, they also reported that the evidence was unclear regarding an association between BMI and cardiovascular diseases or stroke in adult life. Following their review and adding a meta-

[1] https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/country-work
[2] The National Health Service

analysis, Llewellyn et al. reviewed 26 studies (excluding those that were not longitudinal, had less than 1000 prospective follow-ups from childhood to adulthood and did not provide enough information to establish predictions). The focus of the systematic review was on associations of childhood overweight and obesity with coronary heart disease, type 2 diabetes, metabolic syndrome, or cancer in an adults life. The findings provide evidence for a statistically significant positive association of childhood BMI with adult type 2 diabetes (OR 1.70, 95% CI [1.30 – 2.22]), coronary heart disease (OR 1.30, 95% CI [1.16–1.47]), hypertension (OR 1.29, 95% [CI 1.19–1.40]) and statistically non-significant positive relationship with cancer. The above odds ratios were relevant for children aged > 12; the authors also found the statistically significant positive relationship of similar effect sizes aged 7–11 and < 6 years.

Llewellyn et al. focused on predicting the incidence of adult health conditions from childhood BMI (ibid). They identified that at 85th centile of BMI (i.e., overweight and obesity), the incidence of adult health condition was 31% for future diabetes, 16% for future strokes or 22% for future coronary heart disease and hypertension that have developed in children with overweight and obesity statuses aged > 12 years and similar for children aged 7–11 years. At 95th BMI centile (i.e., obesity only) the prediction was 13% of future diabetes, 8% of future coronary heart disease or 8% future hypertension in children identified as having obesity. The later incidence does not include children with overweight. Authors themselves concluded that predicting any of the above health risks from childhood BMI is just slightly better than chance. However, this study was not without its limitations. The number of cohorts was low per observed risk (k < 3), the studies had high heterogeneity (> 90% I^2), and many of the cohorts were commenced between the 1920s and the 1950s, which may impact the data standards (ibid).

The research articles above showed that obesity and overweight in children tracks into adulthood and may come with an increased incidence of health risks in adult life. This has important implications for programmes such as the NCMP because it supports monitoring obesity from childhood age. However, childhood BMI has an important caveat since it is a predictor with low sensitivity, and while it is a convenient method of measuring childhood obesity, it can predict future obesity and health consequences just slightly better than chance.

I have presented the studies above that have an onset in childhood since the above paragraphs have reviewed articles discussing the development of future risks in adulthood. Several researchers have also reviewed the evidence regarding childhood obesity and associated health risks (Kumar & Kelly, 2017; Morales Camacho et al., 2019; Ozturk, 2017). Most recently, Morales Camacho et al. (2019) reviewed the evidence regarding aetiology, comorbidities, and treatment. With regards to comorbidities, the authors reviewed numerous conditions that are associated with childhood obesity. Camacho et al. (2019) found evidence discussing childhood obesity and its association with increased risk of hyperandrogenism and Polycystic Ovary Syndrome in terms of metabolic and cardiovascular comorbidities. Additional evidence was discussed about pulmonary comorbidities – the authors present issues such as sleep apnoea or reduction in total lung volume (ibid). One of the more frequently occurring conditions of gastrointestinal comorbidities is a non-alcoholic fatty liver disease that affects as many as 70% of childhood patients with obesity. There has also been evidence for problems in renal functions; previously presented chronic kidney disease is a closely related medical issue to childhood

obesity. Last, Camacho et al. (2019) have presented evidence regarding the decrease of immunity function, decreased mobility function and perhaps most importantly, a number of conditions developed at a psychological level. Among those psychological conditions, the authors mention depression, anxiety disorders, low self-esteem, and increased risk of discrimination. For further details, Figure 1 summarises additional conditions (ibid).

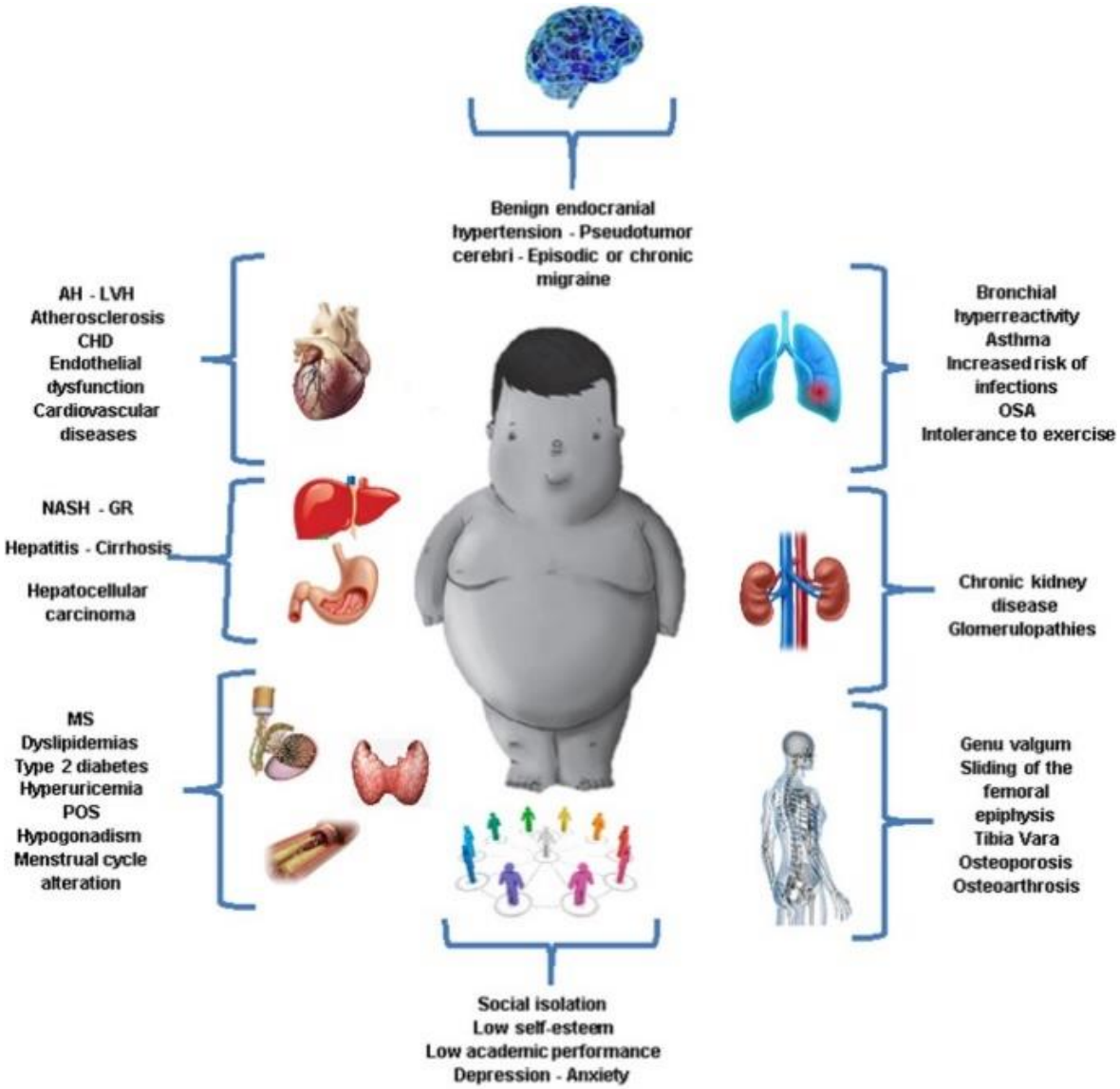

Figure 1: Conditions Associated with Childhood Obesity Camacho et al. (2019, p. 5)

The findings from Camacho et al. (2019) shows that the medical problems associated with childhood obesity might have onset in childhood. In this sense, early prevention and identification of overweight are important to prevent further medical complications. In summary, overweight is one of many markers of these associations that have onset in childhood and adulthood, so the British Government and other institutional bodies are interested in monitoring it.

1.2.2 Children within the underweight range

The prevalence of children living in underweight category in England is much lower than prevalence of those with overweight or obesity category. Nonetheless, on a global stage, children in the underweight range remain a more prevalent category (Yanovski, 2018). Reflective of the low prevalence, the British Government is primarily focusing on overweight categories with its policies and interventions; however, recent evidence points out that children with underweight are underrepresented in the guidelines surrounding these policies (Gillborn et al., 2019; Lobstein & Jackson-Leach, 2016).

There is evidence that suggests that underweight status is associated with poorer health. For example, the study by Wake et al. from 2013 identified that poorer global health is associated with children who are young and with underweight. The authors of the study group children into larger age bands where 4606 children were aged 2–3 years, 4983 aged 4–5 years, 4464 aged 6–7 years, 1541 aged 8–12 years, and 928 13–18 years. They then provided summaries of comorbidities in per cent per band and weight status (Table 2 in Wake et al., 2013). The risks of poorer global health and physical health were strongly associated with age and weight categories; younger children were classed as underweight and older children with obesity had elevated risks (Wake et al., 2013). The study provides important evidence that the health risks are shared by children with both overweight and underweight. The study limitations lie in the cross-sectional design that did not allow for long-term observations and parent self-reported comorbidities for children that introduced response bias.

Another study published in 2015 focused on disadvantaged children. Pearce, Rougeaux and Law (2015) have examined the NCMP data from 2007 to 2012 ($n^{boys} = 66584$; $n^{girls} = 78934$) and measured the prevalence of children who were at the relative risk of living with severe underweight or obesity across the different socioeconomic gradient. The analyses showed that as the deprivation gradient moves from low deprived to high deprived, the relative risk ratio of severe thinness increases for girls and boys; similarly, the relative risk ratio of severe obesity increases for girls and boys. These results indicate that while obesity risk ratio is slightly higher than underweight, the difference seems negligible, and both conditions should be observed in the lowest deprivation deciles (Pearce et al., 2015). However, the study was limited as the research took a secondary analysis approach, making causal inference more challenging and using cross-sectional data that do not consider long-term factors to identify these risks.

The fact that children with underweight status may need support was also highlighted in the recent article by Paulis et al. (2017). The authors reviewed the health profiles of adolescents across all weight categories and interviewed 683 adolescents across three-time points (i.e., the initial consultation, 3 months, and 12 months follow-ups). While adolescents with underweight did not differ in attendance frequency from adolescents with normal weight, they have been less satisfied (OR: 0.53, 95% CI [0.31 – 0.92]) with their eating behaviours (similarly to obesity and overweight) in comparison to their normal-weight counterparts (Paulis et al., 2017). The findings for the children with underweight were similar to children with overweight. The research used a cross-sectional design that poses limitations typical to observational studies; however, this finding suggests that underweight adolescents deal with similar health concerns to those with overweight status.

Last, the underweight status itself comes with health risks that need to be considered. This is often difficult given the western obsession with thin-ideal (Klaczynski et al., 2004). A recent cohort study from Sweden (2017) by Lorem et al. has investigated the effect of mortality and self-reported health in a large nationally representative sample (n = 31,985). The authors have followed cohorts between 25 – 69, 25 >, and 30 > years across four different time points and analysed how the interaction of BMI and age impact self-reported health and mortality (Lorem et al., 2017). The authors have also examined several other independent variables such as gender, birth year, various pathologies, biomedical risk factors and health-related behaviours (Figure 1 in Lorem et al., 2017). Analysing the weight status only, the authors have found that participants with underweight status (<18.5 kg/m^2) reported overall lower levels of self-reported health in comparison to their normal weight (22 – 24.99 kg/m^2) counterparts (Table 2 in Lorem et al., 2017). However, these results are secondary and need to be considered with age as an interaction. Introducing age as an interaction effect, the authors have discovered that albeit participants in younger age groups (25 years old) had better self-reported health (0.226, 95% CI [- 0.094, 0.546]), as the participants got older (> 80 years old) the self-reported health got significantly worse (−0.059, 95% CI [-0.115, −0.002]) in comparison to the reference group (Lorem et al., 2017). Also, participants with underweight had a two times higher mortality rate (0.021) in comparison to the reference group (0.010) and a higher rate in comparison to participants who were with obesity (0.018) (Lorem et al., 2017).

These findings show that children with underweight status may require a similar level of attention as children living with obesity. However, this is true only under certain conditions such as when children live in deprived areas, low-income households, have evidence of eating disorders, or when the weight status seems to track into later ages. There are at least two important caveats that provide a good rationale to focus primarily on children living with obesity. First, the underweight status has a comparatively low prevalence to overweight status (NHS Digital, 2020). Second, the NCMP and PHE[3] (Public Health England; now the Office for Health Improvement and Disparities) have commissioned tracking reports in the past and found that most children living with underweight status did not retain this status as they grew older (Copley et al., 2017). The report demonstrated that most of the 2% of children living with underweight grew into healthy weight at a later age (i.e., 77% boys and 68% girls grew into healthy weight). In comparison, the evidence shows that around 27% (for those who live with obesity, the prevalence is under 5%) of all children who live with overweight status will return to their healthy weight status (Copley et al., 2017).

1.3 Childhood Weight and Weight Stigma

The previous Section 1.2 established the association of weight with health outcomes such as cardiovascular health and the importance of weight as one of the indicators of childhood health. While the focus on weight is beneficial, it can be reductionist and downplay the significance of psychosocial aspects. The current section explored the interaction of weight stigma (as the primary psychosocial aspect) and childhood overweight (including obesity) and underweight. The section starts with a definition of weight stigma, and follows up with two prominent theories explaining the mechanism of weight stigma and the impact (psychosocial and health) of weight stigma on children.

[3] Public Health England was replaced by UK Health Security Agency and Office for Health Improvement and Disparities on 1st October 2021

1.3.1.1 The current definition of weight stigma

Various definitions of weight stigma exist. For example, Farhat defined weight stigma as "the disapproval of individuals perceived to be overweight or obese" (Farhat, 2015, p. 56). Alternatively, Tomiyama defined it "as the social devaluation and denigration of people perceived to carry excess weight" (Tomiyama, 2014, p. 8). Such definitions are common in recent articles and can be described as "theoretical definitions", implying deductive consequences – social or psychological (Hurley, 2000, p. 96).

In 1963, Erving Goffman defined the term stigma as "an attribute that is deeply discrediting" (Goffman, 1990, p. 12). Continuing his definition, he distinguished three key types of stigma based on body appearance, character flaws, and lineages (or tribal stigma) such as race or nationality. The stigma according to Goffman (1990), allows the "normal" society (or "normals") either consciously or unconsciously discriminate the holder of stigma and make them inferior to the society based on the belief that they are not "really human" due to their stigma. According to Goffman, another reason the normal society avoids the stigmatised individuals is the nature of stigma to "spread" to people in close contact with a stigmatised individual. This is known as "courtesy stigma" (Goffman, 1990, p. 61). In other words, the courtesy stigma is a phenomenon where the person shares negative consequences of stigma because they are associated with a person carrying a stigma.

Goffman does not describe weight stigma directly, nor does he concern himself with weight/fat as a possible attribute of stigma. However, other authors clearly describe how Goffman's terms can be extended to the weight stigma. In her book "Fat Shame", Farrell (2011) carefully elaborates the complexities of weight stigma. She acknowledges that Goffman's concepts are useable for weight stigma. Furthermore, Farrell describes that weight stigma persists across all three types of stigma described by Goffman. It is especially interesting regarding perceiving stigma as a "character flaw". Weight stigma, according to Farrell, is associated with characteristics such as "*excess of desire, of bodily urges not controlled, of immoral, lazy, and sinful habits*" (Farrell, 2011, p. 10). The body appearance aspect of stigma is obvious. However, it is expanded on by Farrell in the context of culture, status or citizenship when she describes fatness as a trait that is being used to identify *"inferior bodies" – those of immigrants, former slaves, and women – and it became a telltale sign of a "superior" person falling from grace* (Farrell, 2011, p. 6). The third type of stigma – tribal stigma, is also represented in weight stigma. The rise of language such as obesity epidemic or "fat nation" strengthens this idea, and there is a wealth of evidence in media (Farrell, 2011, p. 6). Finally, what is perhaps fascinating is the "relativeness" of weight stigma – in the 18th century, fat would be a sign of prosperity, class, elite; a bizarre to imagine this given the evidence of discrimination against people with obesity in the 21st century (ibid). This information puts Goffman's concepts into a modern perspective. The picture would not be complete if one last thing regarding weight stigma was not acknowledged. It is the pervasiveness of weight stigma in our society. This is perhaps due to apocalyptic thinking of people attempting to eradicate obesity; obesity has become something to wage wars against and a fat person an enemy (ibid). As Farrell states, "*Our national "war on fat" has created a colossal health and diet industry closely enmeshed with government agencies.*" (Farrell, 2011, p. 14). In other words, weight stigma is justifiable because of the "war on fat" (see above), and this has become engrained in many settings such as employment, healthcare, education, media, and personal relationship (Puhl & Heuer, 2009).

Recent authors have leaned towards establishing weight bias, stigma, and prejudice as the same concepts that may result in negative attitudes, stereotypes and discrimination towards people with overweight or obesity (Daníelsdóttir et al., 2010; Lacroix et al., 2017). Therefore, bias, stigma, and prejudice are also used interchangeably throughout this text. However, it is useful to define the following additional terms briefly: attitudes refer to an evaluative tendency, stereotypes to beliefs, and discrimination to behaviours (Daníelsdóttir et al., 2010; Nelson, 2009). Indeed, such distinction is in the tradition of social psychology research (Nelson, 2009).

Finally, an especially important development regarding stigma (and weight stigma research) came with the works of J.C. Phelan and B.G. Link. Previous authors have often attempted to position stigma somewhere outside the other concepts such as stereotypes or discrimination; these authors have embraced the complexities of stigma and defined it as *"co-occurrence of labelling, stereotyping, separation, status loss, and discrimination in a context in which power is exercised"* (Hatzenbuehler et al., 2013, p. 813; Link & Phelan, 2001). The concept of power is important because, as Farrell (2011), weight stigma has become a tool to assign lower status membership and label certain people as "body outcasts". According to Phelan and Link, stigma is a broader concept that can encompass multiple statuses and characteristics such as obesity, disability, or HIV that result in an individual's discrimination (Hatzenbuehler et al., 2013).

Stigma is, therefore, a complex phenomenon, which in the case of weight refers predominantly to individuals with overweight or obesity who are being labelled, stereotyped, and discriminated against as a result of the stigma associated with higher weight status. Multiple theories emerged to describe how this process of "stigmatisation" works, and its consequences for individuals; however, particularly Attribution Theory and Fundamental Cause Theory are relevant for this study (Hatzenbuehler et al., 2013; Kelley & Michela, 1980). Attribution Theory helps to explain why parents may be blamed for their child's weight status, while Fundamental Cause Theory shows why it can be challenging to reverse the stigma and how stigma disrupts the ability of individuals to benefit from health interventions, such as those employed as part of the NCMP (i.e., proactive follow-up, weight management services).

1.3.1.2 Attribution Theory, controllability, and culture

One of the most well-known theories describing the development and process of weight stigma has its roots in the attribution theory developed by Fritz Heider (Heider, 1958). However, the theory became prominent after developments by psychologist Harold Kelley, and there was a burst of various models that were developed to explain the process behind Attribution Theory. For example, Kelley's own ANOVA model was only one of such models which aimed to explain the attribution process as a logical activity where people make causal attribution based on consensus, consistency, and distinctiveness of information (Kelley & Michela, 1980).

Roughly speaking, two lines of attribution research can be drawn. According to the first, people perceive someone's behaviour as an event that can be explained either based on situational causes or personal causes (Malle, 2011). This is similar to Kelley's model mentioned above. The other line, which traces back to Heider, suggests that people explain behaviour by whether it is unintentional or intentional; while the first explanation is akin to the attributional theorist line, the second provides further perspective and opens an important link to how attributional theory works in weight stigma – the intentionality of

behaviour allows to assign various evaluative judgements, for example, blame and responsibility (Malle, 2011).

This leads to Bernard Weiner's originally introduced research line. In 1988, Weiner et al. hypothesised that stigma implies cause and using the Attribution Theory framework, the perceived cause of stigma should determine the affective responses and reactions towards the stigmatised person. Weiner et al.'s findings show that stigmas can differ in terms of perceived controllability and perceived reversibility which leads to obvious consequences – while uncontrollable stigma is associated with affective reactions such as pity and liking, the controllable stigma is associated with anger and judgement. Among stigmas that were perceived as controllable was obesity (next to child abuse, drug addiction, and AIDS). Although it could be seen as a physically-based stigma, the attributions made by the participants were more in line with perceiving obesity as a character flaw, thus attributing it with mental-behaviour stigma (Weiner et al., 1988). This further supports the notion that weight stigma is a complex stigma sharing all types described by Goffman that I have highlighted in the previous section (Farrell, 2011; Goffman, 1990).

The idea that weight stigma leads to negative reactions is due to a perception that weight is controllable and changeable, which has received a lot of attention (e.g. Crandall et al., 2001; Hinman et al., 2015; Swift et al., 2013; Vartanian, 2010). However, several researchers claimed that it is not only a belief in controllability that causes negative reactions towards people living with obesity. Notably, research by Crandall et al. (2001) hypothesised that more fundamental belief systems identified as social world ideology is linked with the belief of controllability. The authors defined the attribution-value model of prejudice, which proposes two factors of prejudice, namely, controllability belief and cultural value. The former was explained in the paragraphs above and has been derived from research on anti-fat prejudice; the latter implies that the prejudice does not work on a simple group membership but on the fact that the group member's key attribute holds negative value in a given culture. In this sense, people with obesity are not being discriminated against "simply" because they "have obesity" but because obesity is associated with values such as laziness or unintelligence, which are deemed negative in a given culture (Crandall et al., 2001).

Attribution Theory helps to establish the unfavourable impact of childhood stigma on parenting experience, and naturally, on the childhood experience. Individuals with overweight status are commonly attributed negative traits that impact them unfavourably and their close relatives. Evidence that could reinforce why parents are blamed for their child's weight is the link between stigma and the mere-proximity effect. For example, children aged 5 to 10 years preferred drawings of children with an average weight status less when they were presented next to children with an overweight status (Penny & Haddock, 2007).

1.3.1.3 Fundamental Cause Theory

Link and Phelan (2001) considered the exercise of power a context in which stigmatisation occurs. As such, stigma ensures that those with lower status cannot change the status while those with higher status can protect theirs (Hatzenbuehler et al., 2013). This makes stigma a social condition that impacts a person's life to such an extent that it can be a possible cause of disease. Link and Phelan (1995) would call such a condition a fundamental cause of the disease. There are four features to the social condition as a fundamental cause: first, it influences several health outcomes; second, it usually involves multiple risks factors; third,

it directly involves resources or social capital which can be used to minimise the impact of disease; fourth the mechanisms which intervene with the health conditions can be replaced as long as the fundamental cause persists (Link & Phelan, 1995; Phelan et al., 2010).

As mentioned at the begging of the paragraph above, stigma operates in the context of power, and those with power have necessary resources that can be utilised to minimise the impact of the disease. Therefore, aside from socioeconomic status, stigma (including weight stigma) is a prime example of the fundamental cause behind disease (Hatzenbuehler et al., 2013). The concept of power is especially important to the definition of weight stigma in the context of a fundamental cause. If there are two people with equal social resources, but one has a stigma, then the person with stigma, according to the fundamental cause theory, has to spend their resources on tackling stigma, while the person without stigma can use theirs to avoid preventable disease, improve their lifestyle, and increase their resources further (Hatzenbuehler et al., 2013; Link & Phelan, 1995; Phelan et al., 2010).

Additionally, a person who has no stigma or other fundamental cause of the disease is equipped to protect themselves from diseases with preventable risks. This has crucial importance for designing intervention and policy. Phelan et al. (2010) reported that people who do not suffer from a fundamental cause could utilise their resources and modify their behaviour. Thus, policies that offer intervention on an individual level or behaviour are successful among people with resources to implement them.

Considering weight stigma as a fundamental cause have many implications. First, stigmatised individuals need to exhaust resources on tackling the stigma. Second, interventions tackling obesity have to address the social factor of fundamental causes – weight stigma (Hatzenbuehler et al., 2013). Third, stigma as a fundamental cause still impacts additional domains such as education, housing or employment; they also result in status loss, isolation, and increased health disparities and health problems (Hatzenbuehler et al., 2013).

These two theories highlight the mechanisms of weight stigma. They also point to where the NCMP initiative may be lacking. In the first instance, the NCMP does not involve elements that would address misattributions (the first theory), nor does it tackle the fundamental cause of stigma itself; it merely addresses the consequences, i.e., the non-optimal weight. Although addressing stigma is not the aim of the NCMP, implementing changes in the result letters that do not further exacerbate weight stigma will be important.

1.4 Role of Language

Governments need to create convincing narratives to promote their interventions. The following section explores the role of language in the context of childhood weight further. In the beginning, the dominant discourse surrounding the NCMP is defined in addition to rhetorical devices used to communicate with the general public. This is followed by Section 1.4.2 about strategies that can be utilised to communicate public health messages and how the discourse is utilised in the letters relevant to the NCMP.

1.4.1 Dominant Discourse and Rhetorical Devices

Jenkin et al. (2011) and various other authors argue that obesity, its causal explanations, and solutions that need to be implemented are framed through stakeholders' narratives (e.g., medicine, public health, media, or industry). According to the authors, the basic definition of “framing” anything can be analogous to “packaging” the concept to convey a

certain meaning; or more specifically, it consists of making certain aspect of the truth salient while concealing other – for example, by promoting a particular definition (Jenkin et al., 2011). Other authors have defined framing as ‘‘the basis by which public policy decisions are made’’ or in a wider context, framing also points to a solution: “If we alter the definition of problems, then the response also changes’’ (Wallack et al., 1993 in Menashe & Siegel, 1998, p. 310).

Jenkin et al. (2011) explored two competing stakeholders in New Zealand – public health and industry, frame narrative about obesity. They collected 31 written submissions submitted to the inquiry initiated by the New Zealand Government as a response to the rising prevalence of obesity and type 2 diabetes in the country. The submissions represented the food and marketing industry (e.g., Coca-Cola, McDonald’s; n = 17), and public health stakeholders (e.g., Diabetes New Zealand, Obesity Action Coalition; n = 13), totalling 968 pages of data. Jenkin et al. (2011) used the framing matrix developed by Kwan (2009) to code text and ensure they are systematic. The matrix includes signature rhetorical devices (*“describe the representation of an issue”*) and signature framing devices (*“which facilitate frame articulation and description”*) (Jenkin et al., 2011; Kwan, 2009, p. 29). Utilising the matrix, the authors have found striking differences and few similarities in how the food industry and public health stakeholders frame obesity.

In terms of *overall representation,* public health stakeholders used the frame of “epidemy”, while the industry frames the problem as “concern” or “issue”. When discussing the *causes of obesity*, public health argued that obesity is caused by the obesogenic environment, while the industry argued it is a matter of individual responsibility and overconsumption. Public health stakeholders opposed that a lack of knowledge and motivation causes obesity, while the industry argued that this is a key issue (Jenkin et al., 2011). When it comes to *solutions* offered, public health criticised the current New Zealand Government plan efforts – especially the self-regulatory side of the business, while the industry was happy with the voluntary regulation and proclaimed this is their “willingness to be part of the solution” (Jenkin et al., 2011, p. 1027). Please see Table 3 in Jenkin et al. (2011) for further comparison.

These results show that framing is used to influence policies, and there is a contest between groups representing the industry side and groups on the side of public health organisations (Jenkin et al., 2011). While the industry is trying to approach obesity as an individual issue and responsible behaviour, the public health sees its roots in obesogenic environment and obesity being a normal response to aggressive marketing (Jenkin et al., 2011). These frames are part of the overall public discourse – a package more specifically used to describe an issue (Kwan, 2009).

In the context of England, Mulderrig (2016) investigated how the English Government frames the discourse of childhood obesity. Particular importance has been on what is known as “Libertarian Paternalism”, which is often seen in the technique of behavioural nudging that has been used widely in England (Mulderrig, 2016). Mulderrig (2016) aims to provide a systematic and critical analysis of the nudge discourse in England, specifically how obesity is framed in the Change4Life (C4L) campaign and government policy documents. The author uses the frame analysis developed by Lawrence (2004) in conjunction with the approach known as critical discourse analysis. This allows for the identification of discourse either in systemic or individualistic terms (frames). While individualistic terms assign

responsibility and blame to individuals, systemic allow focussing on a broader context, thus assigning responsibility to government or policymakers.

Mulderrig's analysis starts her exploration by defining the C4L campaign. She asserts that the campaign's core relies on a social marketing approach targeting "at risks" groups. Her analysis further continues with what is known as identifying where C4L sits in the context of social practices (ibid). The social practices can be understood as ideologies, documents, and policies forming a broader context around C4L. Thus, C4L works with industry partners and builds on evidence from public health.

The cooperation with industry partners is unique in the context of C4L. In Jenkin et al.'s (2011) analysis, it became clear that these stakeholders (i.e., industry and public health) frame obesity strikingly differently. These framing discrepancies were also identified by Mulderrig (2016) in the context of England. First, until 2016 when the soft drinks industry levy was proposed, the English Government was facing a conflicting position of partnering with those responsible for the current situation, and no regulations were applied for nearly a decade since the initiation of C4L. Second, the approach of joining with industry partners led to contradictions and tensions between how public health stakeholders framed obesity as opposed to industry stakeholders (Mulderrig, 2016).

In terms of the public health expertise, Mulderrig (2016) identified that the key document providing the evidence for the C4L campaign is the Foresight report (Butland, Jebb, Kopelman, McPherson, Thomas, Mardell, Parry & others, 2007). The report frames obesity as systematic or "obesogenic" and produces a causal map of various factors influencing the development of obesity, i.e., obesity system map. However, the systemic framing is limited because, according to the report's authors, in the centre of the system map is an individual and their behaviour. This, according to Mulderrig, is a shift from systemic terms to individualistic terms. Furthermore, the report fails to be truly systemic because it does not acknowledge other causal factors such as working hours, urban planning, and most importantly, social inequality. This shows a clear imbalance in discourse provided by the Government report, where on the one hand it attempts to contextualise obesity, and on the other hand, it states individual actions are easier to implement and places these in the centre of their system. This is further exacerbated in what could be described as "loss of information" or recontextualization (Mulderrig, 2016). The C4L campaign relies on the report but attempts to simplify the message to reach a wider audience. However, in doing so, the final message is not aligned. While the report attempts to be nuanced, the C4L campaign presents a return to the individualised discourse of thinking and framing obesity – obesity is an individual's struggle against their biology (Mulderrig, 2016). Further simplification occurs as the C4L attempts to present evidence in their fairy tale genre with three key elements to this simplification.

First, statistics in the C4L campaign are exaggerated; for example, it predicts that 9 in 10 adults will "become obese". This is achieved by exemplar reframing, a key nuanced message from the Foresight report, which refers to the specific child population, is taken and reframed for adults. Second, biomedical facts are presented in the emotive language and informal register (Mulderrig, 2016). For example, *severe impact, life-threatening, dangerous, horrid* (Mulderrig, 2016). Mulderrig argues that this is an "example of how private anxieties, parental concern, and hopes for a better future are manipulated in the public management of health risk" (Mulderrig, 2016). Finally, originally the Foresight Report has discussed various consequences of obesity, whereas the C4L campaign narrows this

to three – cancer, heath disease, and diabetes (Butland, Jebb, Kopelman, McPherson, Thomas, Mardell, Parry & others, 2007; Mulderrig, 2016). Perhaps the most important change is that the word “obesity” has been deemed to be alienating; therefore, the sentence “dangerous amounts of fat” is used in its place; however, this further blurred the report’s message (Mulderrig, 2016).

These changes are employed to address the individual parent and nudge them through anxiety and fear tactics employed by the discourse of disease (Mulderrig, 2016). This individualisation is an interesting move from the more systemic termed Foresight Report. However, Mulderrig (2016) argues that this discrepancy (systemic vs individualistic) is mitigated by the vague usage of the term “we” in the C4L campaign. “We” is used both to mean everyone and the environment but also in the sense of “we should act together” which implies individualistic action (Mulderrig, 2016).

Mulderrig’s article provides invaluable insight into how the discourse (e.g., disease discourse, obesogenic environment) is communicated from government to public and what rhetorical devices are used (e.g., usage of we, parental anxiety). There are nonetheless limitations to this article. First, it does not explore in detail how the role of industry is shaping the C4L narratives, it does mention conflicting positions; however, these are not explored further. Also it does not provide a perspective of how this discourse is understood by parents or the target population, in other words, the perspective of the receiving side of the communication is missing in the analysis; however, other authors have focused on this as mentioned before (Thomas et al., 2014). Finally, Thomas et al. does not provide any limitations of her own, does not state the overall number of the documents included in the analysis, and the analysis mostly revolves around the Foresight Report and C4L campaign launch.

1.4.2 Public Health Communication Strategies

The previous section discussed the literature that shows the overall health discourse in which the NCMP letters exist. The current section will address the essential elements of public health communication that can be applied irrespective of the recipients. This will provide a blueprint for what may work with the NCMP, given that the programme has to be produced en masse, and not every letter can be tailored.

Meng, Pan, and Reber (2016) conducted a study to analyse what was widely known as award-winning public health campaigns from the National Public Health Information Coalition (NPHIC). The authors focused on identifying the so-called “excellent” features of award-winning campaigns that were running between 2010 – 2013. The analytical method used in the article is content analysis with a focus on the type of public health message, range of the issue, the severity of public health issue, audience, message delivery and effectiveness. The analysis included 70 award-winning campaigns which were relatively diverse (35.71% related to antismoking, 15.71% flu prevention, 12.86% obesity-related, 8.57% infant mortality, and 7.14% public emergency preparation).

In terms of their findings, the most surprising is that out of 70 award-winning campaigns, 61 (87.14%) have not mentioned any numerical or statistical evidence. Furthermore, mentioning health risks was also not as common as one would expect because 30 out of 70 campaigns (42.86%) have mentioned health risks when discussing the public health issue; however, when they did mention health risk than 26 out of 30 (86.67%) have linked them to situational problems. Nonetheless, the authors found that campaigns did mention

negative consequences to self in 61.43% (n = 43) and 20% (n = 14) to others. These are the main findings. Therefore, to summarise the top three characteristics employed by award-winning campaigns, the first is lack of statistical and numerical evidence (87.14%), followed by stressed, negative consequences to self (61.43%), and the third is lack of health risk information (57.14%) (Meng et al., 2016). Meng et al. argued that they attempted to identify "excellent" features; however, the lack of numerical evidence is presented in their conclusions as something future campaigns could use more often. I argue that this might be a conscious decision by the campaign developers. As seen in Mulderrig's (2016) analysis of C4L, the numerical evidence is often deliberately "muddled" to present a stronger claim; therefore, the persuasive strategy, in this case, may rely on avoiding the numerical evidence altogether if such evidence does not fit well with the overall nature of the campaign. It is a clear limitation of the article that Meng, Pan, and Reber (2016) have not attempted to analyse this finding further. Although not the most ethical, the case presented here may serve to develop a rather effective campaign. Similarly, the authors ignore that 57.14% of these campaigns did not rely on health risk information, this suggests that other techniques and strategies were used, but the coding categories provided do not allow to understand what this was. Finally, the overall attempt to use negative consequences as one of the persuasive techniques is interesting to explore further as it is relatively popular among public health campaigns and is known as a fear appeal.

In their study, Avery and Park (2018) have explored the use of fear appeal in fear and non-fear images related to Human Papillomavirus (HPV). The use of visual images is prominent as documented by the authors; however, there is a lack of evidence regarding the effectiveness of visual stimuli as opposed to verbal. There is also a chance that if induced fear through visual message outweighs our ability to manage the threat, the overall response is overload and avoidance (Avery & Park, 2018). This is commonly referred to as self-efficacy ability to manage the fear appeal. To assess these research questions, authors have prepared several stimuli: fear visual HPV flyers, non-fear visual HPV flyers, or text only HPV flyers. The study focused on message recall, perceived informative value, behavioural intentions, and visual attention as the main outcome variables. The sample consists of 75 participants across three different experimental groups (*"a fear visual with text group, a non-fear visual with text group, and a text-only group"*) with 25 participants per condition (Avery & Park, 2018, p. 324). The study results showed that visual attention negatively affected message recall, but only when a non-fear visual was used, i.e., the visual was distracting. Additionally, visual attention predicted vaccination intentions, with the intentions being stronger when fear visual was utilised at $p < .01$ than non-fear visual. The authors could not confirm that the fear visual triggered overload or avoidance with the possible explanation that the visual was not "fearful" enough. These results suggest that the use of fear appeals might be appropriate as they trigger response regarding the intention to vaccinate and promote the performance of potential campaigns. However, the study's sample size was relatively small, albeit with considerable effect sizes. Another limitation is that it might not necessarily be fear that triggered the response. In fear stimuli, human images were used; however, in-text there was lack of comparable attribute. This means that such an effect should be also explored with other control conditions.

While the above article suggests that fear appeal might be effective, other authors argue for more scrutiny and offer a different critical perspective. Such a critical review was conducted by Kok et al. (2018). The authors review empirical evidence regarding a fear appraisal, the theory behind the method, and situational elements when such a method may

be appropriate (Kok et al., 2018). First, according to Kok et al. (2018), and as suggested in the article above, the theory behind fear appeal is that if severity and susceptibility are perceived as high by people, they attempt to manage the fear; however, their decision depends on their self-efficacy. Thus, if a fear appeal is high and self-efficacy low, then the response is ignoring, avoiding or denying the threat, and vice versa. According to Kok et al. (2018), the problem with fear appeal in public health is that health behaviours are often associated with low self-efficacy. This is supported by a meta-analysis conducted by Peters et al. (2013), and even where the fear appeal does work, it still fades in comparison with other approaches because it requires high levels of self-efficacy (Kok et al., 2018; Peters et al., 2013). Despite these findings, a fear appeal is a frequently used method in public health messaging, and according to the authors, this is possible because it is intuitive, persistent, and easy to use – furthermore, they argue that it has shifted the focus of public health from other, more useful methods (Kok et al., 2018). Furthermore, these methods are also used in the context of health advertisements as documented by other authors, and they deliberately aim to trigger negative emotions and often include content that is stigmatising people living with obesity (Dixon et al., 2015). In 2016, Kok et al. (2016) summarised these in a taxonomy of behaviour change methods; for example, methods such as the use of arguments, motivational interviewing, or persuasive communication are only a few of many examples listed in their taxonomy (Kok et al., 2016).

In their systematic review and meta-analysis, Bull et al. (2018) have focused on the delivery component of the behaviour interventions, among other key components. However, I mention delivery specifically, as this is relevant to both communication strategies and the NCMP and warrants further discussion. The authors have applied the TIDieR checklist to categorise 35 trials offering behaviour change (Bull et al., 2018). Part of the checklist is 4 questions assessing “How?” a specific intervention offered the delivery component. These questions categorise whether the intervention was delivered as “personal contact” with or without manual, “face-to-face”, and the “individual” or “group” format. Their main results indicated that when RCTs delivered an intervention on healthy eating, then the personal (face to face) delivery method was associated with increased effectiveness as opposed to the remote delivery. For interventions focusing on physical activity, delivery in a community setting or home setting, as opposed to a health setting, was associated with increased intervention effectiveness. On the other hand, smoking cessation interventions were not associated with a particular delivery context (ibid). These results show that the public heal information needs to be delivered in a specific context to be effective, and such contexts warrant further examination.

These paragraphs explored the essential elements of public health messaging. Interestingly, the NCMP seems to utilise only some of these elements, for example, a fear appeal by mentioning diseases such as cancer or cardiovascular problems. One reason I believe the NCMP cannot utilise a variety of strategies to communicate the message is that it is often utilised through the means of letters and is often highly standardised by guidelines and in some cases by legislation (Department of Health & Social Care, 2007; Public Health England, 2020c). In addition, the reliance on letters provides unique challenges instead of other mediums such as campaigns, adverts, or messages on the Internet. These challenges should be explored, and to do this, it is necessary to venture into what is a letter in the first place and identify what the letters are in terms of their linguistic properties. To do this, I will discuss whether a letter can be considered part of the genre that has established conventions in the following paragraphs.

1.4.3 The Genre of Public Health

According to Hyland (2015), the genre is essentially an influence of previous texts on how we shape the current text, or more specifically, "abstract, socially recognised ways of using language" (p. 32). The idea is intuitive and has been the core concept of what is known as genre analysis. This form of analysis was used by Barron (2012) when she analysed the genre of public health messages, and who stated that the concept of analysis relies on understanding "how members of a specific speech community use language to get things done" (Barron, 2012, p. 7). As part of this analysis, the analyst identifies a moves structure that helps deliver the communicative purpose of a text or a message through a series of moves – the move is a rhetorical device (Barron, 2012). A move is a unit of text, in which case, the whole letter would be framing of the text in the context of the genre – public health.

Barron's (2012) work is a nuanced analysis of how public health institutions communicate with the general public, and her findings should be mentioned here. She concludes that the public health campaigns she has analysed often used what is known as the directive function. This function aims to persuade the reader to modify their behaviour and change their attitude. This can be done, for example, by using what has been already described as a fear appeal. She has also identified 7 moves that form the genre of public health messages, with some of them being obligatory and some being optional. These moves were often used in relatively loose order, as opposed to other genres such as scientific articles. Finally, the linguistic features used in public health messages often used some form of personalisation to make relatively impersonal messages feel more relevant and personal. The moves she has found are self-explaining; the obligatory moves identified were 1) capturing the attention of the reader [e.g., *"including human faces"*], 2) justifying changes required in the message [e.g., *"Price awareness pays"* (p. 131)], 3) seeking further action from the audience [e.g. *"GIVE UP", Irish anti-smoking campaign* (I-AS-PP2 in Barron, 2012a, p. 146)], and 4) establishing credibility [e.g., *"Mention state authority"* (Table 5-23 in Barron, 2012)]. See Table 5-26 in Barron (2012) for further information.

Barron's work provides initial ideas on how the NCMP letters could be structured in association with the genre of public health; however, she has focused on campaigns that did not include the specific medium of the letter. However, Upton (2002) has analysed direct mail letters and conducted genre and corpus analyses to understand linguistic strategies and framing of mails sent by philanthropic organisations to increase their fundraising. Upton (2002) focused on four key elements; linguistic description, 2) functional language description, 3) interactional analysis, and 4) contextual analysis, which combines linguistics and the social context of the genre. The last element is especially important as it provides an insight into how a given genre is applied in the real world. Each genre exists to fulfil a specific communicative purpose; as Bhatia (1993) stated, "*each genre is an instance of a successful achievement of a specific communicative purpose using conventionalized knowledge of linguistic and discoursal resources*". For example, the communicative purpose of the corpus (i.e., direct mails) used in Upton's study is to *"raise funds for support"* or *"communicate good cause",* which has similarities to sales letters that aim to make customers purchase something (Upton, 2002, pp. 1–2). To further explain, the communicative purpose is important because it gives rationale as to why a genre is structured the way it is, which helps explain the order of moves and the functional purpose of each move. Upton (2002) also used "structural elements", which are highly occurring

units of text that are used to further serve the communicative purpose and are closer to the design of the letter, i.e., it is aesthetics (e.g., date, signature) rather than semantics.

The main communicative purpose of direct mail letters is to raise funds. Next is to segment the letters into units of texts that are then categorised as moves before being further analysed. In his study, Upton (2002) formed the corpus of 242 direct mail letters from 71 organisations, totalling 146 693 words. To derive the right moves, he relies on Bhatia's (1993) conception of a six-move structure; however, his analysis further modified the original structure by adding two additional moves, collapsing some moves, and such (In Upton, 2002). This resulted in a seven move structure which contains the following moves: "1) get attention, 2) introduce the cause and/or establish credentials of organization, 3) solicit a response, 4) offer incentive, 5) reference insert, 6) express gratitude, and 7) conclude with pleasantries" (Upton, 2002, pp. 6–7).

To give a few examples, the first move, "get attention", includes sentences that include pleasantries or other comments to get the reader's attention. "Solicit response" serves the main communicative purpose by asking the reader to respond either by providing financial support or volunteering (Upton, 2002). For more examples, please see Upton (2002) Table 1. To assess the reliability of their classified moves, Upton had two raters who hand-coded the letters and calculated interrater reliability at 84%; however, no further details are given as to how reliability was calculated or how much it differed across individual moves. Most of the discrepancies were around where one move ends and starts (Upton, 2002). Upton (2002) continued with corpus analysis, with the most common move being Move 3 – "Solicit a response" that has been included in 39.3% across the corpus (N = 546) and represented in 97% of the letters, followed by Move 2 – "Introduce the cause" (26.0%, N = 362) which was represented in 93% of the letters. The other moves were not nearly as common (≤ 11% across the corpus), and therefore the moves 2 and 3 are perceived as obligatory in the given genre. Other moves are also interpreted by the authors, for example, Move 1 – "Get attention" (2.5%, N = 35, represented in 15% of letters), and Move 7 – "Conclude with pleasantries" (2.4%, N = 33, represented in 13% of letters) were so-called "Icing on the cake" which were used relatively scarcely but served the communicative purpose by attempting to persuade the reader further.

Additionally, the move structure also mattered. For example, Move 2 (74% of times as the initial move) and 3 occurred almost always together (87% of the time is the Move 3 following the Move 2), and in this order. Finally, Upton (2002) analysis of structural elements of the letters found (presented as percentage in the letters): Date (77%), Address (51%), Salutation (88%), Complimentary Close (90%), Signature (89%), Signature Footer (87%), Footnote information (7%). These were not as important as the moves, but they were also frequently used and helped to shape the aesthetics of the letters. The above results show an important approach to the analysis of the genre known as the direct mail letters. The author used corpus analysis in combination with genre analysis to achieve a level of interpretation beyond simply relying on one or the other. This shows that letters are structured in a given order, and some of these attributes (moves and structural elements) might be expected in the NCMP letters (irrespective of whether they are printed or electronic). Upton (2002) did not describe all the methodological considerations and it was also unclear how the reliability of coders was computed. Further validity and reliability checks would be appropriate to strengthen the coding. This research is somewhat dated, but so is the letter as the medium and the insights obtained are therefore no less important.

The issue with carrying the example mentioned into the NCMP is that the letters carry different communication purpose and differ in an emotional context.

This section has explored whether the NCMP letters can be considered part of the genre with established conventions. The NCMP letters seem to be part of the public health discourse, similar to that analysed by Barron (2012). Besides, given that the NCMP itself is produced yearly and in iterations, previous instances of the initiative influence the later instances. The NCMP could even be considered a genre of its own, as defined by Hyland (2015). However, that could be a step too far as isolating the NCMP from other relevant genres. The benefit of establishing the letters produced in the NCMP as a genre is that it provides nuanced insights into how to analyse this form of communication (as will be shown in the method section and later in the results). In addition, I am now able to build on literature that has analysed letters in the past.

To finalise the current section, an additional trait of the NCMP has to be reviewed. This is the fact that these letters contain information that is potentially threatening, inflammatory, and intimidating. The use of fear appeals may further exacerbate this. This poses particular challenges that need to be addressed separately. Thankfully, the genre of “bad news” letters is not unknown, and in the upcoming section, I will discuss this particular element of the NCMP.

1.4.4 Messaging the Bad News

The case of letters such as direct email carries a relatively neutral emotional message; however, this is not the case of medical communication where a diagnosis is shared. In terms of the communicative purpose of the NCMP, it can be established as “*sharing the results about the child’s weight in the most appropriate fashion*” (where the result is the diagnosis). The evidence in other fields suggests that while considering individuals' circumstances, informing patients about a diagnosis could be potentially threatening (Fallowfield & Jenkins, 2004). Even when the news is not objectively bad (e.g., terminal illness), communication of a diagnosis can still be challenging and difficult for both patients and healthcare professionals (ibid). In the case of delivering such news using a letter, the message is likely to utilise additional moves to manage the reader's emotional response. In the case of the NCMP that aims to deliver results “*in the most appropriate fashion*”, the appropriate fashion means using moves that mitigate emotional discomfort.

First, though, examples of using moves in the genre to change the reader's attitude do not necessarily have to be from medical communication. For example, Rutherford (2005) has analysed the genre of corporate annual reports in the UK and found that even though these reports should aim to be neutral, they are deliberately biased towards appearing more positive (Pollyanna effect). Furthermore, companies performing poorly were even more likely to use similar language (Rutherford, 2005). In another example, Clatworthy and Jones (2003) also analysed the genre of financial reporting. They have been focusing on what is known as “bad” and "good" news and discovered that companies report these differently. In line with Attribution Theory, when the company reported bad news, they attributed the failures to external factors, while reporting the good news, they attributed it to themselves (Clatworthy & Jones, 2003).

Another example can be illustrated using the work of Barton (2004), who explored the oral genre of treatment discussion between a medical professional and an oncological patient. Barton discovered that medical professionals used specific language as part of one of the

moves that allowed them to “avoid” discussion regarding a patient's prognosis. The specific attribute of this language was that it was “indirect”. For example, when discussing care with oncological patients, one of the features were vague quantifiers: *“It has a chance to cure it. Most people respond... Some people get cured (...)”* (Barton, 2004, p. 88). The indirect language also relied on euphemisms, complex syntax, and vague descriptive language (Barton, 2004). The reasons to use such language were to avoid being the bearer of bad news, to maintain patient’s hope, and to some extent, place the responsibility to initiate the medical discussion of prognosis on patient – the healthcare professional can “simply” passively answer questions (Barton, 2004). This is another showcase of moves with features that exist to manage readers or listeners responses.

Ideally, this section would also include a case of a threatening letter that contains a weight-related message; however, there is no evidence in the literature that genre analysis has been conducted on this type of messaging. For example, Derricks and Earl (2019) presented evidence suggesting that targeting people specifically because of their weight status negatively affects a person’s self-efficacy and causes irritation. Such research is relatively common regarding weight letters – the evidence focused on attitudes of readers, listeners, or patients; however, I did not find research exploring weight letters such as the NCMP themselves as a genre of its own. This is particularly important for this project as it shows the need to provide further evidence of how such letters may work and whether they can truly be considered “a bad letter”.

1.4.5 Talking about weight

Considering the frame and strategies mentioned above, the letters then have to provide the communication of results. This may pose challenges for local authorities who deliver the results and parents who share the results with children. For example, parents of children who live with very overweight status frequently report feelings of shock, disgust, or experience self-blame when they receive of the letters (Gainsbury & Dowling, 2018; Nnyanzi et al., 2016). The present section scoped key research evidence from two systematic reviews related to discussing and talking about weight with children and parents.

The topic of weight talk was discussed by Gillison et al. (2016), who investigated the association between weight talk and child wellbeing. Thirty-eight associative studies and four intervention studies were identified. Using the associative studies, the authors then produced four categories of weight talk that were further analysed. The categories were a) Encouragement to lose weight (26 studies), b) Encouragement to exercise/eat a healthy diet without reference to weight (2 studies), c) Weight criticism (13 studies), and d) Impersonal weight comment/discussion (7 studies, however, meta-analysis was not conducted due to high heterogeneity across studies).

The results showed an association between dieting, dysfunctional weight loss practices, and depressive symptoms when the children were encouraged to lose weight (a). Similarly, poorer wellbeing and unhealthy eating behaviours were associated when weight criticism (c); on the contrary, encouragement to exercise/eat a healthy diet without reference to weight was associated with less dieting and fewer unhealthy weight control behaviours (Gillison et al., 2016). These results provided important evidence during the study designing stages as the idea of avoiding referencing weight was utilised during the letter development. In summary, it seems possible to talk with children or adolescents about exercise and a healthy diet provided it is done without referencing weight, criticising, or directly prompting

to lose weight. In another study by Gillison et al. (2014), evidence is provided that these changes would be what some parents have been calling for in the NCMP for some time.

The previous paragraph focused on weight talk directly with children and adolescents. The review shows that the topic does not need to be avoided if appropriately framed. The question is how to ensure the information is sensibly communicated to parents. There is evidence that various programmes similar to the NCMP exist in other countries (Davidson et al., 2018). A review by Davidson et al. (2018) identified similar initiatives to the NCMP in 4 other countries and 26 journal articles (namely in Australia, Sweden, the Netherlands, and the United States). However, the important question is which are effective regarding the parental notification about their child's weight. The systematic review by Ames et al. (2020) explored further the effective ways to notify parents and their children about the child's weight. The authors identified four experimental studies measuring the effect of the notifications (between 2014 and 2017) and twenty-three qualitative studies focusing on the experiences of parents and their children (Ames et al., 2020).

The experimental studies compared different feedback methods such as face-to-face, various written formats, and with or without additional information. Ames et al. (2020) found that the studies consistently showed no statistically significant differences between the format of the feedbacks. However, the feedback followed by motivational interviews with the parents led to higher satisfaction among parents as opposed to receiving only written feedback (ibid).

The results from the qualitative studies that Ames et al. (2020) analysed were broadly grouped by the themes such as Timing of information, Amount of information, Source of information, or Self-efficacy (ibid). These themes provided a variety of evidence reported by parents. For example, parents wanted to be informed about the measurements as early as possible. Some felt the additional materials were too easy to overlook, others struggled to interpret the BMI charts, and most valued and trusted their healthcare providers as a reliable source of information. Particularly important in the context of the NCMP feedback were findings regarding the content of the letters. Parents wanted simple and easy-to-understand letters, more individualised, non-judgemental, sensitive, and supportive letters.

Furthermore, the evidence showed that a notification should avoid certain terms such as obesity or colloquial terms referring to childhood weight. The findings also by Ames et al. (2020) showed that most parents did not accept the feedback that showed their child as 'overweight'. Instead, these parents would react towards the letter as being "cross", "angry", "annoyed", "upset", "insulted", "distressing", and "perturbed" (ibid). Ames et al. (2020) also found evidence that parents felt powerless, overwhelmed, or had difficulty addressing their child's weight appropriately.

Importantly, the findings from the above studies are reflected in some of the NCMP guidance. Specifically, local authorities can use a conversational framework to prepare the letters (Chadwick et al., 2019). For example, the framework recommends avoiding medical jargon, using sensitive language, and building on parental knowledge (ibid). That said, weight talk within a family remains a complex topic, and there is evidence that even parents can be the cause of further stigmatisation of children living with overweight status since family and peers are a common source of weight stigmatisation which is associated with unhealthy weight control behaviours (Berge et al., 2015; Eli et al., 2014; Puhl & Himmelstein, 2018). Furthermore, the language itself may not be the primary reason why parent or family decides to avoid attending a weight management programme referred to in the NCMP. In

particular, the evidence shows a wide array of beliefs such as mistrust in BMI or the results themselves that are reasons to avoid weight management programmes (Povey et al., 2019). This invites further exploration of evidence regarding parental attitudes towards their children's weight.

1.5 Perspectives of Parents towards Weight

Research evidence suggests that family members and especially parents are a potential source of weight bias towards children who live with obesity (Himmelstein & Puhl, 2019; Pont et al., 2017). For example, Puhl et al. (2013) surveyed 361 adolescents aged 14 – 18 has found that parents are the source of weight stigmatisation in 37% of cases. In another study, when family members were the source of labels such as “too fat”, the labelling was a significant predictor of obesity at the age of 19 years as opposed to when the source was not a family member (Hunger & Tomiyama, 2014). Similar findings warrant exploration of the literature on how families, namely parents, discuss the weight of/with their children.

Neumark-Sztainer et al. (2010) explored what is known as “weight-talk” among family members, or rather, from parents towards their children. They accessed data from a lifestyle management programme attended by 356 girls with an average age of 15.8 years who were either living as overweight or at risk of moving into the category. The girls had completed several measures related to their home and family weight environment and several other measures on topics such as body dissatisfaction or binge eating. Neumark-Sztainer et al. found that 45% of girls have been encouraged by their mothers to diet, and mothers themselves were also dieting themselves (in about two-thirds of cases). Similarly, 40% of girls responded that their fathers have dieted and encouraged them to diet. However, it was primarily mother’s weight talk that was significantly associated with unhealthy and extreme weight control; on top of this, 60% of the girls reported some form of weight teasing from their family members. Neumark-Sztainer et al. (2010) concluded that weight talking in a family might contribute to disordered eating behaviours among teenage girls. Furthermore, at no instance it was associated with improved weight outcomes in the lifestyle programme. However, the study is problematic in how the statistical results are reported, as confidence intervals are missing and odds ratios and only percentages are reported. Also, the research does not show the form of weight-talking; however, qualitative studies may fill this gap.

Berge et al. (2015) aimed to provide qualitative evidence of weight talk experienced at home from parents' perspective. The authors have specifically explored low-income families with most parents female (90%), African American (65%), aged 35 years (SD = 7.5). The sample was comprised of 120 guardians and 120 of their children. Data were collected across two home visits. As part of the second home visit, the researchers interviewed the primary caregiver with the main aim to discuss weight talk and weight teasing. The interview transcripts were then coded using grounded theory analysis, with four specific research questions: 1) What Types of Weight Talk or Teasing are Occurring in the Home Environment?; 2) Why do Families Engage or not Engage in Weight Talk and Teasing?; 3) How is Weight Talk and Teasing Handled in the Family When it Occurs?; and 4) How Does One’s Culture Influence Weight Talk and Teasing in the Home Environment?. Four themes relating to weight talk were found; 1) no weight talk or teasing, 2) overt weight talk/teasing, 3) covert weight talk/ teasing, 4) weight talk/teasing contradictions. Especially, the first question is interesting to know the form of weight talk.

Berge et al. (2015) reported that 29% of parents did not engage in weight talk or teasing. However, 17% engaged in overt weight talk with comments such as: *"with my daughter, I might say, 'If you want to show your legs, then you got to stop eating'" [African American, male, 40 years old]*. An additional 20% of parents engaged in covert weight talk (e.g., "*Well, those pants are getting kind of tight. You know, you're getting a little big there. [African American, female, 27 years old]"*). Finally, 18% per cent engaged in weight talk with contradictions (e.g., "I don't get on either one of my kids about their weight, although this past year, we did call Anthony bubble butt (laughs)…" *[African American, female, 27 years old])* (Berge et al., 2015).

According to Berge et al. (2015), parents often have said they engage in weight talk because they are concerned about their child's health. They did it to protect their children from being teased at school. Berge et al. (2015) found that weight talk can be reciprocal (36%), acceptable (21%), or not acceptable (25%), and finally, 65% of parents believed that their culture promotes weight talks and teasing. This research provides important evidence for why and how weight talk in a family setting occurs. Some parents are engaging in weight talk with their best intentions regarding their children's health, while others believe this is something that cannot be accepted.

The last two studies provide a complete picture. However, further evidence also points out that weight discussions in a family are indirectly associated with experienced weight stigma (Pudney et al., 2019). In addition, adolescents are sensitive to weight-related language – with some experiencing feelings such as shame or embarrassment (Puhl & Himmelstein, 2018).

Discussing weight in a family setting can be problematic; however, the family setting is not where children are measured as part of the NCMP. Instead, it is predominantly schools; therefore, this setting and parental attitudes towards measurements must be explored in detail in the following Section 1.5.1.

1.5.1 Parental Attitudes towards Weight Measuring in Schools

As part of the NCMP, children's weight and height are measured at school. This initiative is large enough to cause public reactions. Similar initiatives exist across the USA (Ruggieri & Bass, 2015). The current section reviews attitudes of the general public towards weight measurement programmes in schools in the USA and the UK. There are practical differences between screening, surveillance, and monitoring; however, all of these procedures include measuring; therefore, the implications are unimportant for the current section.

In 2007, Nihiser et al. published a review of evidence regarding BMI measurement in Schools (mostly USA-based). Importantly, they reviewed the evidence regarding public opinion (mostly parental) about collecting measurement information of children in schools. The overviewed evidence suggested that parents favour school-based measurements; however, they also indicated some concerns and standards under which the measurements should be conducted. The reviewed studies concluded that any measurements should be done with professional care in private and respectful custom, parents should receive advanced notice and be able to opt-out, and staff should attempt to minimise any weight-related teasing (Nihiser et al., 2007).

Two additional studies conducted in Ohio also mentioned by Nihiser et al. (2007) are especially relevant here. The first found that out of 117 parents, 80% agreed that school is an appropriate setting for weight measurement (Murphy & Polivka, 2007). In the second study conducted by Murnan et al. (2006), 344 parents were asked to rate 37 different actions that the school should be responsible for, in their opinion. Concerning the NCMP, Murnan et al. (2006) asked about the importance of the school measuring each child's weight and height. In this case, 15.5% of parents felt that it was very important, and 27.3% found it unimportant (Murnan et al., 2006). The articles by Nihiser et al. (2007), Murphy & Polivka (2007), and Murnan et al. (2006) provide some initial evidence about public opinion on weight measurement in schools; however, they do not focus extensively on the topic. In addition, the samples are not representative and mostly from a few selected schools which may result in bias.

Johnson et al. (2009) assessed parents' reactions towards school-based BMI screening programmes. The authors conducted a BMI screening procedure at a school in Florida and recruited 296 parents and their children into the screening. Children had their weight and height taken by school nurses, and parents received a letter with the results shortly after the screening. From the overall sample of parents, semi-structured interviews about reactions towards the programme were conducted with 219 parents (74% response rate) – parents who had children in the underweight group were more likely to participate. From the sample of parents who agreed to participate in the interview, 53 had children in the overweight category, 52 in the "at-risk" category, 51 in the normal weight category, and 63 in the underweight category (Table 2 in Johnson et al., 2009). According to the authors, most parents were "*mothers, Caucasian, married, had some college education, and averaged 40 years of age"* (Johnson et al., 2009, p. 218). Also, 40.4% of parents were living with obesity, 34% overweight, 25.5% normal weight, and 0 underweight. The results indicated that 66% of parents were happy BMI screening in schools during the interview. Compared to Caucasian parents, ethnic minority parents preferred BMI screening in school (84.9% vs 56.0%). These provide additional information about BMI screening in school settings. Specifically, most parents are not against it, and there is also the possibility of parents from ethnic minorities favouring these programmes. However, the research was observational; therefore, the conclusions are limited. Furthermore, the split between the weight groups seems unusual given the prevalence of each group in the population.

In the UK, Mooney et al. (2010) conducted a small-scale study on the implementation of the NCMP programme in 2008/2009 in four PCTs. The full study sample consists of 616 parents who responded to a survey. I will explore the follow-up interviews with 49 parents (7.95%) from the initial survey for the current section as only this section explored parental opinions about the views on the programme. When these parents were interviewed about whether children should be weighed and measured in schools, only 1 out of 49 parents disagreed (Mooney et al., 2010). Furthermore, 44 parents (90%) indicated that they would be willing to let their child measure again (Mooney et al., 2010). While the authors do not provide further information on this topic, most parents seemed fine with their children being measured in a school setting. The problem with studies such as this one is that the sample is voluntary based, and participants who were presented with this question were likely those who were more willing to cooperate with researchers. Hence, this study cannot be extrapolated to the experience of parents who were not willing to participate in the interviews for some reason or another.

There are other methods to explore parents' opinions about similar programmes. Kovacs et al. (2018) explored parents' opinions about the NCMP on UK-based online discussion forums. The authors have previewed threads from 2010 to 2017 across two major online fora for parents: mumsnet.co.uk and netmums.co.uk. The authors focused on threads mentioning the NCMP, and via thematic content analysis, identified three key themes (coded by the first author). These themes were: "Sources of legitimate feedback", "Intrusion versus intervention", and "Weight obsession versus weight discussion" (Table 2 in Kovacs et al., 2018). I will focus on the second theme – "Sources of legitimate feedback" for this section, which is the most relevant section here. As observed by the authors, participants who engaged in the discussion shared some dissatisfaction with the government's idea of measuring weight and heights in schools in the UK. This theme has focused on a more general level. The first of two of the sub-themes was "Nanny state", and the typical commenters were expressing the following: *"The government can mind its own business", "I'm not comfortable with the excuse of Government statistics",* or *"If I was concerned, I would take them straight to the doctor"* (Kovacs et al., 2018, p. 7). These referred to the perception that the NCMP is unwanted and unnecessary state intrusion, and the theme's name "Nanny state" is a critique that has been mentioned in previous sections as part of the libertarian ideology. The second sub-theme identified by the authors was "Evidence based policy ...how can that be wrong?", the commenters were stating, for example, this: "*If we didn't have the childhood measurement programme, we wouldn't know that children, (…) were getting heavier.*", or *"if bigger children aren't measured it skews the population norms"* (Kovacs et al., 2018, p. 7). As opposed to the first sub-theme, the second sub-theme is made of comments that provide arguments for the defence of the NCMP as a government policy. Interestingly, both sub-themes and the main theme were mostly active threads before the measurement started in each Local Authority. This article provides a unique perspective to what parents discuss as peer-to-peer. However, similar research is limited by the anonymity of internet fora. There is for example no guarantee that the person from the discussion is who they proclaim to be. Furthermore, the user base of these fora may not represent the population adequately enough.

Finally, tracking the implementation phase of the NCMP, Shucksmith et al. (2008) published a report for the UK Department of Health. As part of their report, they have assessed the views of various stakeholders engaged in the NCMP, for example, PCTs, parents, and healthcare professionals. In one of the stages of the research, the authors conducted several focus groups and recruited 29 parents of Reception years children, 24 parents of Year 6 children, and then 28 Year 6 children across four geographical areas. Most parents were white British nationals and had vocational qualifications. The authors reviewed information about the content of feedback letters, guidance on the provided information, what follow-up information to provide, and overall preferences of parents about weight monitoring. The last topic of the focus group is what is especially relevant for this section. First though, from the perspective of parents, the majority who discussed the topic as part of the focus groups thought the measurements were a good initiative and supported them. However, few parents also declined to participate in the measurements, and those provide a unique insight into challenges parents may face with the NCMP. These parents often had their own experience with such measurements. For example, one parent (father) stated, "*The reason I objected to letting my daughter get weighed was that I didn't want the other kids to pick on her…* "(…) "…*my daughter was always being picked on and the other children would call her 'fatty…'*" (Shucksmith et al., 2008, p. 43). Another parent (mother)

voiced the following: *"My lass didn't want to be weighted… she cried for a week… She's a big lass and she said 'everyone will pick on me if I get weighed"* (Shucksmith et al., 2008, p. 43). Additionally, her daughter has voiced her worry over the teacher, saying: "*fattest person in the class was … me*" (Shucksmith et al., 2008, p. 43). The authors also interviewed a group of children about the results they have been given. However, the interviews did not focus on the procedure of the NCMP itself. For example, in terms of results, children voiced their worries about the use of the word "obesity", with some not knowing what it meant: "*Don't like the word obese; it sounds like 'a beast' [Yr6-15] [others agreed]."* (Shucksmith et al., 2008, p. 54). Children also had preference over metric systems, did not know what the BMI stands for, and did not like if there was too much information on the letter (Shucksmith et al., 2008).

These studies all show that most parents support weight measurement schemes at schools; however, some parents have voiced reasons (e.g., children's wellbeing, their experience, weight stigma) that may have a significant impact on those who belong to weight stigmatised groups or other marginalised groups. Nevertheless, parents generally are fine with their children being measured in schools.

1.5.2 Parent's Attitudes towards Weight Letters

Finally, this brings us to the question of what happens when a family (parents) receives information from a screening programme about their children's weight. The present section explores parents' attitudes in the UK and outside with regards to what is known as the NCMP results' letters, BMI reports, or other forms of weight-based feedback.

1.5.2.1 Attitudes in countries outside the UK

In the US, screening at schools was introduced in 2003, and the first state was Arkansas. More than a decade afterwards, more states introduced the screening and feedback to parents – with 11 states offering screening and feedback in 2015, and 25 states in 2018, of which 12 provided results back to parents as so-called "BMI reports" (Gee, 2015; Ruggieri & Bass, 2015; Ruggieri et al., 2018).

In 2014, Moyer et al. (2014) explored parental attitudes towards the BMI reports in the state of Massachusetts (MA) in terms of their readability and parental responses to it. Study participants were parents of children living with obesity aged 8 – 14 years and participated in the lifestyle management programme. The participants were invited to focus groups (while being in the lifestyle management programme), which included 29 participants (83% female, average age 41 years, 65% of Hispanic ethnicity). The letters used in the study have similarities with the NCMP; they include split to BMI categories, height, weight, and BMI percentile with short text accompanied. In terms of the results, researchers have identified several topics with distinctive themes. In the topic concerning reactions towards the letters, the themes that have emerged were: 1) the letter did not provide new information; 2) the letter was acceptable and could be helpful; and 3) the validity of BMI as a measure of children's overweight was questionable (Moyer et al., 2014, p. 212). Participants were also split between seeing the letter as acceptable (n = 8) and seeing the letters as potentially harmful (n = 11). For example, one participant in the "positive" group indicated: *"'This is very positive, and I think everybody should get [the letter] and get screened . . ."* while a participant in the "negative" group said: *"It really should be coming from a physician and not a nurse from a school."* (Table 4 in Moyer et al., 2014). Also, the parents did not receive the letters in envelopes; therefore, children could see the results,

which were seen unfavourably by some of the parents. Other topics that have been explored by the researchers concerned "*Understanding of the BMI letter", "Reactions towards BMI screening in schools" "Patient–provider weight communication", "Participants' emotional reactions to their child's weight",* and *"Recommendations for discussing weight"*. To summarise these, parents often questioned BMI validity, and information in the letters; however, some felt it is helpful for comparison with other children. Other parents had trouble understanding the BMI centile scales and interpreting them appropriately. Parents also did not like words such as "obesity", as they had themselves negatively experienced this word. Finally, parents felt various emotions associated with the whole programme and weight-related issues. These were mostly negative and concerned emotions such as: "*Concern, Guilt, Fear, Upset, Rationalization, Scepticism, and Acceptance"* (Table 7 in Moyer et al., 2014). This finding emerged although researchers were not specifically focused on emotional reactions. For example, one parent stated (Upset*): "I hate [the word obese], I do.*", while another said (Guilt): "*Did I do enough? You beat yourself up and the kids notice that too."* (Table 7 in Moyer et al., 2014). Overall, this study provides valuable findings of parental attitudes, emotions, and overall reactions towards BMI screening programmes, especially the feedback letters or reports. The study is best interpreted in the context of the particular state; however, the letters and some of the procedures are similar to the NCMP. The drawback of similar research studies is that they do not explore the further journey from the point of receiving the letter. The sample in the study was not as diverse and cross-sectional, and researchers relied on convenient sampling.

Thompson, Linchey and Madsen (2015) focused specifically on the feedback letters in the sample of 79 participants (97% female, 53% high school diploma, recruited from most diverse and low-income schools) who took part in semi-structured focus groups (60 – 90 minutes; an average of 9 parents per group). The authors have aimed to review preferred language in the letters, opinions about the BMI, behaviour change recommendations in the letters, and formatting. The results from focus groups indicated that parents in the current study "overwhelmingly" wanted to use visual representations of BMI categories (see Figure 1 in Thompson et al., 2015), preferred "at risk of overweight" and "overweight" terms over "overweight" and "obese", and especially parents of African American and Latino ethnicity were perceiving the term "obese" as "ugly", "derogatory", and "traumatizing" towards their children (Thompson et al., 2015, p. 2). As with Moyer et al. (2014), parents were aware of much of the information on the BMI reports; however, they have stated that they would appreciate suggestions for actions to improve the health of children and the whole family with a preference for visual infographics over text. Finally, parents favoured brief reports with more graphical elements (Thompson et al., 2015). In summary, the study proposes several critical elements to the BMI reports, such as visual guides, sensitive language, and health recommendations. Therefore, the study is limited to more functional letter elements and parents' reactions or expectations of these elements rather than overall parental acceptance of the feedback. Thompson et al. (2015) also present suggested reports; however, these elements do not guarantee that parents will be more likely to follow the advice or opt-in for service.

Finally, Faircloth (2019) provides more recent evidence which focuses on what terms parents prefer during a discussion of childhood weight. The authors surveyed 349 parents of children aged 3 – 17 years (47.3% females, 11.5% living with obesity), which explored parental attitudes towards weight-related terminology, degree of offensives, motivation for change, and preferred setting to discuss weight. The survey used a Likert scale to assess

parental attitudes on the topics mentioned above, and data were collected during paediatric and adolescent's clinic visits. The results of the survey showed that the three least offensive terms were "at-risk weight", "BMI is above 95%", and "BMI is high", while the three most offensive terms were "overweight", "obese", and "fat" rated on a scale from 0 to 4 ("not at all offensive to "extremely offensive") (Figure 1 in Faircloth et al., 2019). Furthermore, while the least offensive term was considered offensive in 6.12% of cases, the most offensive term was found offensive in 32.4% of cases. In terms of the terms that were perceived as motivating (i.e., scored as −2; "*would not change*" to +2; "*extremely likely to change*"), the term "obese" was perhaps surprisingly the most motivating term, followed by the second most motivating term "unhealthy weight" (Faircloth et al., 2019, p. 3). These results provide evidence into parents' most and least preferred weight-related language. The authors conclude that preferred terms should be used with motivational interviewing; however, they do not give any guidance with regards to whether any of these terms should be used in a letter or not, and they did not explore settings outside routine, acute, or well visits (Faircloth et al., 2019).

Unfortunately, the further context of weight stigma does not have a strong presence in Faircloth et al. (2019) study. For example, the authors conclude that the term selected by the providers should also be balanced with the motivational value of the term, which implies that the term "obese" might be at times appropriate to use as it was the most motivating term. However, the motivation should arguably be balanced by perceived urgency (or threat) and the term's offensiveness. Similarly, they also recommend linking excess weight with health risks (Faircloth et al., 2019). Given the evidence regarding weight talk and weight stigma, and since other terms such as "BMI is very high" were still perceived by many parents as motivating, there is no reason to use the most threatening term and favour fear appeals that might highlight the sense of urgency. The study did not measure parents' self-efficacy, and the chance is that if they do not think they can change children's weight, then the most threatening terms are ignored.

These studies provide overall evidence of how parents perceive programmes similar to the NCMP outside the UK. Next, I will explore parental attitudes towards NCMP.

1.5.2.2 Attitudes towards the NCMP in England

The routine letter (or feedback) to parents or carers has received substantial media and public attention. However, whilst the overall reaction of caregivers towards letters is relatively positive (Henderson et al., 2015; Statham et al., 2011), evidence shows that the routine parental feedback infuriates parents of children classed with overweight or very overweight by the NCMP; ignore the results, or perceive it as unhelpful (Falconer, Park, Croker, Skow, Black, Saxena, Kessel, Karlsen, Morris, Viner & Kinra, 2014; Gainsbury & Dowling, 2018; Gillison et al., 2014; Nnyanzi et al., 2016).

There have also been instances of national media referring to the NCMP letters as "fat letters" and labelling them as "crude and unhelpful" (BBC, 2015), including unfavourable opinions from parents. However, it is perhaps surprising how little similar attention is given, both in media and research practice, to children with underweight status despite equally serious health, emotional, and social consequences of low body weight (Pearce et al., 2016).

Additionally, evidence suggests that although a third of parents of children with overweight and obesity statuses initially have an intention to follow-up the feedback and make changes,

when contacted in a follow-up, most usually report that they had not made any such attempts. Therefore intentions often do not translate into an actual behaviour change that would improve the health of their children (Falconer, Park, Croker, Skow, Black, Saxena, Kessel, Karlsen, Morris, Viner & Kinra, 2014; Mooney et al., 2010).

Furthermore, critics of the current practice argue that without external help, parents may not be able to effectively achieve the healthy weight status with their children by themselves and that external follow-up with child weight management service is essential to the effectiveness of the NCMP (Lloyd, 2015).

Syrad et al. (2014) reported that parents of children with overweight status fail to take the NCMP feedback seriously because they believe it does not account for the child's individuality, and parents view the child's weight as less important than health and happiness. This means that the feedback is not useful to parents of children with overweight, obesity, and possibly also underweight statuses.

In the following paragraphs, I review this evidence in closer detail and present the parental attitudes towards the NCMP. Previously, I presented evidence from reports by Shucksmith et al. (2008) and Mooney et al. (2010) regarding the public's attitudes towards BMI monitoring in schools setting. However, both reports also provide valuable evidence regarding parental opinions about the letters.

In Shucksmith et al. (2008), parents had to specifically ask for the feedback. Of the 29 parents involved in focus groups, parents who did not request any feedback stated that they had no concerns about their children's weight; alternatively, children themselves may have been the reasons, as one parent stated that their child asked them not to do this. However, most parents expected to receive feedback by default if the results indicated any concerns. Parents also voiced a strong opinion favouring receiving the results via post and avoiding giving the results directly to children. Similarly to studies in the USA, parents in the UK were also strongly against the term "obese". Parents reviewed three forms of letters – with height and weight only, with BMI, and with traffic lights visualisations. These produced number of responses, most of which favoured short and brief versions; however, parents were divisive over some versions (traffic light), which were perceived as too "in your face" by one group of parents but "easy to read" by other parents (Shucksmith et al., 2008).

In Mooney et al. (2010), the authors have surveyed 611 parents and collected comments made by parents regarding their reactions to the letters. The authors have focused on how parents reacted to receiving the letter, whether they agreed with the results, had any prior concerns, found the information in letters and attached leaflet useful, and planned any behaviour changes. When parents received the letters, 87.2% of them have agreed with the results, most of the parents who disagreed received a letter with Underweight (only 14.3% agreed out of 7 parents), and Very Overweight (51.5% agreed out of 33 parents) results. While the numbers of these groups were slow, the percentage of parent's who agreed were very different compared to 97.4% of parents who agreed in the healthy weight category (n = 506). For example, one parent who disagreed stated: "*My child has been told by three different consultants that he is not overweight for his height. I think you need to consider the rate each child grows at! (Very Overweight)"* (Mooney et al., 2010, p. 21). Regarding parental reactions towards the letters, the authors asked how "helpful" the information was. There was, again, a clear difference across weight categories, while parents of children with Underweight (n = 7), Overweight (n = 68), and Very Overweight (n = 33) status thought that the letters were unhelpful with a range of 11.8% to 14.3%, the parents of children (n = 505)

with healthy weight thought so only in 2.8% (Mooney et al., 2010). Furthermore, parents receiving overweight status results thought it was very unhelpful in 14.7% cases, and parents with very overweight thought so in 6.1% cases. In terms of comments, the participants stated, for example, the following: *I really can't tell you how helpful it is. Well done! (Healthy Weight),* or *"Really, really bad, disappointed, shocked and not doing my job properly as a mother. (Very Overweight)"* while the authors indicated that very few parents with results outside healthy weight results made positive comments (Mooney et al., 2010, pp. 23–24). Similar differences were also seen in terms of how much parents were (dis)satisfied with the letter's information. While parents of children with healthy weight status were not satisfied only in 1%, other results ranged from 25.0% (very overweight) to 31.3% (overweight) of "not satisfied". For example, one parent stated: "*I heard a wail...she says „I could die of diabetes". It took days to get her calmed down. (Very Overweight)"* (Mooney et al., 2010, p. 26). Finally, the authors also asked if parents planned to change anything or do any actions regarding their children's behaviour; 56.1% who received overweight said that they do, 89.7% in very overweight, and 85.0% in underweight results. In summary, while these feedback letters are received relatively well by most parents, most of these parents receive results stating that their child is in the "healthy weight" range, while parents with different results share much more mixed views of the NCMP letters. This report remains one of the most comprehensive of its kind regarding the evidence on such letters; however, it was published when PCT managed the NCMP, and now, the NCMP is managed by LAs.

The fact from the above evidence showed that most parents with children who received an overweight letter have negative reactions towards being informed about this. These reactions were further explored in research by Gillison, Beck and Lewitt (2014). The authors have surveyed 313 eligible parents from the NCMP cohort, of which only 14% (n = 45) responded to the survey. Of parents who agreed to be surveyed, 53% agreed with the survey results if they received either overweight or very overweight results. Nonetheless, parents expressed several issues with regard to the NCMP result letter. These can be split into two major categories, with one labelled as "*Lack of belief in judgement*", and the other as *"Belief that the judgement is unwarranted"* (Table 2 in Gillison et al., 2014). In the former, parents often quoted examples such as that children are naturally large, go through puberty, BMI is an invalid measure, the measure is only isolated, or the child is normal compared to other peers. In the latter, parents expressed that they believe telling children that they have overweight is harmful, that the NCMP does not account for the overall lifestyle, that child will naturally grow out of this, or that weight is not related to overall health. These instances provide important evidence of why parents do not agree with the results in the NCMP letters. A limitation of this study was primarily the low response rate of 14%. This may suggest that dissatisfaction is significantly different amongst those willing to respond than those who declined participation.

The other issue mentioned is parental passivity after receiving the feedback. As indicated in Mooney et al. (2010), many parents do not take any action after receiving the NCMP result. Falconer et al. (2014) examined this topic with a pre-post survey of 1844 parents of children in the Reception year and Year 6. The study result shows that the impact of feedback increased general recognition of a child's overweight status from 21.9% to 37.7%; however, when considered specific adjustment at baseline versus follow-up to lifestyle behaviour and sugary beverage consumption, the changes were negligible. Thus, the authors conclude that the impact of the feedback is minor; though, they also state that this

is without obvious unfavourable consequences. Considering the studies above, this seems an overly positive claim given the comments made by some parents who received overweight, very overweight or underweight results.

Nnyanzi et al. (2016) conducted one to one interviews with parents of children with overweight after they had received the NCMP letter to provide further insights regarding parental response. They explored reactions and described the behaviours as a staged process that parents take after receiving the letter informing them that their child is overweight. Nnyanzi et al. (2016) interviewed 16 parents (female = 13, low SES = 8) and described a range of behaviours from being shocked, denying the results, to fear or help-seeking (Figure 3 in Nnyanzi et al., 2016). These behaviours occur and vary across five stages for parents who received an overweight letter. In Stage 1, after receiving the letter, the common reaction is being shocked or disgusted. This results in various behaviours; however, some parents noted that they had destroyed the letter, hid it, or otherwise got rid of it (Nnyanzi et al., 2016). This eventually goes to Stage 2, in which parents may go through behaviours such as denial, or realisation (in which case they may neglect or ignore the letter), Stage 3, which according to Nnyanzi et al. is typical by acceptance and self-blame (where parents discuss the results with family and friends), Stage 4 characterised by fear, worry, or panic in which paren may go back to any of the previous stages. In some instances, Stage 4 can also lead to Stage 5, which Nnyanzi et al. (2016). describe as help-seeking, in which case parents may contact GPs or services. However, it is not clear how many parents may go through all stages and whether any reach the last stage; only a small number seek help. The study provides further insight into the process of receiving what could be labelled as a “bad news” letter and some explanation of how parents react to the news.

The studies above paint a relatively stark picture for some parents of children who receive overweight and very overweight letters. Therefore, it is also worth mentioning the only attempt so far to modify the letters as part of RCTs by Sallis et al. (2019). Unfortunately, the authors did not attempt to change the overall reactions of the parents towards these letters; however, if the letters proved to provide a significantly better experience, then perhaps the uptake into services would increase as well as the main aim of the authors was to see a change in uptake. Sallis et al. conducted the intervention with 2642 children who were to receive overweight or very overweight letters in 2015 (after PCT ceased to operate) and aimed to increase the service uptake through modifying the letter. The modifications included offering visual changes that help recognise childhood weight status, including nudging and social norm statements, and finally, by having parents booked in the services by default opt-in if they received overweight or very overweight statuses in the letters. Through these changes, the authors achieved small effects on service uptakes. Specifically, in the intervention group, 4.33% of parents indicated that they would enrol their children compared to 2.19% in the control group. The actual contact with the services was similar (4.80% intervention group and 2.41% control group). The authors concluded that the letter, which includes aspects of nudging and is informed by theory, provides better performance than the control letter; however, the study did not attempt to explore parental reactions, and while the difference was significant, the effect that was measured was rather small. Parents may also seek help in other resources outside the conventional lifestyle service, or perhaps they may not seek help if they are offended by the letters.

1.6 The Development of the NCMP in England

The present section will describe the sources documenting the history and development of the NCMP. In addition, the section aims to portray the origins and evolution of the NCMP up to the current state. Finally, this section also introduces some of the key research that challenged the NCMP during its development.

The NCMP went through multiple changes. However, these changes were often viewed as uncoordinated, inconsistent, and systematically criticised (Godson, 2009; Lake, 2009; Nnyanzi, 2012). This section presented the changes in chronological order and grouped them as per major developments in the NCMP. At times, these developments were part of wider changes regarding public health policies in England and had a major impact on shaping the operation of the NCMP (for example, determining whether parents receive feedback with results).

Four developments "eras" are described below:

1. Pre – NCMP era: up to 2005
2. The NCMP: 2005 – 2007
3. The NCMP: 2007 – 2011
4. The NCMP: 2011 – the current project

1.6.1 Pre – NCMP Era up to 2005

Since the 20th century, the UK has aimed to determine which children and infants may need further health care (Blair & Isaacs, 2003). In other words, children were under medical surveillance or screening; these terms need at least a basic definition.

Medical surveillance (or medical monitoring) is broader than medical screening. It refers to collecting and analysing health information to identify areas that may benefit from prevention (for example, a workplace or an educational setting). In contrast, medical screening aims to identify individuals with an increased probability of certain diseases before seeking medical care (Geoghegan et al., 2015; Wilken et al., 2012).

Before the NCMP, England was collecting data on childhood overweight and obesity through the National Study of Health and Growth (NSHG); this was in the period between 1974 to 1994; from 1995, the data were collected as part of the Health Survey for England (HSE), which is a survey that is still in operation (NHS Digital, 2016; Parliamentary Office of Science and Technology, 2003; UCL, 2017). Therefore, until at least 2005, the most representative source of childhood overweight and obesity data was the HSE (Lake, 2009; Lobstein et al., 2003). The programmes mentioned above fall into the category of medical surveillance or monitoring, and they fit the definition stated above as they "simply" provided data on the prevalence of childhood overweight and obesity; they did not take any actions on an individual level (Evans & Colls, 2009; Geoghegan et al., 2015).

Because these programmes aimed to provide data on a national or at best a regional level, they could not be tracked at a lower level, such as to individual data (Department of Health & Social Care, 2006). However, various authors (e.g., Westwood et al., 2007) argued in support of such a level of surveillance and claimed it to be sufficient in the context of England. Nevertheless, the Government's strategy was about to change with a pro-action oriented approach to childhood obesity (Ulijaszek & Mclennan, 2016).

1.6.2 The NCMP: 2005 – 2007

In 2004, the British Government had increasing concerns about the rise in prevalence of childhood overweight and obesity (Lake, 2009; National Audit Office Health Care Commission and Audit Commission, 2006; Westwood et al., 2007). The situation of 2004 is best described by the Public Service Agreement (PSA) target that stated the aim "To halt, by 2010, the year-on-year increase in obesity among children under 11 in context of a broader strategy to tackle obesity in the population as a whole"; (National Audit Office Health Care Commission and Audit Commission, 2006, p. 9).

Additionally, reports discussed by the House of Commons in 2003–04 showed clear intentions to take actions, as reflected in the following statement: "We recommend that throughout their time at school, children should have their Body Mass Index measured annually at school, (…) The results should be sent home in confidence to their parents, together with, (…) advice on lifestyle, follow-up, and referral to more specialised services." (House of Commons Health Committee, 2004, p. 95). As this statement showed, the aim was to develop a screening programme that would track childhood obesity and report the results back to parents. Nevertheless, such statements, however decisive they sounded, did not reflect the standard requirements placed on screening programmes. This was reflected in at least two key critical perspectives.

One line of critique reflected the fact that it is not possible to justify screening individual children without effective childhood obesity interventions, and as of 2005, there was a lack of evidence for such interventions (Westwood et al., 2007). To the same conclusion led the Child Growth Foundation seminar in 2000 when its attendees shared consensus that childhood screening for obesity cannot be recommended due to a lack of effective interventions (Blair & Isaacs, 2003). Essentially, it would be unethical to inform parents that their children have overweight or obesity, but not offer services providing evidence-based interventions where children could be referred. Thus, causing a situation where parents and carers cannot take any steps if they wished to do anything with their information.

A different critical perspective was, and still can be, represented through the UK National Screening Committee (the UK NSC) evidence review criteria which required provision of evidence from Randomised Control Trial (RCT) study about the screening procedure's effectivity to reduce mortality or morbidity of the disease to establish the procedure in practice (Evans & Colls, 2009; Lake, 2009). This particular issue was especially relevant in the context of providing parental letters. By definition, a screening programme takes action on an individual level, and sending routine letters to parents or carers would be such action. However, as of 2006, the UK NSC concluded that such action's potential benefit would not outweigh the harm (Evans & Colls, 2009). Interestingly, as of December 2018, the UK NSC stated that it "does not recommend screening for obesity in children" with the next review is due to start in 2021/22 (UK NSC, 2018, p. 8).

Nonetheless, the NCMP was developed in 2005 (NHS Digital, 2007) by the Department of Health, and the first roll of the programme started in the school year 2006/2007 (Nnyanzi, 2012; Pearce et al., 2016). Importantly, in light of the critique mentioned above, the British Government stated that the purpose of the NCMP was general population surveillance providing data at the local or regional level. Parents were not supposed to receive any feedback, unless they specifically requested it, and perhaps most importantly, that the NCMP was to be implemented not as a screening programme but a monitoring (or

surveillance) programme (Evans & Colls, 2009; Lake, 2009; Nnyanzi, 2012). The statement was reflected in the first NCMP guidelines provided to Primary Care Trusts (PCTs) who received the mandate to manage the NCMP (Department of Health & Social Care, 2006). The proclamation that the programme was not an obesity screening tool meant in a practical sense that the British Government could effectively fend off the recommendation standards set up by the UK NSC. However, the first run of the NCMP in 2006/2007 was not without additional problems. The major issues are reflected in the following paragraphs.

In his doctoral thesis, Nnyanzi (2012) summarises the evidence that the programme reported misleading statistics, exposed children to the risk of further victimisation, and did not guarantee confidentiality. Last, parents generally misunderstood the programme's purpose, which coincided with misaligned expectations about its outcomes. Additional evidence by Nnyanzi reflects feelings of children about the NCMP, best summarised in the following quote: “Many children feel anxious, nervous, and worried, yet with no clear understanding of what happens during the actual measurement” (Nnyanzi, 2015, p. 3).

Similarly, as documented by Evans and Colls (2009), there was an expectation from the Department of Health that if children will not be told their BMI’s, the potential risk of stigmatisation will be avoided. The reality was, however, that children were genuinely interested, worried, concerned, and curious about the measurement results; and BMI, in this case, went much beyond a simple numerical value of body mass indication; it embodied a social status among children and emphasized peer competition in already evaluative schools system (Evans & Colls, 2009). These children's reactions illustrate the degree to which the British Government underestimated the value and meaning of BMI for children at the programme's initiation.

Despite these problems, the programme carried on into the upcoming years; however, due to pressure from the Government, and further legislation changes, the programme soon transformed from a monitoring tool into a screening tool; despite recommendations set up by the UK NSC and other critiques (Lake, 2009; Nnyanzi, 2012).

1.6.3 The NCMP: 2007 – 2011

As of 2008 – 2009 (NHS Digital, 2008), the feedback was provided to parents or carers about their child's results in the NCMP (Falconer et al., 2012; Lake, 2009). This can be illustrated by a change of sentence in the 2007 – 2008 report from “The programme also seeks to engage with parents about the importance of healthy weight in children” (NHS Digital, 2008, p. 6), to the version appearing in 2008 – 2009, “The programme also engages with parents about the importance of healthy weight in children, since their children’s results are shared with them” (NHS Digital, 2009, p. 8). In other words, the programme expanded its aims from a national monitoring programme providing data about the prevalence for local government planning to a screening programme with aims to raise parents’ or carers’ awareness of the health risks associated with “non-healthy” BMI and allow parents or carers to seek advice and support (Falconer et al., 2012; Jebb et al., 2013; Public Health England, 2017).

Above, I discussed that the NCMP began as a monitoring programme introduced in the school year 2006/2007. As a monitoring programme “only”, this permitted the NCMP to start without holding up to the UK NSC standards; in fact, the PCTs were initially “discouraged” from sending out letters with feedback to parents (Evans & Colls, 2009). The fact that the NCMP transformed into a screening programme two years from its start was a controversial

decision. The following paragraphs discuss the rationale behind this change and the critical perspectives of various authors.

Lake (2009) and Nnyanzi (2012) stated that since 2004, the Department of Health was under pressure from a House of Commons Committee to change the programme and include delivery of universal feedback to parents or carers. This proposal first came in 2004 but was not supported by the Department of Health Expert Committee (Lake, 2009). Despite this, in 2007 legislative changes to the NCMP (i.e., as part of the Social Care Bill clause) were announced by the Department of Health. These changes resulted in the delivery of routine feedback to parents or carers since 2008/2009; even though the Government stated its firm belief in the usefulness of such an approach, no statement about further aims was presented to support this decision (ibid).

The British Government had a “strong belief” that parents would welcome feedback about their children’s weight (Department of Health & Social Care, 2007). It was assumed that providing the feedback may increase parents' awareness about their child’s weight, which in turn may promote dietary restrictions by parents. However, there was a degree of uncertainty whether this would happen due to the multifactorial nature of obesity (Mooney et al., 2010).

Several studies were carried out to assess what to expect from the feedback, three of them are mentioned here, and these studies play an important role in later chapters. Among the first were Grimmett et al. (2008), who examined the psychological impact of the NCMP feedback. They surveyed 358 children and 287 parents 6 weeks before and 4 weeks after the feedback (ibid). The authors concluded that parents did find the feedback acceptable in an opt-in situation; however, this was concerning in the context of other findings where parents of girls with overweight status introduced dietary restrictions. Additionally, the feedback resulted in negligible effects on parents’ perceptions of a child’s weight, and most of the positive effects were found primarily among children categorised with a healthy weight (Grimmett et al., 2008).

Shucksmith et al. (2008) was another piece of evidence providing a critical perspective regarding the use of parents’ feedback. Their report was structured into multiple stages; however, I am focusing only on the stage relevant to parental perception regarding the feedback. They carried out a series of interviews and questionnaires with relevant stakeholders engaged in the NCMP, such as parents, children, PCTs, and academics. Twenty-nine parents of Reception year children, 24 parents of Year 6 children, and 28 Year 6 children were interviewed about the feedback letters. The report's overall findings concluded that parents were keen to have some form of feedback about their children. At the same time, there were mixed opinions regarding the wording of the feedback letter. While almost all parents did not approve of the term obesity, there were various views towards the term overweight, especially as some parents had trouble understanding what it meant. Parents also did not agree on sharing any of these terms with their children. Some parents also expressed concerns regarding the emotional, psychological, and social impact of the feedback letters on children (e.g., bullying in class). These opinions seemed more common for parents of children with overweight status than any other parents. While the review provides a good summary of parental opinions, it is difficult to establish the report's practical implication as there was a wide variety of individual views. Shucksmith et al. (2008) did not provide enough detail about the perceptions of subgroups of parents, other than a level of education, and perceived parents as a relatively homogenous group.

Finally, Mooney et al. (2010) conducted a survey recruiting 616 parents, from which they conducted 49 follow up telephone interviews. Importantly, their interviews focused on including children across all weight categories and in contrast to Shucksmith et al. (2008), they seem more aware of subgroup differences in the overall sample of parents. Most parents agreed with the results of the letter and found it helpful. However, a pattern emerged concerning parents with children who had overweight status. This group of parents were less satisfied with the letters, were more likely to disagree, shocked and surprised, and found attached material less helpful. Additionally, a very small proportion had followed up the letter with actual behaviour changes among all interviewed parents. Finally, the study was limited by its scale as it focused on only four selected PCTs in England.

While the above studies explored the inclusion of parents' feedback, it is not easy to conclude whether the feedback should be included as a standard part of the letter. Interestingly, there was the practice of similar screening running in Singapore as part of the "Trim and Fit" programme between 1992 and 2007; and parents or carers of children with overweight and obesity reportedly proclaimed their aggravation with having their children "labelled" to the extent that even the Singaporean Government acknowledged that it was stigmatising (Lake, 2009). However, this evidence was not considered during the introduction of the feedback.

Continuous critique towards the ineffectiveness of the NCMP since its beginning also came from Rosalind Godson (Unite/CPHVA). Godson proclaimed that the NCMP was a waste of financial resources given that it does not affect childhood obesity prevalence whatsoever, that it only increases work burden on school nurses, and provides information that could be supplied by national surveillance (Godson, 2009). On the other hand, Jenny Osborne (2009) of Hounslow PCT denounced this critique and labelled it as an unconstructive and pessimistic portrayal of the NCMP, proclaiming that the parental letters, in particular, were a welcome change which will put considerable pressure on PCTs to introduce long-needed changes, and provide parents with vital information. These two perspectives show diverse opinions about the NCMP and a lack of common ground, which could serve for a mutually beneficial discussion. It is also noteworthy that Osborne's views on parental letters reflect those of the British Government, which felt that there was a need to involve parents in the matter of childhood obesity (Shucksmith et al., 2008).

Of concern is the fact that health authorities were reluctant to acknowledge the NCMP as a screening programme, perhaps in an attempt to avoid criticism from many sides; especially since the programme merely identified a "problem" (i.e., labels children) without providing any solution to (Nnyanzi, 2012).

Finally, there are various accounts that the system was understaffed, and the Government had to quickly train more school nurses to balance the fact that there was not much parental support (National Audit Office Health Care Commission and Audit Commission, 2006). Although some parents or carers may attempt to treat their child's obesity, it is not possible if appropriate services are not available (Nihiser et al., 2007). In addition, many schools and PCTs did not have appropriate staff to handle the requirements of the NCMP as presented in the National Audit report conducted in 2006 (National Audit Office Health Care Commission and Audit Commission, 2006).

Despite its rocky beginning, the programme did not stop and was scheduled to run, with further changes planned.

1.6.4 The NCMP: 2011 – The Current Project

In 2010/2011, the Government introduced a new executive body falling under the Department of Health & Social Care called Public Health England (PHE)[4] (Department of Health & Social Care, 2010). PHE was formally introduced in The Government's Public Health White Paper "Healthy Lives, Healthy People: Our Strategy for Public Health in England" in 2010 (ibid). The purpose of PHE was to "…support local innovation, help provide disease control and protection and spread information on the latest innovations from around the world" (ibid, p. 2). PHE was introduced as part of further changes that were about to happen in the upcoming two years, and aside from the aims above, its purpose was also to guide Local Government Authorities (LGAs) in the provision of public health agenda, albeit it blurred what it will mean in practice at the time PHE was introduced (Shapiro & Jones, 2011).

The major change occurred in 2012 when the new Health and Social Care Act moved the responsibility to operate the NCMP from PCTs to LGAs. The new responsibilities meant that LGAs would be responsible for weighing and measuring children at schools and overall management of the NCMP. To be exact, as the statutory instrument published in 2013 states: "Part 3 makes provision for the weighing and measuring of children in attendance at schools under arrangements provided for by local authorities. These weighing and measuring exercises are collectively known as the NCMP (Queen's Printer of Acts of Parliament, 2013, p. 18) and affected 152 LGAs.

Changes in the Health and Social Care Act did not impact only the NCMP but were part of a wider decision to localise public health by moving responsibilities from the NHS (national level) to LGAs who were suited to carry out these tasks (Gorsky et al., 2014). In fact, this change was the reappearance of an idea from the era pre-1974, which was to "return public health home" (ibid, p. 546).

Although introduced in 2012, the Act did not officially take effect until April 2013 (UK Parliament, 2012). Commencing April 2013, LGAs took full responsibility for the Public Health agenda.

This led to two consequences. First, NHS England was given duties regarding responsibilities to reduce health inequalities which were shifted from the Department of Health. Second, LGAs ("upper-tier" and "unitary") were given responsibility regarding the public health agenda (previously held by the NHS) with support from PHE (Middleton, 2017). Simultaneously, PHE set seven key priorities ranging from 2014 to 2016: among them – tackling obesity (ibid). This was in line with a government focus as evidenced by the Healthy Lives, Healthy People report that set an ambitious goal to achieve "a sustained downward trend in the level of excess weight in children" (and adults) by 2020 (Department of Health & Social Care, 2010).

Tackling obesity was, therefore, to remain a key priority even after 2016 and at least until 2020 (Public Health England, 2016a). Furthermore, key action on the national level in 2016/17 was to "enable England to become the first country in the world to significantly reduce childhood obesity, contributing to the delivery of the Government's Childhood Obesity Strategy and the development of the sugary drinks levy" (ibid).

[4] Public Health England was replaced by UK Health Security Agency and Office for Health Improvement and Disparities on 1st October 2021

To support LGAs in their management and delivery of the NCMP, PHE developed NCMP Guidelines, first published 2 May 2014 (Department of Health & Social Care, 2021a). These guidelines resembled the previous guidelines developed by the PCT and covered each step of the NCMP process in Section 1.7 (see below).

The phases of development make the NCMP a key element in the process of achieving these ambitious goals. LGAs were to manage the NCMP, measure and weigh children, send out the feedback letters with results to parents who will, hopefully, see the letters as an incentive to act on and manage their child's weight. The whole process was guided by PHE, which is now part of the Department of Health and Social Care under the Office for Health Promotion (Department of Health & Social Care, 2021b; Iacobucci, 2020). This was also the shape of the NCMP structure at the time of writing this thesis.

1.7 The NCMP Process

The current NCMP is an England-wide programme that operates under the Department of Health and Social Care (DHSC) and was further guided by PHE[5] (NHS Digital, 2013). The NCMP can be roughly separated into four distinctive phases:

1) the pre-measurement phase where parents or carers of children in the Reception year (aged 4 to 5 years) and Year 6 (aged 10 to 11 years) receive information about the upcoming measurement day and have a chance to opt-out their children from being measured;
2) the measurement phase where children of parents or carers have their BMI measured;
3) the routine feedback phase in which LGA or organisation commissioned by LGA send the results from measurement day to parents or carers and their children;
4) the proactive follow-up phase where some or all parents or carers receive additional support regarding their child's results (Public Health England, 2017).

Further context regarding each of the phases is briefly described in more detail below.

1.7.1 Pre-measurement Information

It is legally mandated by the Health and Social Care Act (2012) that parents or carers are informed about the measurement day and have a chance to opt-out of the NCMP (UK Parliament, 2012). Therefore, independent of any local variations to the NCMP across LGAs, there always must be some form of communication about upcoming measurements from LGAs to parents or carers. Furthermore, the information regarding measurements are recommended to be delivered using communication modes close to parents, such as emails if it is the same mode used by local schools (Public Health England, 2017).

1.7.2 Measurements

As part of the measurement phase, children in the Reception year and Year 6 are weighed and measured to compute their BMI (ibid). Legally, the measuring must be conducted "in a room or screened area where information on the measurements is secure and cannot be seen or heard by anyone who is not assisting in the conduct of the exercise or overseeing it" and must be managed by "a registered medical practitioner, a registered nurse or a registered dietitian" (Queen's Printer of Acts of Parliament, 2013, p. 5). LGAs usually

[5] Now under the Office for Health Promotion at the Department of Health and Social Care

conduct the measuring within schools, and in cases where children cannot attend the measurement, an alternative setting is to be arranged (Public Health England, 2017).

1.7.3 Routine (parental) Feedback

Locally, routine feedback is a non-mandatory part of the NCMP managed by LGAs or external organisations commissioned by LGAs and is usually delivered as a standard letter within six weeks after the measurement (Public Health England, 2017). The NCMP routine feedback provides parents or carers with information about their children's BMI and classifies children with underweight, normal weight, overweight, or very overweight[6] statuses (NHS Digital, 2017). Informing parents or carers as part of routine feedback is believed to increase public understanding of childhood weight-related problems, produce behaviour and lifestyle changes, and motivate parents to seek further advice (Falconer, Park, Croker, Skow, Black, Saxena, Kessel, Karlsen, Morris, Viner & Kinra, 2014; NHS Digital, 2017; Nnyanzi et al., 2016; Public Health England, 2017).

1.7.4 Proactive Follow-up

PHE recommends proactively contacting parents or carers of children who have been classed in any other than with healthy weight (Public Health England, 2017). The contact involves offering parents or carers individualised advice and "services to support them to help their child achieve a healthier weight" (ibid, p. 29). The proactive follow-up is often delivered as a phone call by a commissioned service provider or nursing team (ibid).

1.8 Importance of the Current Project for the NCMP

The previous sections provide an overview of how the NCMP was established. They also present some of the research that challenged and reflected on the NCMP. To strengthen the rationale for the current project, the current section of the introduction highlights the core ideas of the thesis. Ultimately, this frames the current research within the wider scientific discourse of the NCMP and align it with past evidence.

The upcoming three paragraphs present the primary ideas of the thesis. These are followed by a section overviewing the research questions and aims that translate these ideas to aims and objectives. Each of the paragraphs below presents a strand of research aimed to address in the thesis.

The importance of exploring the NCMP operation

One of the first acknowledgements in this project was that the NCMP changed dramatically over the years since it was introduced in the school year 2006/2007, as described in the previous Section 1.6. One of the important changes was moving the responsibility to manage the NCMP from the PCTs to LGAs. However, aside from the older studies such as Shucksmith et al. (2008) or Mooney et al. (2010), none seem to focus on the operational process of the NCMP. Additionally, more "recent" studies have been based on the previous PCT system, such as those by Nnynazi et al. (2016). Thus, there is a need to provide updated evidence of how the NCMP works in the current environment. The best way to approach this was to deliver an explorative study to gather evidence across the LGAs. This gained even further urgency with a recently published report from the House of Commons that calls for an urgent need to critically review the NCMP and its delivery (UK Parliament,

[6] The term very overweight also includes obesity (here and elsewhere) and is used in line with the NCMP guidelines.

2021). This thesis helps to bring further evidence to the call made by the House of Commons.

The importance of engaging parents

While the measurement is mandatory for parents, engaging with services is not, which means that it is up to parents to decide whether they follow-up feedback and make behavioural changes based on the NCMP. Evidence suggests that although a third of parents of children with overweight and obesity initially have an intention to follow-up on the routine feedback and make changes, when contacted as part of proactive follow-up, most usually report that they had not made any such attempts. Therefore intentions often do not translate into actual behaviour change that could improve children's health (Falconer, Park, Croker, Skow, Black, Saxena, Kessel, Karlsen, Morris, Viner & Kinra, 2014; Mooney et al., 2010). Additionally, Syrad et al. (2014) reported that parents of children in the overweight range do not take the NCMP feedback seriously because they believe it does not account for the child's individuality, and parents view their children's weight as less important than their health and happiness. This means that the feedback might not be useful to parents of children with overweight and very overweight, but also possibly in the case for parents of children in the underweight range.

The thesis aimed to establish whether modifying the routine feedback letters may improve parental engagement and if these modifications may translate into changes in the parents' behaviours. In this research strand, the focus was placed on improving the routine feedback to make it more relevant to parents of children within the overweight, very overweight, and underweight ranges.

The importance of supportive feedback

Parents of children who live with very overweight frequently report feelings of shock, disgust, or experience self-blame due to receiving the feedback informing them of the measurement results (Gainsbury & Dowling, 2018; Nnyanzi et al., 2016). While studies that attempted to directly change the feedback exist (i.e., letters), no research has focused on the concept of weight stigmatisation within the feedback (Sallis et al., 2019). Therefore, as part of providing supportive feedback letters overall, I also attempted to make the letters more neutral and less weight centred. For example, by avoiding referring to service as "weight-loss camp" because such terms create a negative impression or trigger memories of past negative experiences in parents who have engaged in weight loss programmes (Smith et al., 2014; Turner et al., 2012). Additionally, based on the available evidence, it seemed important to ensure the letters are not medicalising the children's weight as this often had a similar effect on parents (Ames et al., 2020; Chadwick & Croker, 2015; Faircloth et al., 2019; Nnyanzi et al., 2016). For example, parents perceived statements informing them of their children's potential future cardiovascular disease as threatening (Nnyanzi et al., 2016).

1.9 Overview of the research aims and objectives

The overall research aim of the project was ***"to conduct a national, collaborative analysis of the NCMP process with parents, carers, and other stakeholders".***

Specifically, by analysis, it was meant that the NCMP process would be **explored** and **evaluated** with a particular focus on the results letters delivered to parents or carers.

The overall research aim was further extended into the following research aims addressed in each study. First, as stated above, the analysis focused on **exploring** and **evaluating** the NCMP.

With regards to **exploring** the NCMP and the letters, the following two questions guided Study 1:

i. “How is the NCMP delivered across Local Government Authorities in England?”
ii. “What variations among the NCMP result letters produced by Local Government Authorities in England exist?

In terms of **evaluating** the NCMP and the letters, the questions below guided Study 2 and Study 3:

i. “What are the opinions of parents or carers about the NCMP result letters?”
ii. “How can the current NCMP result letters be further improved?”

The overall research aim expanded into three study objectives.

1) The objective of Study 1 was to understand the NCMP result letters to the extent that the knowledge allowed the development of a new version of the letters (discussed in Study 2 chapter). This objective was explorative.
2) The objective of Study 2 was to understand how the new letters perform compared to the letters issued at local authorities from standardised PHE templates.
3) Finally, the objective of Study 3 was to understand how parents perceived standard and experimental letters.

The aims and objectives presented above were inspired by the literature presented in the sections up to this point. Section 1.10 below shows the identified literature gaps around which these aims and objectives were generated. The reader may also want to see section 2.3.1, which discusses generating these research aims and objectives from a methodological perspective. Finally, each chapter with the study (i.e., Chapters 3, 4, and 5) include these aims and objectives at the beginning to ensure that the process can be easily followed.

1.10 Gaps in the Literature

The final section highlights the gaps in the literature that this thesis will address and, in doing so, focuses on what the thesis would contribute. Four fundamental gaps are presented.

The first gap identified in Section 1.5 is the research need to **update the evidence on the NCMP operation**. Previous reports such as Shucksmith et al. (2008) or Mooney et al. (2010) are now dated, and newer studies (e.g., Nnynazi et al. 2016) provide evidence that needs to be updated as they focused on the system operating under PCTs while the current NCMP does operate under LGAs. In addition, a recently published report from the House of Commons also highlighted the urgent need to critically review the NCMP and its delivery (UK Parliament, 2021). Therefore, this thesis aimed to review the operational process of the NCMP across various LGAs and update the evidence.

The second research gap is the lack of studies investigating the **role of language in the NCMP letters and the overall framing of the feedback letters**. Two previous studies discussed in Section 1.4 explored public health campaigns' discourse. The first and probably the most detailed was the analysis of the role of language in public health

messages by Barron (2012). The other example was Mulderrig's (2016) contribution investigating the nudge discourse in England in the context of the C4L campaign. However, no researcher aimed their attention specifically at the feedback letters in the NCMP. Although there is a wealth of evidence informing about negative parental reactions towards the letters, such as those by Falconer et al. (2014) or Nnynazi et al. (2016), no study has examined the language of the letters. The thesis aimed to provide a detailed analysis of the letter corpus via a unique combination of quantitative text analysis and genre analysis and provide evidence to seal the gap.

The third gap is interconnected with the previous as it relates to language. **The past studies did not investigate the existence of systematic weight stigma in the NCMP result letters**. Researchers, for example, Gainsbury & Dowling (2018), Nnyanzi et al. (2016), Falconer et al. (2014), and Gillison et al. (2014), evidenced some of the negative reactions of parents that received the result letter informing their child was not within the healthy weight range. However, no study focused on weight stigma as the contributing source of these parental reactions. This topic was challenging to investigate as it required measurement of weight stigma in the context of letters. To provide the appropriate evidence, I aimed to compare standard letters with letters that did not include parts expected to evoke weight bias, such as the medicalisation of childhood weight.

The last and the fourth fundamental gap in the literature is **the need for evidence of altering and improving the NCMP result letters beyond nudging**. For example, Sallis et al. (2019) focused on enhancing the letters alongside several studies from the USA. However, there is a lack of studies measuring parental user experience, and specifically, the user experience of parents that received the result informing their child was not within the healthy weight range. This research aimed to provide further evidence of how the user experience of parents can be improved.

2 Philosophical and Methodological Foundations

In the current section, I will establish philosophical foundations which drive my research and address the universal philosophical challenges. These will be closely followed by the section regarding methodological foundations where mixed method research is introduced, rationalised, and visualised. This chapter is foundational because it provides the overall philosophical and methodological platform before jumping into Chapters 3, 4, and 5, introducing individual studies, methods, and findings.

Certain assumptions were made to design each study. These assumptions are part of what is known as the philosophy of science which is a field that studies how science and scientists approach what is the nature of reality (ontology) and what is considered valid scientific knowledge (epistemology) (Saunders et al., 2012).

Okasha (2002) distinguishes philosophical challenges which can be applied to any discipline as they are universal (e.g., induction versus deduction, realism vs anti-realism) and challenges that are only applicable to a given discipline (e.g., modularity of mind in psychology).

2.1.1 Scientific Realism and Scientific Anti-Realism

One of the oldest problems that have been studied as part of the philosophy of science is scientific realism and anti-realism (Okasha, 2002). The most common example that separates the two is the old question of "when a tree falls in the forest, and no one can hear or see it, did it really fall"? The anti-realist would claim no (and deem the question as meaningless), but the realist would claim the opposite (and deem it probable) despite not being able to see or hear it (Blackmore, 1979). Generally speaking, scientific anti-realism stands on a viewpoint that the physical world is dependent on conscious human activity and science provides only the description of the observable world. In contrast, the scientific realism claims that science provides a true description of the world, and the physical world is independent of our thoughts about it (Okasha, 2002). Realists, therefore, argue that there is the real world upon which we can draw theories. Realism and anti-realism, as the name suggests, are alternative positions, but there are flavours of anti-realism such as solipsism, which argues there is only oneself, and idealism which claims that there is not anything such as the real world, only ideas that stand in direct opposition to realism (Dienes, 2008).

The discussion between realism and scientific anti-realism is important when considering theoretical underpinning. Theories connect or idealise (depending on the position taken, as discussed in the paragraphs above) the world we aim to observe and explain as scientists. According to realists, science aims to use theories to describe the observable and unobservable world; according to anti-realists, there is no such thing as the unobservable world, only what can be observed, and theories are "mere scaffolding" which can be discarded once findings have been confirmed with experiments (Chalmers, 2013). While realists would argue that the truth is also a theory, anti-realists would accept theories only as mere idealisation and, at most, the best attempt to predict the truth (Chalmers, 2013). The latter stance is also known as instrumentalism because it describes theories only by their value to predict the truth; however, once the truth can be observed, theories are useless (Chalmers, 2013; Okasha, 2002). This latter stance – instrumentalism is what I mean by scientific anti-realism. Furthermore, the word scientific means I wish to discuss realism and anti-realism approaches in the domain of science, not in the domain of scientific search, as opposed to other domains, such as morality or spirituality.

These two viewpoints are still debated in the philosophy of science (Chalmers, 2013; Dienes, 2008). Realists argue that theories are valuable for their ability to predict the existence of phenomena; however, the anti-realists object that the past theories had this ability as well but would not be accepted as truthful from the modern scientific viewpoint (Chalmers, 2013). Such a theory could be Newton's theory which had predictive power; yet, it was later replaced by Einstein's theory of relativity (Chalmers, 2013). Anti-realists do not see theories as attempts to approximate truth, and they are simply instruments of prediction (Dienes, 2008). Karl Popper, a well-known realist and philosopher of science, disagreed with this and argued that theories are attempts to approximate truth, but that does not mean that these approximations and the real world are alike; they (hopefully) in the long run bring us close to the description of the real world (Popper, 1999).

Furthermore, according to realists, no theory could simply happen by chance, i.e. by a miracle (hence known as the no miracle argument); therefore, they must have been at least approximately true (Okasha, 2002). Anti-realists denounce this. Going back to Newton's versus Einstein theory, the issue was not simply that one was an approximate truth and the other more approximate to the truth, but that while one is true, the other is false (Worrall, 1989).

While this discussion may seem ideological, the consequences of it are real. For example, most psychologists accept as true the "reality of the domain of their subject – of minds, and of brains, thoughts, images, networks, social pressures, social identities..." (Dienes, 2008, p. 28). These positions result in dialectical complexity that is challenging to solve; however, philosophers have attempted to overcome this and suggested potential solutions to the dispute between realism and anti-realism (Chakravartty, 2017). My own attempt to describe their solutions is presented in the section below.

2.1.2 Attempts to Resolve the Dialectical Complexity

I will provide an overview of some of the attempts to resolve the discussion between scientific realism and anti-realism. One such attempt was done by Fine (1986), who argued that both realism and anti-realism are pro-science. He was particularly interested in the flavour of realism known as instrumentalism which was mentioned earlier. The focus on instrumentalism is important as instrumentalism does not claim that the real world does not exist and only ideas are real (such as in idealism), rather it is, as Fine describes, "non-reductive" – instrumentalism does not aim to eliminate the current scientific paradigm (ibid, 1986). As mentioned earlier, the key difference lies in the notion of truth. Realists believe that the truth is somewhere out there and theories approximate it (this is the aim of science), instrumentalists are satisfied with less than the truth – they argue that it is sufficient that the theory is useful as an instrument (instrumental reliability is the aim of science) (Fine, 1986; Okasha, 2002). Fine's aim is to highlight the similarities of both worlds; however, Fine views both philosophies as radical and rigid. According to Fine, the most problematic part of these philosophical attitudes is that they view science as something that requires interpretation on its own, and this is their downfall because science does not need a philosophical interpretation, it does not need to ask questions similar to those regarding "What is the meaning of life?".

The position that he offers as an alternative is called "The Natural Ontological Attitude" or "NOA", and what this position does is that: *"It counsels us to resist the impulse to ask, 'What does it all mean?' NOA urges us not to undertake the construction of teleological*

frameworks in which to set science" (Fine, 1986, p. 172). In other words, NOA believes that science is possible to do without philosophical interpretations, such science is local and there is no higher aim as the process of science is the value on its own (goal is the path). Therefore, NOA deems the issue of realism and anti-realism as a hermeneutic trap that needs to be avoided. However, critics do state that the result of this position does not attempt to solve the questions asked by realism and anti-realism, and is difficult to characterise in a classical philosophical sense as it does not permit us to continue asking philosophical natural questions regarding what is the meaning of truth (Liston, 2019). McArthur (2006) categorises Fine's approach as an anti-philosophical approach that views the question of realism and anti-realism agnostically (Mcarthur, 2006). McArthur provides various case studies showing how stance towards realism directly impacts the choice of methodology and scientific practice. Indeed, these questions are everyday practice. For example, they start as simple local questions such as "Do laboratory studies on weight loss transfer to the real world?". Ultimately, this begs the question what is the real world and whether the truth that he observed exists outside of the laboratory or whether it is fruitless to bother with this question and focus on the instrumental reliability?

Others have attempted to offer a solution to the anti-realism and realism conflict, and there is more that I wish to discuss. Namely, unrepresentative realism by Chalmers and structural realism by Worrall, which are both attempts to take the best of both anti-realism and realism, specifically the latter gained more attention than the former (Chalmers, 2013). Worrall's (1989) attempt lies in merging the anti-realists critique of scientific revolutions with the realists' approach to the current theories. The argument for scientific realism is known as no miracle argument, which points to the theories as approximately true; however, this does not hold well against the historical context of these theories, especially when some were ontologically false (Worrall, 1989, p. 109). How does Worrall solve this dilemma? He turns to Henri Poincaré. The suggestion is that even the falsified theories were approximately true, but they were not true in their content; they were true in their structure; therefore, what is being true and carried further throughout the history of science is the structural idea (Worrall, 1989). In Worrall's own words: "*Roughly speaking, it seems right to say that Fresnel completely misidentified the nature of light, but nonetheless it is no miracle that his theory enjoyed the empirical predictive success that it did; it is no miracle because Fresnel's theory, as science later saw it, attributed to light the right structure"* (Worrall, 1989, p. 117). Worrall does not see structural realism and NOA as substantially different; however, it seems that structural realism does keep the question of realism in place without taking an agnostic stance towards science.

The problem I see with structural realism is that to carry the structure; we need to consider the mathematical or abstract level and lose the phenomenal level. Despite being considered a defensible form of scientific realism, further critique has been expressed towards structural realism (Ladyman, 2019). Notably, critics argue that structural realism only applies to physics and is applied with difficulty in fields outside of it. Moreover, the distinction between what is mathematical and what is physical is reduced, and finally, structuralists cannot argue for causation (Ladyman, 2019). The attachment of structural realism to physics makes it difficult to apply to public health and social sciences.

Therefore, what should I do if I wish to apply the knowledge of the realism and anti-realism debate? Considering structural realism, it becomes clear that the application might be restrictive when I wish to apply the position on the multidisciplinary project at hand. NOA

brings an attractive position; however, it does so by turning its back against the debate. The position of NOA is well summarised by Blackburn (2002), who said: "*NOA will remain a puzzling, shy, philosophical child, only staying in the room by refusing to talk to the grown-ups"* (Blackburn, 2002, p. 128). NOA does not wish to engage in the debate. However, this is not to say I do not see a position that would fit my needs. Elsewhere, Blackburn says: *"Contemplating that a genuinely equally good way of looking at things exists that is just as adequate, violating no norms, and that is genuinely inconsistent with mine, gives me pause whatever my philosophy of science."* (Blackburn, 2002, p. 126). This is close to the essential principle of pragmatism if I ask, "*What concrete practical difference would it make if my theory were true and its rival(s) false?*" and if I find no practical difference, there is no problem to be further solved, this is known as "pragmatic maxim" (McDermid, 2019, p. 5). Blackburn agrees with pragmatists (namely James) and deems the disputes of realism as idle. In the simple sense, the pragmatic approach perceives the truth as a utility (Fine, 1986, p. 176). I will explore the pragmatist position further as I see the notion of utility relevant to the applied multidisciplinary research of this project.

2.1.3 Pragmatism

Pragmatism was introduced in the 19th century and represented by three dominant authors – William James, C.S. Peirce, and John Dewey (McDermid, 2019). The term "pragmatism" was presented in lectures of William James, who can be credited for popularising Peirce as the inventor of pragmatism (Dewey, 1916). Peirce presented the core ideas of pragmatism in his essay "How to make our ideas clear" (Peirce et al., 1998). In this essay, Peirce presents his stance on the metaphysical problem of realism and anti-realism (discussed in sections above) and pragmatism as a way to deal with "metaphysical deception" caused by the discussion (Misak, 2010; Peirce, 2001). The word "pragmatism" itself is not defined in "How to make our ideas clear" (Dewey, 1916). What Peirce introduces is a concept defined as the "third grade of clearness"; he states: "*Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object"* (Peirce, 2001, p. 202). Peirce states that understanding the practical use of an object or concept is akin to achieving the highest degree of clarity of understanding, which allows us (the researcher) to create conditional statements about it and further experiment with it. As noted by other scholars (e.g. Atkin, 2019), this is Peirce's early version of what is known as the pragmatic maxim. This has been further developed by Peirce himself (mostly due to misunderstanding that came from the interpretation of his text – discussed below).

Pierce's later clarifications are well presented by Misak (2010); according to her, what Peirce suggests can be represented in three steps of inquiry. In the first step (definition), the person provides an analytic definition of the concept; in the second (analytic grade), the person shows use cases of the concept, in the third step (pragmatic maxim stated above), the person offers what is known as pragmatic elucidation – this is the clarification of the concept in practical terms and what happens if it is true or not (Misak, 2010). What is important is that Peirce does not say that the first or second steps are useless. On the contrary, they have their place in science and scientific inquiry and are indeed valuable in the metaphysical discussion. The crucial point Peirce tries to make about his third maxim is according to Cheryl Misak, best presented in words of David Wiggins: "*if the term is already fundamental to human thought and long since possessed of an autonomous interest, definition often proves to be highly problematic*" (Wiggins, 2001, p. 316). Such terms require

the third step; they need to be explored in "*connection to practice*", which is what pragmatism is essentially about (Misak, 2010, p. 80). Such a position allows to acknowledge philosophical discussions of realism and anti-realism – they might be useful for anyone who needs a definition of the concept or where the goal is to apply the concept only in an abstract fashion (Misak, 2010). The position also offers a viable solution to it in terms of focusing on research practice itself for concepts that need to be evaluated in terms of effects on our world (Misak, 2010). Finally, Peirce's view regarding what is true is: "*a belief is true if the logical consequences would fit harmoniously with our otherwise grounded knowledge, were we to pursue our investigations as far as they could fruitfully go*" (Misak, 2010, p. 87). This is an elaborated version of what pragmatism is, according to later accounts of Peirce.

Unfortunately, these ideas coined by Peirce have often been misunderstood. For example, James's version of pragmatism has defined hypothesis as whatever works for the person's case using the hypothesis (Misak, 2010). The truth is then whatever works for "this or that person" (Misak, 2010, p. 78). Later accounts of pragmatism presented by Rorty have also been heavily criticised. For example, Pleasants (2003) puts this rather strongly. He deems both realism and pragmatism as failures and states: "…*we have seen Popper proposing a set of unrealistic methodological rules, (…) and Rorty offering redescriptions that, if taken seriously, would leave us unsure whether to go to the butcher or the physician for medical advice*" (Pleasants, 2003, p. 82). This is unfortunate given that Peirce tried to clarify his position and even decided to coin a term "pragmaticism" stating "*to serve the precise purpose of expressing the original definition, he (*Peirce talks about himself*) begs to announce the birth of the word "pragmaticism," which is ugly enough to be safe from kidnappers*" (Peirce, 1905, p. 166).

Dewey offers another position, but in my view, his position is not at a clash with Peirce's (as opposed to James' or Rorty's); however, his focus lies in different aspects of experience. For both Peirce and Dewey, the process of scientific inquiry is of key importance (Misak, 2010; Morgan, 2014). I have presented the process as explained by Cheryl Misak with regard to Peirce. Morgan (2014) offers a concise presentation of Dewey's process of inquiry. The process is separated into five parts:

1. *Recognizing a situation as problematic*
2. *Considering the difference, it makes to define the problem one way rather than another*
3. *Developing a possible line of action as a response to the problem*
4. *Evaluating potential actions in terms of their likely consequences*
5. *Taking actions that are felt to be likely to address the problematic situation*

(Morgan, 2014, p. 1047)

This somewhat extends the process presented by Peirce; of significance is the fact that Dewey is focusing on the researcher's subjectivity and experience of things rooted in life (Morgan, 2014). Peirce also acknowledged this element when he said that the belief would logically fit with "*our otherwise grounded knowledge"* to be true (Misak, 2010, p. 87). However, for Dewey, human experience is key as it also helps to focus from "distracting" metaphysical discussion back to what is in front of us, our beliefs and reflections as a researcher which, in the process of Dewey's inquiry, helps us to take actions to address the research question. Thus, as Morgan explains: "*Dewey's pragmatism as a philosophy addresses the central question: What is the nature of human experience? Refocusing on inquiry as a central form of human experience requires reconsidering the philosophy of*

knowledge by replacing the older emphasis on ontology and epistemology with a concentration on inquiries about the nature of human experience" (Morgan, 2014, p. 1048).

Peirce takes a different approach to experience. While Dewey is considering it a key process, which is part of research inquiry and is something that moves it forward, "*on the Peircean conception of experience under consideration here, our experiential judgments are authoritative in that we have no choice but to pay attention to them. They arrive uncritically and then we subject them to reason and scrutiny. When we are careful in evaluating our experiential judgments, they tend not to lead us astray and hence our taking them seriously seems wise as well as necessary."* (Misak, 2010, p. 83). Therefore, Peirce sees the experience as something that in itself may be biasing the research process, but if it is processed under the lens of our judgments, it becomes useful for research inquiry.

I consider both views perfectly valid in the process of inquiry regarding my research project and will aim to take the best of both. They allow me to approach the research question reflexively but also to consider any doubts and feelings I may have about the process as a researcher.

The philosophical stance of pragmatism can also extend to the methodology of (MMR) mixed-method research (Morgan, 2014). In mixed-method research, pragmatism as a philosophy often suffered and been simplified to the "what works best" approach (ibid). However, as presented above, pragmatism is a philosophical stance that allows to consider the researcher's own experience, a plurality of experiences of others (for example, stakeholders) and focus on the research problem at hand. It is not simply the "what works" approach, as pragmatic research follows a specific process of inquiry (as described above) that is continuously evaluated against our experiences, which must be further scrutinised and analysed.

Clarke and Visser (2019) discuss the benefits and pitfalls of utilising a pragmatic paradigm in their research methodology. Throughout their paper, they have faced similar problems I have faced and adhering to a single methodology was not possible as it did not allow to naturally explore different viewpoints of all stakeholders or offer a viable option when following either only constructivist or post-positivistic approaches. The research question dictates the methodology to a pragmatic researcher, not the other way around; furthermore, the pragmatic researcher aims to capture plurality and context of where the problem is set. This stance naturally leads to the abandonment of pure methodologies; in fact, methodological rules surrounding pure methodologies are bent if it is required by the research aim and fits in the process of inquiry. However; as Clarke and Visser note there are also certain pitfalls to this approach: "*The idea of autonomy within the research was beneficial, but it required confidence that using a pragmatic methodology was a sound choice and that it could be suitably justified*" (Clarke & Visser, 2019, p. 464). Ultimately, a pragmatic researcher is vulnerable to doubts, his beliefs, and in lack of experience, the researcher must spend a significant amount of time in the literature regarding methods and methodology.

The conclusion is that the philosophy of pragmatism leads my research to the mixed-method approach to research. Therefore, in the next section of this chapter, I discuss the MMR (Mixed Method Research) in further detail (mixed research approach section), define my approach in general, and discuss potential challenges of using MMR. I will then discuss the justification (design justification section) of the chosen approach for my use case.

2.2 Mixed Research Approach

Pragmatic philosophy and pragmatic method of research are not identical things. Pragmatic philosophy has been synonymous with a practical approach to research for some researchers; hence it has been associated with mixed-methods, but pragmatic philosophy has a broad philosophical tradition and basis (Morgan, 2014). The point can be exemplified by Norman Denzim, who said that "*classic pragmatism is not a methodology per se. It is a doctrine of meaning, a theory of truth"* (Denzin, 2012). In the previous paragraph, I have explored this doctrine because it serves as a basis where mixed-methods and mixed-studies research can be used. This position is not novel and has been used by other authors; for example, Feilzer (2010) shows how mixed-method research can be done pragmatically by acknowledging pragmatism as the central research paradigm. The authors utilised sequential multilevel mixed design on their crime study and successfully married together methods of quasi-experimental intervention, large-scale survey, and in-depth interview (Yvonne Feilzer, 2010). They are done so in a pragmatic manner which enabled them to cross the divide between quantitative and qualitative paradigms and allowed them to aim "*to interrogate a particular question, theory, or phenomenon with the most appropriate research method*" (Yvonne Feilzer, 2010, p. 13). Importantly, they have faced a similar issue to mine: their research aim required "a naturalistic research design" (Yvonne Feilzer, 2010, p. 9).

Above, I have referred to mixed methods and mixed studies. These two terms refer to slightly different concepts. Specifically, "mixed methods research integrates qualitative and quantitative methods, whereas mixed studies reviews integrate qualitative, quantitative, and mixed methods studies" (Pluye & Hong, 2014, p. 30). I wish to discuss the former, as I believe that while I present the project in several studies, they all aim to address one single research aim with different methods to reach the aim. In terms of presentation, it makes sense to present them as different studies of the research project. The definition offered by Pluye and Hong (2014) points to an important element of mixed-method research (MMR) which is integration; however, I feel that the distinction between mixed studies and methods introduces rigidity. The research aim dictates whether there will be one study in research. Forcing oneself into a position where I must choose either only a study with multiple qualitative and quantitative methods or a project with mixed studies leads to needles methodological puritanism when I wish to pursue a more naturalistic research design. Thus, taking slightly different definitions into account, MMR is close to what is known as pluralism in qualitative research, simply put as "the use of more than one qualitative approach with another" (Frost et al., 2010, p. 442). Finally, I present another definition that does not rely on the difference between mixed studies and mixed methods. According to Tashakkori and Creswell, mixed methods is "*research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry*" (Teddlie & Tashakkori, 2009, p. 14). This is the definition that will be applied in the upcoming sections under the acronym MMR and will be the primary definition I will use regarding mixed method research.

2.2.1 Choosing the Right Mixed Method Design

There are various types of designs that can be fulfilled under the umbrella of MMR. The MMR designs are not established as the standard qualitative and quantitative designs; therefore, they require the researcher to be more creative and deal with the uncertainty (Clarke & Visser, 2019). Various authors present slightly different designs. Creswell &

Creswell (2018) introduce three core types of research design in MMR. They talk about convergent design, explanatory sequential design, exploratory sequential design, and other more complex designs that could be larger "fourth" core type of designs (Creswell & Creswell, 2018). Other authors, such as Teddlie and Tashakkori (2009), have taken a slightly different approach. They separate designs into monomethod and mixed methods designs. The former are classical designs that utilise either qualitative or quantitative; the latter are those which are relevant here, the mixed-method types that combine and integrate both qualitative and quantitative. The latter are further categorised into a family of five types: parallel, sequential, conversion, multilevel, and fully integrated mixed designs (Teddlie & Tashakkori, 2009). Both sources acknowledge that these typologies can occur in modifications and permutations; therefore, I conclude that there is not any exhaustive MMR design typology.

Other typologies could be considered, and in their recent book, Creswell and Plano (2018) review literature that presents various typologies of design for MMR. This review is then used to develop the three core typologies presented above (explanatory, exploratory, and convergent) (Creswell & Plano Clark, 2018). What they add to the discussion on top of their typology is their distinction of fixed method design and emergent design. The fixed method design is designed a priori and the researcher expects to carry out such elements of study while the emergent design is rising from decisions or reactions of the researcher towards issues or problems encountered as part of the project. This distinction is not a dichotomy but rather a continuum. Challenges arise during the research process and the acknowledgement of emergent MMR focused on pragmatic approach allows to deal with them, in fact, it is even acknowledged that "the methods emerge during the process of the research" (Klassen et al., 2012). This bold position requires open-mindedness and trust that the aims of research can at times dictate methods (Denzin, 2010).

For my project, I focused further on the typology presented by Teddlie and Tashakkori (2009) because the authors stress out that they have aimed to develop the typology based on the implementation process while Creswell and Creswell (2018) were focusing on reflecting the overall discussion in the research literature and field. Teddlie's and Tashakkori's (2009) designs should offer more applicability to this research because their approach addressed practical applications and went beyond the theoretical overview of different approaches. The key types of design are overviewed below.

According to Teddlie and Tashakkori (2009), **parallel mixed design** can be imagined as happening simultaneously. The researcher essentially conducts two studies simultaneously, but one is qualitative, while the other is quantitative. Both studies aim to answer the same questions and are planned to converge at the end. However, the planning and management of such study is rather tedious and requires lots of resources from the researcher. **Sequential mixed designs** allow to mix qualitative and quantitative research elements in chronological order, and further questions may even develop depending on previous studies. This design tackles the issue with the resource intensity of parallel design; however, it introduces potential issues in case a study fails it will impact the following study. The third type – **conversion mixed design**, is perhaps almost a data analyst approach where the data researcher uses is transformed (*"qualitized or quantitized"*) to be analysed in both quantitative and qualitative manner to answer the same questions (Teddlie & Tashakkori, 2009, p. 139). **Multilevel mixed designs** can be parallel or sequential, and the qualitative or quantitative elements occur at different levels. For example, data from school

hospitals in a Local Authority are approached quantitively, but each patient in a hospital is approached qualitatively. The mixing then occurs across levels (Teddlie & Tashakkori, 2009). Finally, fully **integrated mixed designs** are the most complex. The mixing of qualitative and quantitative approaches occurs at any stage of a study. In opposition to previous designs, studies can have both qualitative and quantitative elements; for example, part of data can be analysed through content analysis, while the other can be analysed using linear regression.

At this stage, the thesis presented several possible designs that could, in theory, be implemented. I have stated that for this project, the implementation approach of Teddlie's and Tashakkori's provides a suitable foundation to choose the appropriate design. From the designs discussed above, the one that fits the best current project is what both Creswell and Creswell (2018) and Teddlie and Tashakkori (2009) call "sequential" mixed design. Before I introduce the project's design, I have to address the difference between explanatory and exploratory sequential designs. The explanatory is quantitative followed by a qualitative study, while the exploratory is qualitative followed by quantitative study. Importantly, these designs are formed into two studies. This is not a crucial difference for the current project because more than two studies are used (i.e., three). Therefore, the appropriate term for the mixed design used in this project is **"iterative sequential mixed design"** (Teddlie & Tashakkori, 2009, p. 139).

The rationale for choosing this design comes naturally from how the project was implemented. However, this is formally presented later in Section 2.3. This section served as an introduction to the different types of mixed designs. In other words, the possibilities were purposefully limited to a specific design that is rationalised later. The development of the design had to occur in a dynamic way where the method of choice emerged as a reaction to rising challenges while keeping the research question in the centre. This is acceptable within the pragmatic paradigm and MMR as I could justify design changes when the research aim warranted it or when the initial design was impractical, and the situation demanded a different approach. The iterative sequential mixed design was the most appropriate choice given the applied nature of the research and challenges. This is thoroughly rationalised in the upcoming sections and specifically Section 2.3.2.

2.2.2 Describing the Iterative Sequential Mixed-Method Design

I have described the sequential design, but the best explanation of this design is graphical. Figure 2 shows how a reader can imagine the sequential mixed-method design implementation.

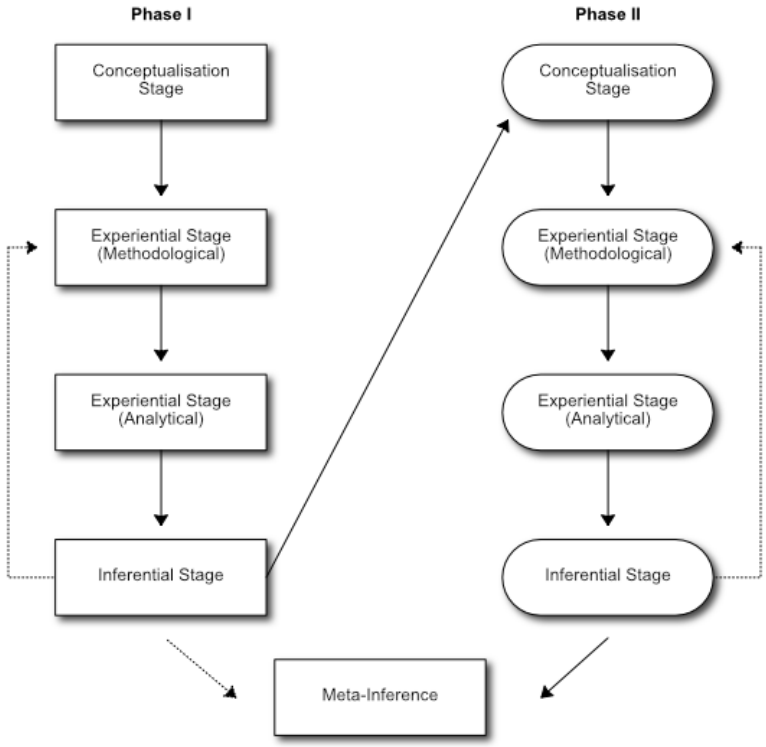

Figure 2: Sequential Design – Figure 7.5 Teddlie and Tashakkori (2009, p. 138)

The sequential design consists of several stages where the core stages are conceptualisation, experiential, and inferential stage (Teddlie & Tashakkori, 2009). In the conceptualisation stage, the research questions are formulated. The experiential stage is where the design is carried out, data are collected and analysed. In the inferential stage, inferences are drawn, and data are explained. Then, the last stage is meta-inference, where both strands of studies are synthesised, compared, and integrated into a conclusion. The dotted lines represent a circular move where one stage can go back to the drawing board as further questions may arise (ibid). MMR allows addressing these emerging challenges. I have mentioned that this project employed elements of conversion design. This is represented and taken into account by an analytical and methodological split of the experiential stage; the researcher can transform data (qualitize or quantitize) to allow an additional analytical step allowing throughout research (ibid). In the upcoming paragraphs, I will provide an overview of a few studies that have successfully utilised some form of sequential design (two or three-phased) to provide more hands-on practical use of sequential MMR. I will overview the challenges faced and opportunities that stem from using this type of MMR design.

2.2.2.1 The practice of sequential mixed-method design

Ivankova, Creswell, and Stick (2006) utilised the MMR sequential "*explanatory study of doctoral students' persistence in the distance-learning program in educational leadership*" (Ivankova et al., 2006, p. 5). As defined earlier, the explanatory study indicates that it was a two-phased design starting with quantitative and followed by a qualitative study. The idea is that the second study would help to further explain the results of the quantitative study.

Ivankova et al. first used a survey to identify key factors of student persistence among 278 doctoral students and then followed up with 4 students and conducted interviews to gain in-depth results. The MMR approach allowed the authors to use the second study and explain why results in the first study were significant or non-significant. Importantly, the authors provide practical guidance for anyone wishing to conduct a similar design as they review the challenges of sequential design. First, they review the challenges of this design and stress that while the design is straightforward additional time and resources are required as the studies occur, and it is more demanding to analyse both qualitative and quantitative data. They identify several practical challenges researchers need to consider. The first is the challenge of priority: a matter of what study is more important, that is, qualitative, quantitative, or both. In the case of the illustrative study provided in the article, the authors suggest the following two approaches. Researchers could either prioritise whichever study is first or do what the authors did and what seems like a more justifiable approach, which is to focus on a study that best answers the asked research question, and best fits the purpose of the study (Ivankova et al., 2006).

Nonetheless, they argue it is a difficult and perhaps the most important challenge. The second challenge – implementation, is determined by solving the first. Implementation is whether the studies should follow sequentially or as parallel. Since the authors framed the first study as explorative, it was on the second study to provide the explanatory part. Finally, the third and last challenge are two types of integration; an essential part of MMR where both studies (or more) are "mixed". The first refers to mixing qualitative and quantitative methods while the second integration is occurring when researchers mix the outputs of both methods (Ivankova et al., 2006). There are many options, and researchers can mix the methods at the beginning, in the middle, or at the end of the study. Specifically, in the sequential MRR design, "*a researcher typically connects the two phases*[7] *while selecting the participants for the qualitative follow-up analysis based on the quantitative results from the first phase*" (Ivankova et al., 2006, p. 11). The second combines the outputs of both quantitative, qualitative (and additional studies); is typically placed within a discussion section of the project. Ivankova et al. suggest considering the research questions in each study and discussing them in relevance to the project's overall aim, alongside appropriate research literature. Finally, the authors stress the importance of drawing a visual model of what they did to enable the reader to comprehend the design better. They outline ten rules that should be followed when presenting MMR visually:

1) *Give a title to the visual model.*
2) *Choose either horizontal or vertical layout for the model.*
3) *Draw boxes for quantitative and qualitative stages of data collection, data analysis, and interpretation of the study results.*
4) *Use capitalized or lowercase letters to designate priority of quantitative and qualitative data collection and analysis.*
5) *Use single-headed arrows to show the flow of procedures in the design.*
6) *Specify procedures for each quantitative and qualitative data collection and analysis stage.*
7) *Specify expected products or outcomes of each quantitative and qualitative data collection and analysis procedure.*
8) *Use concise language for describing procedures and products.*

[7] I refer to phases as studies unless it is absolutely necessary.

9) *Make your model simple.*
10) *Size your model to a one-page limit.*

(Ivankova et al., 2006, p. 15)

These practical guidelines are useful for this type of research and outline challenges I had to consider myself. The important conclusion is that these challenges are best solved in the MMR by considering the overall research aim and research questions relevant to each study.

The MMR sequential design can have more studies. This was the case in the project by Kumagai et al. (2004), who prepared two studies using a mail survey (quantitative) that occurred in sequential order and were followed up with two in-depth interviews (qualitative). The authors were exploring causal attribution of wildfires – a potentially traumatic situation; specifically; they explored "*human dimension of wildfire during or immediately after a wildfire"* (Kumagai et al., 2004, p. 114). Similarly to the research above, the author used "*the qualitative data (…) to triangulate with and to help clarify the interpretations of the mail survey results*" (Kumagai et al., 2004, p. 116). As the research had four studies, their research timeline looked $QUANT_1 \rightarrow QUAL_1 \rightarrow QUANT_2 \rightarrow QUAL_2$. Kumagai et al. noted that the MMR design was beneficial as the qualitative studies offered a richer explanation of the context that would not be possible to explore with close-ended surveys or a single method approach. It also allowed the researcher to engage in chaotic fieldwork that required adaptability. However, the research must have been difficult to carry given the research topic, and I can imagine that collecting survey responses after traumatic events must have been challenging.

When discussing MMR design, particularly valuable sources are research protocols that describe how a study is planned to be carried. For example, in the protocol used by Baheiraei et al. (2011), the authors aimed to explore health-promoting behaviours of Iranian women in a sequential explanatory study with QUANT → QUAL studies. In the first phase, the authors planned to conduct a cross-sectional survey with 1350 women followed by a purposive sampling that selected the most extreme cases based on the result of the survey (Baheiraei et al., 2011). As discussed previously, MMR design opens the possibility of exploring the research aim in further context. This is also noted by Baheiraei et al. "*The collection of both quantitative and qualitative data allow for a better understanding of the research goals"* and is the reason for a similar approach in the current project (p. 4). Ultimately, these protocols can be used to see how the study was carried out when reflecting the protocol. In the project, they collected data from 1359 women in Study 1 and 15 in Study 2. What was particularly useful was that the quantitative study significantly improved the sampling, test scores from validated measures were used to explain extreme cases, and the design improved the validity of the results (Baheiraei et al., 2014; Baheiraei et al., 2011). Without a mixed-method design, the authors would need to interpret the questionnaire only with numerical cut-offs from the quantitative study, and it would not be possible to understand the choices of respondents identified as extreme cases (using the qualitative approach). The study and protocol by Baheiraei et al. (2011, 2014) also illustrate validation strategies that can be used in similar designs to ensure quality in MMR, specifically: *applying a systematic process for selecting participants for qualitative follow-up, elaborating on unexpected quantitative results, and observing interaction between qualitative and quantitative study strands* (Ivankova, 2014, p. 48).

To summarise, there are practical benefits I see in applying MMR design as discussed above, notably:

a) they allow to explain results in-depth (especially QUANT → QUAL);
b) results from quantitative measures can be reflected by respondents rather than numerical matrices only;
c) they can be more flexible than mono-method designs;
d) they can provide holistic and complex picture;
e) they are naturalistic and action-oriented;
f) they allow modification depending on research aims and progress of previous research, studies, or phases.

Manion et al. summarised the benefits of MMR designs by their ability to enable *"a more comprehensive and complete understanding of phenomena to be obtained (…) and answers complex research questions more meaningfully, combining particularity with generality, (…) insider and outsider perspectives (emic and etic research), focusing on the whole and its constituent parts, and the causes of effects* (Manion et al., 2018, p. 33).

However, these are not without certain drawbacks. For example, the common challenges introduced to MMR designs are well summarised as follows:

"Note the challenges this form of research poses for the inquirer. These include the need for extensive data collection, the time-intensive nature of analysing both text and numeric data, and the requirement for the researcher to be familiar with both quantitative and qualitative forms of research" (Creswell & Creswell, 2018, pp. 218–219). Looking back at Clarke and Visser (2019), they have also noted the uncertainty that comes with pragmatic approaches, time-consuming literature research of methodology, and increasing self-doubt that the research may not go as expected and lack of a step-by-step plan as opposed to mono-method designs. The time might also be an issue in the sequential research, and if participants are used in both studies, they need to be accessible over a long period of time (Creswell & Plano Clark, 2018). A researcher may also have trouble justifying certain studies to institutional review boards as they are unclear until previous studies are carried out (Creswell & Plano Clark, 2018).

While the design used in the thesis allowed a naturalistic approach towards the research aims, it had to remain flexible. For example, some design elements always had to change according to stakeholder needs, and the overall design had to allow a degree of uncertainty. On the other hand, when it was required by the situation (for example, due to a limited staff capacity of a stakeholder) to amend the design, it was easier to justify such changes under the MMR instead of a fixed design.

The upcoming section will elaborate on the design plan of all studies, draw a diagram of the final design utilised in the current project, and provide a justification.

2.3 Rationalising the Chosen Design

As noted earlier, the chosen design was the iterative sequential mixed method. This design was formed of three phases which I refer to as *studies*, specifically, $\text{QUANTITATIVE}_1 \rightarrow \text{QUANTIATIVE}_2 \rightarrow \text{QUALITATIVE}_3$. Since the design was sequential, the order of each study was chronological – as represented by the small numbers above.

Several reasons for selecting this design are elaborated in the relevant study chapters below, especially the decision to employ specific methods. First, however, it is necessary

to present the development of the overall research aim and research question at this stage and separate questions used in individual studies.

2.3.1 Developing Research Aims and Questions

Section 1.9. already presented the overall research aim of the project ***"to conduct a national, collaborative analysis of the NCMP process with parents, carers, and other stakeholders".*** In addition, Section 1.9 also showed study aims and objectives. While Section 1.9 framed these in the context of literature, specifically literature gaps in Section 1.10, the current section discusses the generation of these aims and objectives from a methodological point of view. Therefore, this section breaks the aim by looking at the important words and defining them in detail, specifically "analysis", "other stakeholders", and "collaborative".

2.3.1.1 Explaining the overall aim

It was already clarified that by **analysis**, it was meant that the NCMP process would be **explored** and **evaluated** with a particular focus on the results letters delivered to parents or carers. The focus on exploration is rationalised because the gaps identified in the literature showed that the current NCMP was not reviewed in some time (see Section 1.10). Similarly, the need for evaluation refers to the attempt to change the NCMP letters to improve parents' poor experience, especially of parents who received the letter identifying their children with overweight or very overweight status (see Section 1.10).

The generation of the objectives and study aims was further shaped by identifying *who* or *what* is the **stakeholder**. Specifically, parents or carers, LGAs, and PHE were identified as the key stakeholders in the NCMP. These stakeholders were identified from the NCMP guidelines available at the PHE website and discussion with PHE. Specifically, they were identified by going backwards from who or what is responsible for the feedback letters and other parts of the NCMP. In addition, the Key Deliverable Elements of the NCMP document proved useful in the guidance of this process as it describes which stakeholder is responsible for different parts of the NCMP (Public Health England, 2019a).

The idea to frame a public health initiative such as the NCMP from a stakeholder perspective was not novel and was applied to the context of healthcare in the past (Parmar et al., 2010). Commonly, in this perspective, "business can be understood as a set of relationships among groups that have a stake in the activities that make up the business" (Parmar et al., 2010, p. 4). Applying this perspective to the NCMP, individuals or groups holding a stake are those who are the audience or recipients of the NCMP – parents and children. In addition, those who are developing or contributing to the development of the initiative, i.e., school nursing teams, LGA, and PHE, are further stakeholders. Finally, other groups who co-develop the NCMP, such as academics, are the last stakeholders in the NCMP. The project aimed to represent the perspectives of all these stakeholders, which is what the term "**other stakeholders**" refers to in the research aim presented above.

The key stakeholders are PHE (or DHSC), LGAs (specifically Suffolk County Council and Lewisham)[8], and parents or carers. Therefore, studies presented in this thesis account for stakeholders' perspectives. Study 1 primarily focused on the NCMP from the perspective of

[8] Permission to name the Local Authorities of Suffolk CC and Lewisham was granted.

PHE or DHSC, Study 2 from the perspective of LGAs, and Study 3 from the perspective of parents or carers.

Finally, the fact that the analysis was **collaborative** refers to the fact that where it was feasible, stakeholders would take an active part in the research process. For example, they helped develop the new letters, assisted with the dissemination of the letters or consulted wording, timeframes, and other wider research elements.

2.3.1.2 The organisation of the study aims and objectives

Each study had its research question linked to the overall research aim. In practice, this meant defining the achievable objectives of each study.

Study 1 answered two research questions. The first research question was, "*How is the NCMP delivered across Local Government Authorities in England?"*. This question was the quantitative side of the study utilised as an online survey. The second question was *"What variations among the NCMP result letters produced by Local Government Authorities in England exist".* These two questions explored operational processes behind the delivery of the feedback and other elements of the NCMP. The questions were separated into two parts, as discussed further in Section 3.1.

The objective of Study 1 was to understand the NCMP result letters to the extent that the knowledge allowed the development of a new version of the letters (discussed in Study 2 chapter). This objective was explorative.

Study 2 started with a Delphi process intending to develop the new letters based on feedback from experts and preliminary results of the first study (further discussed in Section 4.2.1). There were two research questions, and both were quantitatively oriented in this study. The first, asked *"What are the opinions of parents or carers about the NCMP result letters?",* the second *"How can the current NCMP result letters be further improved?"*. These questions were answered by comparing the new letters against the standard letters across various LGAs, including Lewisham Borough and Suffolk CC (County Council). Further information regarding the study is in Section 4.1.

The objective of Study 2 was to understand how the new letters perform compared to the letters issued at local authorities from standardised PHE templates. The objective of the second study was evaluative.

Finally, Study 3 carried the previous questions from the second study; however, rather than exploring them in an online survey, it employed structured phone interviews to provide an in-depth understanding of the topic and explain some of the survey results. In addition, the same letters from the second study were used, and parents or carers were asked to compare these letters; thus, focusing on the evaluation of these letters. These questions were addressed in 20 semi-structured phone interviews where parents or carers were asked to express their opinions regarding the newly developed routine feedback and the standard letter. Section 5.1 contains further information about the study.

The objective of Study 3 was to understand how parents perceived standard and experimental letters, and this objective was evaluative as well.

Finally, to illustrate the relationship between various studies and the overall aim, I present the following diagram (Figure 3), including all the mentioned questions.

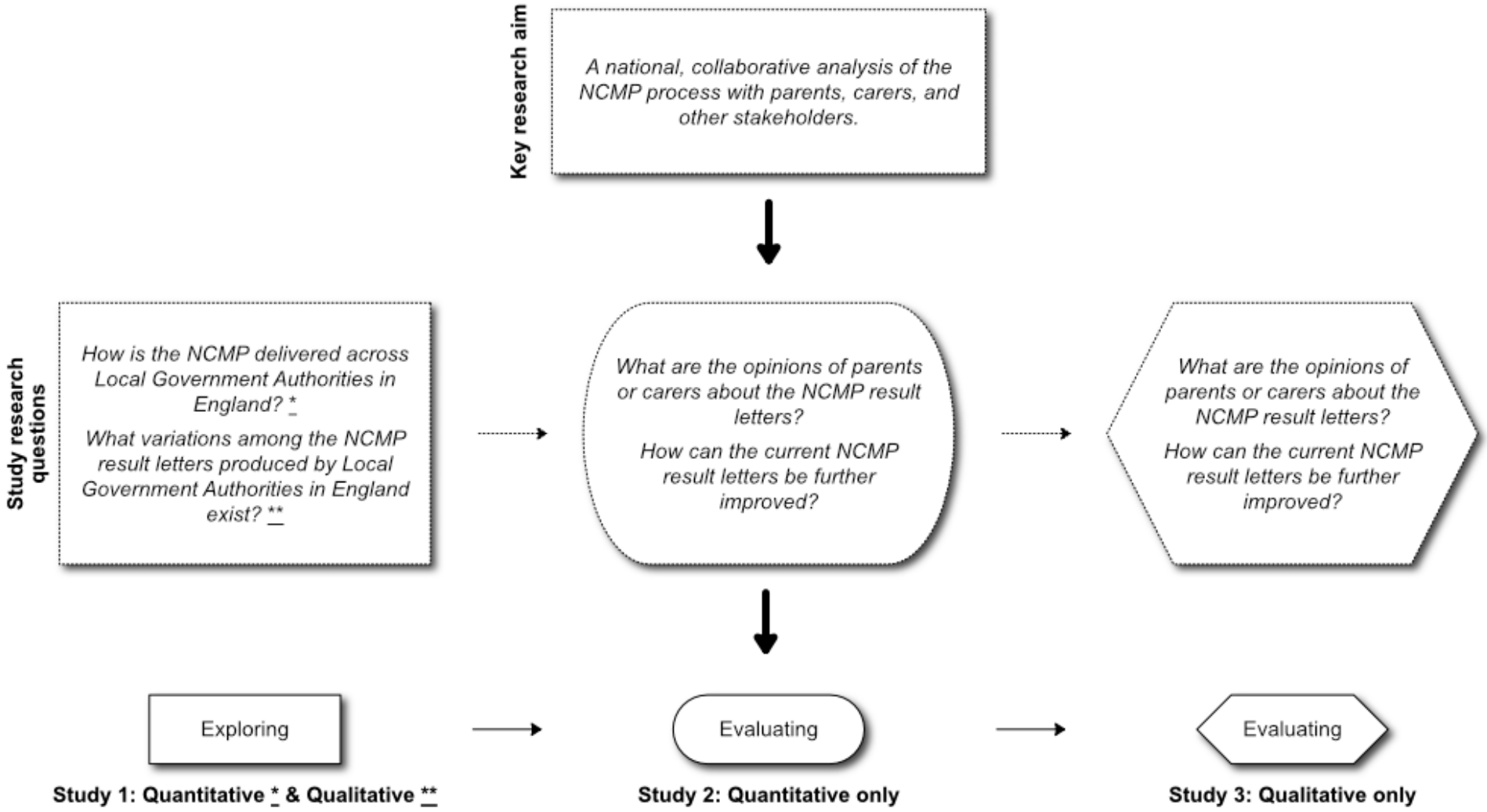

Figure 3: Research Aims and Questions

2.3.2 Justifications

Given the abovementioned questions, I can now justify the MMR design in their context. Therefore, the following paragraphs focus on the key reasons for choosing MMR and pragmatic paradigm over mono-method design and other paradigms.

2.3.2.1 Multiple perspectives

The NCMP process primarily engages LGAs, public health experts, parents, and children. To explore the views of these stakeholders (multiple perspectives), it was necessary to find methods that suit them and allow them to answer the research questions stated previously. It was not feasible to interview everyone in all LGAs, but it was feasible to involve all or most in an online survey with the person managing the NCMP being the key representative. Parents were a challenging population to recruit, and design had to be adapted to make the surveys and phone interviews as accessible as possible, which would not be possible if the design required rigid procedures. The opportunity of MMR also lies in the possibility to phase out the studies and engage various stakeholders in different studies. For example, conducting only a quantitative survey, the aim would be to target *all* stakeholders would result in questions that feel awkward or irrelevant for the target population. Thus, MMR design seemed the most appropriate methodology to address multiple perspectives. It was also an appropriate design to capture a holistic picture of all the opinions, as this was the goal from the inception of this research.

2.3.2.2 Applied research

Applied research significantly differs from laboratory studies or theoretical science. All fit different contexts and purposes, but I believe that in applied research, the researcher balances between methodological purity and practicality of the research – something that is not a great issue when we assume that the environment (laboratory) can be carefully observed, measured, and controlled (Creswell & Plano Clark, 2018). It is one of the criticisms from qualitative and quantitative researchers who feel MMR is impure as opposed to traditional approaches (Teddlie & Tashakkori, 2009). Methodological purity is when we apply any design as closely as possible to the blueprint proposed by its authors and follow it closely. However, in applied research, I have quickly discovered that considering all interfering variables is nearly impossible, assuming that all stakeholders will be both willing and able to follow carefully planned sampling strategies, randomisations, or interventions. As a researcher, I had to work with LGA to prepare a feasible data collection strategy in their area. I quickly realised that any design must also be localised and carefully discussed with the stakeholder (Suffolk CC). Thus, as a scientist conducting applied research, I was thrown into the dynamics of what stakeholders (LGA, PHE, parents or carers) can do and what is methodologically appropriate. This required flexibility and being open to considering multiple methods of achieving an answer to a given research question and then introducing these methods to the stakeholder and choosing the one that was practical enough. Therefore, MMR is a methodology that allows constructing design that fits well the requirements of applied research.

2.3.2.3 Meta-inference and synthesis

The additional challenge from the very beginning was how best to synthesise the results of different studies. Phasing research is familiar to other methodologies, for example, longitudinal and cross-sectional designs that have their place predominantly in quantitative approaches. As an MMR researcher, the challenge was to utilise studies that do not adhere to a single methodology and require a different way of thinking to approach the results. However, the

challenge is not unexpected in MMR designs. Teddlie and Tashakkori (2009) use the term meta-inference, which is defined as *"conclusion generated by integrating the inferences obtained from the QUAL and QUAN strands of an MM study"* to describe the process of results synthesis across strands of MMR (p. 292). Inference can also happen at the end of each study, can inform the other studies in sequence, and even help to modify them if warranted. This flexibility is another reason why MMR was the appropriate design here. For example, in Study 1, I have gained a much better understanding of the NCMP processes and the letters, which then informed the design of the second and third studies. Meta-inference is an important procedure also because it ensures validity, credibility, and integrity of selected methods (Teddlie & Tashakkori, 2009). The process is described and summarised by Ivankova (2014) in the following three steps of ensuring validity in QUANT → QUAL MMR designs:

1. Participants should be selected systematically into the qualitative study; for example, Ivankova used participants who participated in a previous quantitative study. Naturally, other processes can be implemented – if it is systematic.
2. Quantitative results that are unexpected should be further elaborated in qualitative studies. Usually, these are extreme cases, unexpected results, and unusual participant's behaviour.
3. Any interaction between MMR studies (strands, phases) should be reported and discussed. Ivankova suggests that the practice of MMR research can interact in a non-linear fashion; for example, the results of a qualitative study may highlight the need for further quantitative studies. Such interaction follows the opposite direction of research and should be discussed alongside other interactions.

(Ivankova, 2014, pp. 42–45)

The goal of the section was to show key reasons behind choosing MMR design and the expectation that MMR design will employ a form of results synthesis and integration, or meta-inference is an inseparable quality of such design which defines it from "simply" using multiple methods. The synthesis of results in this project occurred primarily in the discussion (Section 6), where the studies were presented in sequential order. The results were then presented by answering each of the research questions and then presenting the view of stakeholders as a series of policy briefings.

2.3.3 Visualising the Final Research Design

I have reviewed the research aim, questions and justified the chosen design. What remains is to present the design visually. Therefore, below is the visual representation of the design in the current project. This also sets the ground for the upcoming Chapters 3, 4, and 5. These chapters present each study as a separate chapter with their methodology and findings.

As discussed above, Figure 4 also shows the study where any inferences of results were planned, and these are presented using dotted lines while full lines represent the sequence of steps within and between studies. Above the diagram, it is visible which methods were combined or dominated. In addition, the diagram shows key methods selected and other information such as participant numbers. The diagram follows a design similar to what is presented in Teddlie and Tashakkori (2009) for iterative sequential mixed-method design and Ivankova (2014). The diagram also introduces the methods applied in different stages of each study, further described in Chapters 3, 4, and 5.

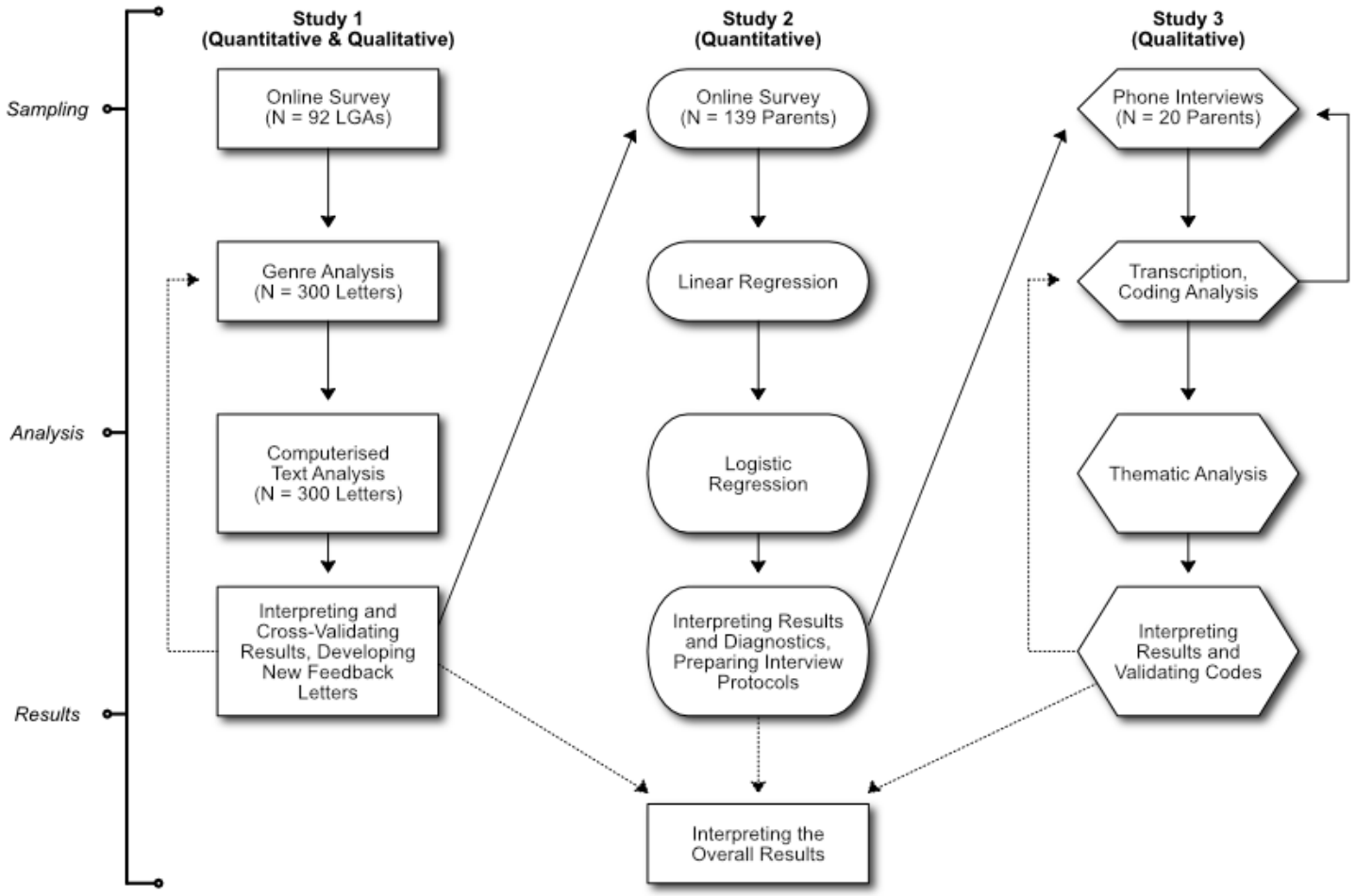

Figure 4: Visualisation of the Final Research Design

3 Study 1 – Exploring Delivery of the NCMP and Feedback Letters in England

3.1 Research Questions and Aims

The overall objective of Study 1 was to understand the NCMP result letters to the extent that the knowledge allowed the development of the new version of the letters (discussed in Study 2 chapter). These new letters were used further in Study 2 (Chapter 4) and Study 3 (Chapter 5). The assumption was that understanding the operational processes and collecting and analysing result letters obtained from LGAs would be sufficient to draft the new version of the letters used in Study 2.

Two questions were proposed to guide the process of understanding the NCMP. First: "How is the NCMP delivered across Local Government Authorities in England?" assessed using quantitative methods, second: "What variations among the NCMP result letters produced by Local Government Authorities in England exist?" assessed through qualitative methods. These two questions explored operational processes behind the delivery of the feedback and other elements of the NCMP. The questions were further separated into two parts of the study with specific aims.

The first part (Study 1 – Part Quantitative) used a survey method to collect opinions across a sample of LGA's representatives. The analysis aimed to answer the question of "How is the NCMP delivered across Local Government Authorities in England?". The aim was to gain a general understanding of the NCMP operation in England. Understanding operation means knowing where is the NCMP delivered, how it is delivered, whether all essential elements of the NCMP are delivered, and to which children and in what weight category is the NCMP delivered.

The second part extended the previous part and aimed to answer, "What variations among the NCMP result letters produced by LGAs in England exist?". This question was explored both qualitatively and quantitatively. In this sense, the question had two further aims. The BCU approach to genre analysis was used as the framework that guided the analysis across both qualitative and quantitative aspects of the part.

The qualitative approach aimed to explore the communicative purpose of the NCMP letters ("sharing the results about the child's weight in the most appropriate fashion") and understand what moves and strategies were utilised across the available documents (i.e., letters) and how they varied. This was conducted using the method of genre analysis on collected letters from the survey mentioned in the paragraph above. This method offered a deeper understanding of the letters by identifying the letter move structure. The key objective was to understand the rationale of the letters, their structure depending on recipients, and finally, how can a letter that challenges the views of a recipient establish further communication with them (e.g., refer them to services).

The quantitative approach was sequential to the qualitative. The objective was to describe and map out different linguistic and structural elements of the letters in greater detail. This was done using various quantitative text analysis techniques such as frequencies, TF-IDF (term frequency – inverse document frequency), or lexical diversity analysis. While the

qualitative approach delivered a deeper understanding, the qualitative provided a better overall description of the corpus.

The analyses were conducted on responses collected from an online survey disseminated to representatives of 92 LGAs and other documents provided as part of the FOI requests. The LGAs shared 300 letters that were separated into 5 distinctive groups based on the result they were delivering – “underweight”, “healthy weight”, “overweight”, “very overweight”, and combined letters (i.e., letter which contained nearly identical structure and only changed the outcome of the measurement).

The key findings of the first part based on a response rate of 92 (out of 152; 61%) LGAs were that most LGAs followed the PHE guidelines and adhered to a common process outlined in the operational guidelines. For example, highlighting the results across the essential phases of the NCMP, 70% of LGAs shared opt-out information in a children school bag, 86% delivered the feedback, of which 75% was delivered as letters using postal services, and 71% of sampled LGAs provided proactive feedback (typically to overweight and very overweight children in the form of a phone call to parents). Most LGAs (80%) had any services[9] available for parents.

The second part identified 6 unique move groups across all letters using the genre analysis approach. These moves delivered results to parents and typically followed the sequence of Move 01 (Opening phrases) → Move 02 (Sharing results) → Move 03 (Educating and informing audience) → Move 04 (Appeal to action or change) → Move 05 (Ensuring privacy) → Move 06 (Conclude with pleasantries).

Further investigation using a quantitative approach revealed that the most frequent move was 04 Appeal to action or change that occurred in 28% (1054 out of 3736 occurrences) of all occurrences. The analysis described the key features in the corpus of result letters and focused on the features across moves, strategies, and letters. An important finding was that each letter could be described by language typical for it, such as “remain” representing letters delivered to children with healthy weight or “type 2 diabetes” in letters delivered for children identified with very overweight status. In addition, the analysis of lexical complexity revealed that the letters typically used simpler vocabulary between 0.2 to 0.4 TTR (Type-Token Ratio).

By understanding the NCMP result letters as outlined in the paragraphs above, it was possible to develop new versions of the result letters. These letters were further refined using the Delphi Method. Several key stakeholders ranging from academics to school nurses and parents, were invited and had a chance to develop the letters. The finalised letters were proofread and offered to respective LGAs who implemented them in their NCMP process. The letters were then used in the second study, where the entire process of their development is discussed further.

[9] As part of healthy weight care pathways; Tier 1, 2, 3 and universal.

3.2 Methods of Study 1 – Exploring Delivery of the NCMP and Feedback Letters in England

3.2.1 Sampling Design

The sampling in Study 1 can be split into two steps: the first being the online survey and the second collecting parental results letters. The rationale for the sampling size decisions is covered in Appendix 2.2.1 (Sample Size).

It was necessary to gather data from as many LGAs as possible; thus, the best approach was a national online survey across all 152 upper-tier LGA in England who have health and wellbeing boards. The survey was hosted on Qualtrics™. To reach LGAs, we have contacted PHE's NCMP team for support with survey dissemination. The NCMP team agreed to support the survey and disseminated it from February to April 2018 using their PHE regional centres. There are 9 such centres spread across England over the North, Midlands, South and London (Public Health England, 2016b). These centres are in contact with LGA representative's in the region and have personnel supporting the NCMP process in the area. To facilitate the distribution, I developed template emails sent in collaboration with PHE staff at regional centres (Appendices 2.2.4 and 2.2.5). The regional centres further disseminated the survey to the most suitable candidates at LGAs they were in contact with. To further facilitate survey responses, the templates were also attached alongside the NCMP monthly update newsletter, and I have contacted the Directors of Public health at LGAs who did not reply after reminders from PHE and sent them a request to complete the survey. The survey officially closed at the end of April 2018; however, few LGAs requested more time and sent responses in early May 2018. The last response was collected 10th of May 2018, and the survey was closed.

In all cases, the LGAs were asked to nominate a representative who was best eligible to answer questions regarding the NCMP at their LGA area and had access to the NCMP result letters and other relevant documents specified in the recruitment email. The survey respondents had an opportunity to receive one of two £100 Amazon vouchers or participation at an international conference to facilitate response rate.

As part of the survey, the NCMP results letters were collected, and LGA had the option to upload these letters directly alongside other NCMP related documents. Nevertheless, since there were LGA who did not upload these documents and LGA who did not participate in the survey at all, we have decided to request the remaining documents by sending FOI requests to FOI Team (template in Appendix 2.2.3) in the remaining LGA. The FOI requests were sent to 60 LGA in June 2018, of which 55 LGAs responded.

I also attempted to get support from the LGA and the Association of Directors of Public Health; however, these organisations could not support the survey dissemination.

3.2.2 Survey Design

To answer, "How is the NCMP delivered across Local Government Authorities in England?" an online survey comprised of 59 questions (including instructions, consent form, and survey information sheet) was developed and hosted on Qualtrics™. The full survey is available as part of Appendix 2.2.2 (see all of the subsections). The survey consisted of a multiple-choice, single choice, and open-ended questions, which always an option of had selecting "I don't know" or "Other". In addition, the LGAs were asked to provide further descriptions when the "Other" option was selected.

With few exceptions, most questions were required to be answered; however, it was possible to skip questions based on the survey logic. This created a relatively complex survey to analyse but took some of the participants' cognitive burden away as the survey was relatively long and required precise answers.

To explore the delivery process of the NCMP, 5 blocks of questions were used: 1) opt-out of NCMP; 2) Parents feedback; 3) Proactive follow-up; 4) Available services; 5) sociodemographic and supplementary information. The choice to separate the survey into these blocks was a result of looking at how the NCMP process is structured according to guidelines and what are the key deliverable elements according to PHE (Public Health England, 2016a; Public Health England, 2017). The essential stages, according to the guidelines, were a) Planning the measurements, b) Doing the measurements, and c) after the measurement (Public Health England, 2016a). The first two stages (a) Planning the measurement and b) Doing the measurement) were covered by the block 1) about opt-out of NCMP. The remaining stage (c) After the measurement) was spread out across blocks 2), 3), and 4). The focus was on the post-measurement stage as the purpose of the survey was to gather information that would help to develop new letters. The information about specific details of measurement (i.e., scale type, measurement room arrangements) were not deemed important for the stated research question. The final block was used to collate additional information about respondents themselves (e.g., local authority name, job role).

In addition, the previous research by Shucksmith et al. (2008) also helped to determine some of the initial questions. Specifically, their work regarding the PCT audit questionnaire helped look at some of the questions that could be used in the survey (Appendix A: PCT audit questionnaire in Shucksmith et al., 2008, p. 69). For example, their work guided the development by ensuring that questions about the method of delivery were included in the survey draft.

The largest contribution to the survey was then made from suggestions and inputs by stakeholders at Suffolk CC, the NCMP team at PHE, and participants who provided their feedback during the pilot. From these, the input from the NCMP team was especially valuable as they provided feedback on individual questions of the survey that were then further developed. In addition to written feedback, I conducted a number of telephone calls and virtual meetings with members of the team, discussing different approaches to map the NCMP process and potential questions that could be asked. Altogether, the pilot process played a crucial role and as it as iterative development. This process is described below in further detail.

Prior to piloting the survey, the study received the ethical approval from the Local Ethics Committee at Leeds Beckett University in August 2017 (Appendix 2.8.1 in 2.8). Pilot sessions were planned to develop the survey questions further and ensure the survey was reliable, valid, and relevant to the target population. Three versions of the survey were piloted in August 2017, October – November 2017, and January – February 2018.

The first version was sent to three participants who were current or past employees at the LGA's Health and Wellbeing Boards. The first iteration was a complex survey that planned to ask participant's questions based on whether a LGA is sending different letters to Reception years and Year 6 pupils. This version had 122 questions, including instructions, consent form, and survey information sheet. The feedback from respondents related to the clarity of questions (difficult to understand), the relevancy of questions (irrelevant for the

target population), and difficulties with uploading documents. The survey was also too long, with one of the participants spending an hour of their time to complete the survey.

The second version aimed to rework the survey and significantly reduce the number of questions; it also removed complicated survey logic. The sample in the second study was a convenience sample (n = 35) of LGA Health and Wellbeing Board Commissioners from across England, representatives of PHE and university researchers. Respondents raised issues with terminology in the survey (for example, one reviewer said, "*We use 'parents' results letter or 'parents feedback letter'. The term 'routine feedback' is only referred to once in the operational guidance.*"), length of the survey, grammar, design of questions (e.g., drop-down vs multiple choice), the addition of new questions, the addition of new choices (such as Job Positions), clarity and relevance of the questions, and suggested providing an incentive to complete the survey.

The third version had to address all the reviewers' feedback regarding the previous version; to do that, I had ensured enough time to re-develop the survey. It also required set up of an uploading system to allow a LGA to upload their documents – this had to be set up with an external service outside Qualtrics™. The third addressed all the issues and provided the incentive to increase the participation rate - all participants were entered into a prize draw to win a place at an international conference or one of two £100 amazon gift vouchers. The survey was distributed to 18 reviewers, mostly academics, Suffolk CC representatives, and representatives of the NCMP team at PHE. The final version received feedback mostly regarding grammar, wording, and some other minor issues.

The feedback regarding the third version of the survey required relatively minor improvements; thus, the survey's final (fourth) version was released in February 2018, with the first responses collected on the 16th of February 2018 and the last response collected on the 10th of May 2018. The distribution process was already described in the previous sections, and the full survey is available in Appendix 2.2.2.

3.2.3 Design of Analyses

The following sections describe the analytical process of Study 1 once data have been collected. As described in the diagram explaining the MMR stages of this project, Study 1 collected data from an online survey and freedom of information requests that have been analysed through multiple methods. The online survey required a quantitative approach – descriptive analysis; the collected letters were analysed using the qualitative approach – genre analysis. Furthermore, once genre analysis of letters was completed, the letters were transformed into text corpus that was further analysed using computerised analysis of a text (Benoit et al., 2018).

3.2.3.1 Survey analysis

The survey aimed to understand how LGAs deliver the NCMP. A descriptive analysis of the survey data was produced to achieve the aim. The survey data were described with frequencies, percentages, and visual representations using R version 4.0.3 and R Studio 1.4.1103.

The analysis was driven primarily by visual graphs, and the key packages to produce these graphs were ggplot2 (Grammar of graphics) developed originally by Wickham, and UpSetR (UpSet technique), which also relies on ggplot2 (Conway et al., 2017; Wickham, 2016).

The descriptive statistics analysis aimed to describe the sample of LGAs based on summaries of their answers and combinations (sets) of their answers (Tabachnick & Fidell, 2012). No inferential statistics were conducted as there were no hypotheses about differences in populations; thus, there was no need to draw an inference about population parameters (Tabachnick & Fidell, 2012).

The challenge was to visualise complex intersections among various options participants could choose in the survey. For example, one question asked LGAs to identify whether the result letters are delivered to all parents no matter the resulting weight category or only to some parents based on the weight category in the result letter (e.g., only overweight and very overweight categories received the result letters). Typically, such intersections are visualised with Venn diagrams; however, when there are many options, Venn diagrams become complex and difficult to interpret (Conway et al., 2017; Lex et al., 2014). This challenge was overcome with the UpSetR package suitable for visualising even large sets and their intersections using a matrix-based layout. Specifically, the package *"visualizes intersections of sets as a matrix in which the rows represent the sets and the columns represent their intersections"* (Conway et al., 2017, p. 2938).

Another challenge was transforming a complex survey hosted on Qualtrics™ into an accessible and tidy data format that can be further analysed in statistical software. A series of scripts and functions were developed in Microsoft R Open to do this and ensure the process is systematic and replicable even if the data change or get updated. The result was a data frame object accessible in R or possible to export as a comma-separated document easily.

3.2.3.2 Letter analysis

As discussed previously, the pragmatic approach is driven by a research question and aim. This aligns well with genre analysis that aims to understand how communication moves help to deliver the communicative purpose of the genre. The communicative purpose of the NCMP letters is "*sharing the results about the child's weight in the most appropriate fashion*". The goal of the letter analysis was to identify the moves that utilised this purpose and explored variations across how LGAs use them (or what different moves they use). Afterwards, computerised text analysis was conducted on the letters to identify general patterns and explore their linguistic features.

3.2.3.2.1 Genre analysis

The current section will introduce the core principles of genre analysis and discuss them in further detail. The letter analysis process used in the first study was linked to principles represented by Bhatia (1993), who presents a genre analysis that is comprehensible, suitable for applications in professional settings, and integrative enough to consider socio-cultural, linguistic, and psychological domains altogether. Such genre analysis focuses on language by bringing together linguistic, sociology, and psychology traditions (Bhatia, 1993). This is useful since research relevant to the NCMP results letters can span across multiple disciplines.

First, a definition of what is a genre is warranted. A general definition would state that a "*genre is an instance of a successful achievement of a specific communicative purpose using conventionalized knowledge of linguistic and discoursal resources"* (Bhatia, 1993, p. 16). The aim of any genre analysis according to Bhatia (1993) is to *"characterize typical textual features of any genre-specific text, (…) and explain such a characterization in the*

context of the sociocultural as well as the cognitive constraints operating in the relevant area of specialization…" (p. 16).

Similar definitions consider genres as "communicative vehicles" that deliver purpose (Swales, 1990). Sometimes this is obvious; for example, the purpose of recipes is to cook a meal successfully; at other times, such as with political speeches, the purpose is less obvious, and uncommonly there might be sets of purposes. But, importantly, if these purposes have a high potential for conflict, the genre stops being an effective device of communication (Swales, 1990).

According to Swales (1990, p. 53), "*correspondence itself does not constitute a genre as it does not represent a coherent set of shared purposes. Rather it represents, as a convenient label, a suprageneric assembly of discourse.*" Swales then continues to clarify that with regards to "administrative" correspondence, there are two establishable genres. He refers to the genre of "good news" and the genre of "bad news" letters from the handbook of Effective Business Communications (Murphy and Hildebrandt, 1984 in Swales, 1990). They form two separate genres because there is a different rationale behind each letter – despite the shared register and style. The rationale of the "good news" letter is that it is an information participant will be happy to hear; therefore, the letter is enthusiastic, facilitates further communication, and removes any obstacles for the applicant. In contrast, the rationale for "bad news" letter is that its unpleasant information; therefore, the letter smoothens the information, prepares an applicant for unpleasant news while also underlining that no further communication will occur – furthermore, the decision is communicated as if it was not individual's but rather some detached body's responsibility (Swales, 1990).

As part of the literature review and introduction, I established that the NCMP letters are part of the same genre, and what Swales argues above can be linked to the NCMP letters analysed. They do not on their own form a genre; the same way campaign messages are not a genre as analysed by Barron (2012). Nonetheless, both are part of a wider genre that can be labelled as public health communication. This genre can use a variety of mediums, for example, campaign messages. As such, the letters are simply what LGA or other stakeholders have chosen as a medium to deliver a communicative purpose from the public health genre. These mediums have registers which are stylistic choices, referring to the specific language of a given document (Swales, 1990). These registers, and the fact they exist within wider genre, is what allowed them to be linked to the genre.

The NCMP letters communicate results aka "news" which except for the "healthy weight" are challenging parents views. In fact, the "unhealthy weight" letters have a difficult position. In the example of "bad news" letters provided in the paragraph by Swales (1990), the letters had the purpose to "smoothen the information" while ending the communication. However, the difficulty of the NCMP letters is that they needed to continue and establish additional communication or contact (usually through some referral) afterwards. Therefore, the question is how to communicate "bad news" accurately, sensitively, yet facilitate further contact? This point drove the analysis and further rationalised the communicative purpose as "*sharing the results about the child's weight in the most <u>appropriate</u> fashion*".

The upcoming section will describe the steps of genre analysis as coined by Bhatia (1993) and later Biber, Connor and Upton (2007), who had simplified it and applied it to direct mail analysis.

3.2.3.2.2 From Bhatia to the BCU

According to Bhatia (1993), at least some of the following seven steps are likely to be considered when analysing unidentified genres (p. 22–24):

1. *Placing the given "genre-text" in a situational context*.
2. *Surveying existing literature*
3. *Refining the situational/contextual analysis*
4. *Selecting corpus*
5. *Studying the institutional context*
6. *Levels of linguistic analysis*
7. *Specialist information in genre analysis*

Although presented as an ordered list, Bhatia (1993) by no means insisted on following an exact order as he advised that genre analysis is to be used in a flexible and selective manner that reflects the needs and knowledge of the researcher.

Bhatia's approach inspired my genre analysis, but it was not deemed practical in context of other research needs such as analysing a large volume of letters, constructing new letters for Suffolk CC and Lewisham Borough, and managing Study 2 data collection. The practical alternative was led to the approach proposed by Biber, Connor and Upton (2007), known as the BCU approach.

Upton (2002) combined corpus analysis with genre analysis. The research has already been discussed in the literature review, and it shares similarities with Bhatia's approach. Four key processes focusing on linguistic description, functional language description, interactional analysis, and contextual analysis drive the BCU approach.

Biber, Connor and Upton (2007) use two important terms in their model, namely "move" and "move type". A move is a functional unit delivering a specific communicative purpose. One text example of a given genre will likely include many moves which in combination, fulfil the overall communicative purpose of the genre (Connor et al., 1995). Move type is the definition and description of that unit used in the coding process. Although Biber, Connor and Upton (2007) distinguish between the meanings of move and move type in their book, the latter is not defined and contrasted from the former. The following passage is an example of the fact that the authors have a different understanding of the meaning behind the terms move and move type: "...once the coding rubric for move types is developed, all texts in the corpus are coded to identify the moves and code the move types" (Biber et al., 2007, p. 36). The current study used "move type" as a category to which a move belonged.

Upton (2002) also uses a term known as "structural elements". These are *"various elements to make* (*direct*) *mail letters more persuasive"* that have originated from various guidelines aimed at training writers (p. 6). Examples of these elements are signatures, dates, footers, and footnotes. I understood these elements in the analysis as physical properties of a letter that address the formal side of the message and distinguished them from moves which are concepts delivering communicative purpose.

The authors identify the approach as a top-down process that utilises corpus-based analysis, which means it is a process where "*the researcher begins with functional-qualitative methods to develop an analytical framework that describes the types of discourse units in the target genre*" and is distinguished from bottom-up which begins with "*linguistic-quantitative analysis: segmenting the texts into discourse units on the basis of*

vocabulary distributional patterns (…) functional-qualitative analysis is a later step, to facilitate the interpretation of the discourse types" (Biber et al., 2007, pp. 241–242). However, the corpus-based part is typically utilised as a part of a bottom-up process; in other words, what the authors did is that they effectively show the methodological process, which, when applied, attempts to take best of both approaches (Biber et al., 2007; Upton & Cohen, 2009). These are the steps (as shown in Table 1) required for the researcher to undertake as part of the process and that I have been following to apply the analysis on the corpus of the NCMP letters:

Table 1: Steps in the BCU Approach

Required step in the analysis	Realisation in this approach
1. Communicative/Functional Categories	Develop the analytical framework: determine set of possible functional types of discourse units, that is, the major communicative functions that discourse units can serve in corpus
2. Segmentation	Segment each text into discourse units (applying the analytical framework from Step 1)
3. Classification	Identify the functional type of each discourse unit in each text of the corpus (applying the analytical framework from Step 1)
4. Linguistic analysis of each unit	Analyse the lexical/grammatical characteristics of each discourse unit in each text of the corpus
5. Linguistic description of discourse categories	Describe the typical linguistic characteristics of each functional category, based on analysis of all discourse units of a particular functional type in the corpus
6. Text structure	Analyse complete texts as sequences of discourse units shifting among the different functional types
7. Discourse organisational tendencies	Describe the general patterns of discourse organisation across all texts in the corpus

Adapted from Table 1.1. in Biber, Connor and Upton, 2007, p. 13; Table 1 in Upton and Cohen, 2009, p. 6.

Following the guidelines in Upton and Cohen (2009), I started the analysis by identifying the genre and the communicative purpose (*step 1*). The communicative purpose was to share the results of the child's weight in the most appropriate fashion. I arrived at this through discussion during a Skype call in June 2018 with PHE's NCMP team representatives. Specifically, the purpose, according to PHE, was "*to communicate sensitive information (children's weight) in the most acceptable format to a majority of parents and avoid any harm*".

This was followed by initial pilot coding and the development of a coding protocol which was then applied to each segment (usually a sentence) of the text available in the corpus (*step 2*). To ease the initial development of the coding protocol, I have appropriated the coding protocol described by Baron (2012) on analysis of public health information messages.

However, this protocol was revised iteratively as many classifications were not relevant in the context of letters. I was also inspired by the coding protocol (especially the idea of structural elements) from the relatively older study by Upton, who applied theirs to the genre of direct mails (Upton, 2002). The coding was done in NVivo Pro v12, and the letters were organised into healthy weight, underweight, overweight, or very overweight, and combined folders. These were meaningful classification units that grouped a larger number of letters and occurred naturally based on the letter's result.

Each segment was classified and associated with moves defined in the coding book (*step 3*). This process was slow and led to a continuous redefinition of the coding book until the segments seemed to fit reasonably well. Two groups of codes/moves were used in the project. The first was "Moves", and the second was "Structural elements" (Upton, 2002). My focus was on the former, as the latter were codes that create the form of the letter (aesthetics), such as a logo or salutations. The move was also further serialised into steps that described different variations or use of the move. Before moving into the linguistic analysis, I shared a sample of codes with my supervisory team and assessed their inter-rater reliability.

The linguistic analysis (*steps 4 and 5*) was computerised text analysis using R, R Studio and quanteda R package (Benoit et al., 2018). The codes were transferred from NVivo to R and the text was converted into a corpus. This corpus was further tokenised while removing punctuation, symbols, separators, stop words based on snowball dictionary (except for "some", "most", and "very"), and selected tokens were compounded (Porter, 2001; Quanteda Initiative, 2020; Watanabe & Müller, 2019). The tokens were then transformed into a document feature matrix (DFM), a convenient data structure utilised by quanteda that aggregates all tokens from the documents (Benoit et al., 2018). Various analyses (e.g., sentiment analysis or frequency analysis) were conducted to describe the corpus.

Finally, the computerised text analysis was followed by determining move structures typical for the NCMP result letter (step 6) and highlighting the moves typical for the whole corpus (*step 7*). This process was considered to synthesise the previous steps that culminated into a prototypical letter with projected moves and structures (Section 3.5.3.5).

The strength of the BCU approach was an option to combine both qualitative and quantitative text analysis methods. The variation of the letters was explained through moves and strategies identified as part of the qualitative study, and the quantitative follow-up part provided a deeper understanding of the linguistic features within these discourse classes (units).

3.3 Ethical Considerations in Study 1

The first study was independently reviewed by the Local Research Ethics Co-Ordinator (LREC) from University Research Ethics Sub-committee (URESC) at Leeds Beckett University after the Director of Studies agreed with the submission of the ethics form. The study was approved after modifications in July 2018 (originally approved in August 2017). The reference number for Study 1 was 50195, and the completed form is in Appendix 2.8.1. The primary elements to be considered were related to the national survey and collaborative feedback sessions that followed up.

3.3.1 National survey

The primary considerations of the national study were regarding data storage and reporting. The data were stored on Qualtrics™ cloud servers and a password-protected computer. The other consideration was that LGAs data are reported anonymously, and readers cannot trace back or deanonymize specific LGA. Where the results were shared and examples needed to be provided, the key elements of the letter, e.g., logo, and contact details, were anonymised. None of the analyses aimed to be critical towards either LGA or PHE; however, I have listed future recommendations and research suggestions where appropriate.

Any collected documents (i.e., result letters, opt-out letters, and other administrative documents) did not contain personal data and were, in most cases, data from the public domain. Particular ethical considerations that required modifying the survey were to ensure that no LGA can be put into positions where we would need to notify authorities due to their answers; for example, the survey avoided asking whether legally mandated parts of the NCMP are provided or not. In such instances, it was assumed that they are (e.g., the option to opt-out from the NCMP).

The survey results provided data on an aggregated level and aimed to describe the NCMP in England further. Thus, there was no need to collect or retain any personal data. Before participating, LGA's representatives read the information sheet and provided consent. One LGA later opt-out from the survey, but all had this option and were informed that they could enact it.

3.4 Analysis of the NCMP Delivery

The following section introduces the results from the exploratory survey conducted in England. As stated earlier, this section aims to comprehensively answer the question: "How is the NCMP delivered across Local Government Authorities in England?" using quantitative methods – survey analysis. Therefore, the key findings are presented below while the remainder is provided in Appendix sections 3.1, 3.2, and 3.3.

3.4.1 Sample characteristics of LGAs

Ninety-two (out of 152; 61%) LGA's representatives completed the survey. Each LGA selected their representative; see Figure 5. A further 23 LGAs provided NCMP documentation after FOI requests (i.e., 115 LGA). The time to complete the survey was approximately 25 minutes for each representative.

Participants also provided email addresses, meta-data (such as IP Address), LGA, and consent. However, as the survey focused on the LGA (not representatives), no personal data is presented. In addition, the LGAs names are hidden to ensure survey respondents remain anonymous.

The findings from the survey focused on a descriptive analysis of the NCMP delivery and are presented in the following section based on the process of the NCMP (Public Health England, 2019b).

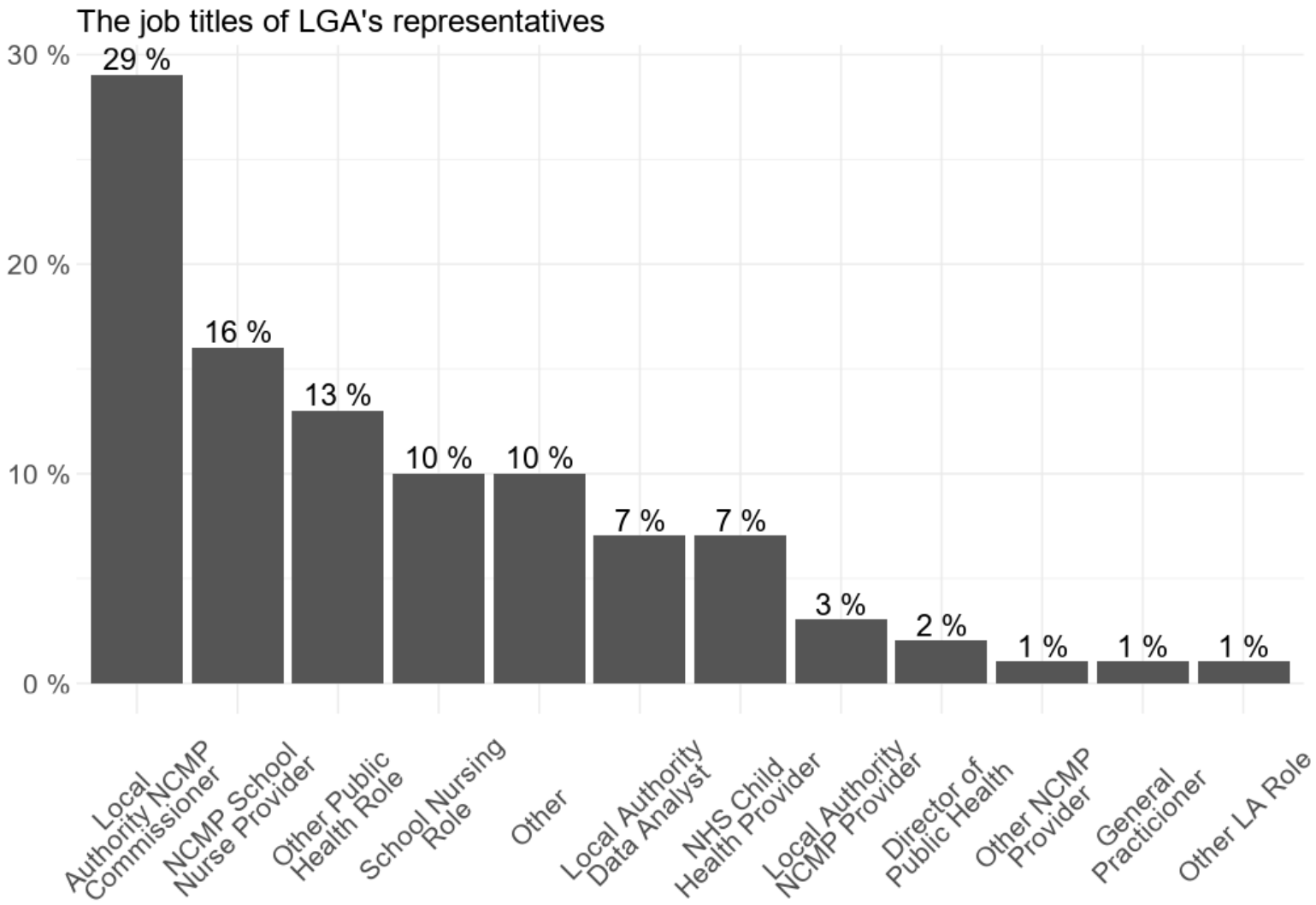

Figure 5: LGA's Representatives and their Roles

3.4.2 Findings

The following sections are the descriptive findings provided by all 92 LGA representatives.

3.4.2.1 The key responsibilities

Figure 6 provides an overview of the tasks and responsibilities for NCMP delivery. Panel A represents those that are managed by LGAs, and Panel shows the responsibilities managed by a commissioned provider and Panel C indicates what responsibilities are shared amongst the two.

The two most common combinations of responsibilities were commissioning the NCMP (NR = 30) and sending school feedback letters (NR = 29) (Panel A, Figure 6).

In comparison, commissioned providers were tasked to manage various responsibilities with the dominant set, including all responsibilities except for commissioning the NCMP, sending school feedback letters, and developing result letters for parents (NR = 13) (Panel B, Figure 6).

The most common shared responsibility was developing result letters for parents (NR = 27), and thus, LGAs and providers co-author the NCMP result letters delivered to parents (Panel C, Figure 6).

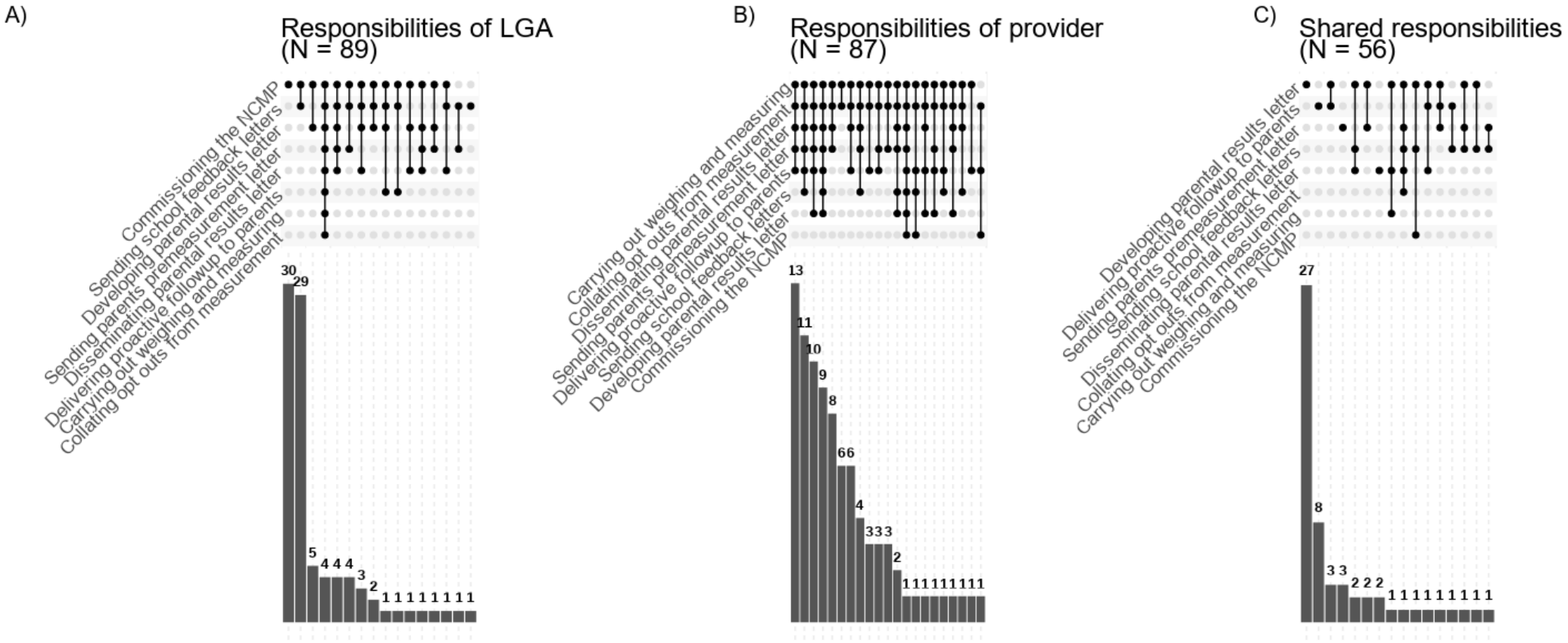

Figure 6: Key Delivery Responsibilities of LGAs

3.4.2.2 The delivery of the opt-out letter

Legally, all LGAs must inform parents and offer them an opportunity to opt their child out of the NCMP. Therefore, it was assumed that all LGAs perform this duty.

The most common method of informing parents about the NCMP measurements was via children's school bags (N = 64; 70%, Panel B, Figure 7), followed by postal services (N = 23; 13%, Panel B, Figure 7); combined approaches were used by some; see Panel A, Figure 7. The letters and postal services were also the most common combination of sets indicating that these are the preferred methods of delivering the pre-measurement letter (NR = 39 and NR = 14 respectively, Panel A, Figure 7).

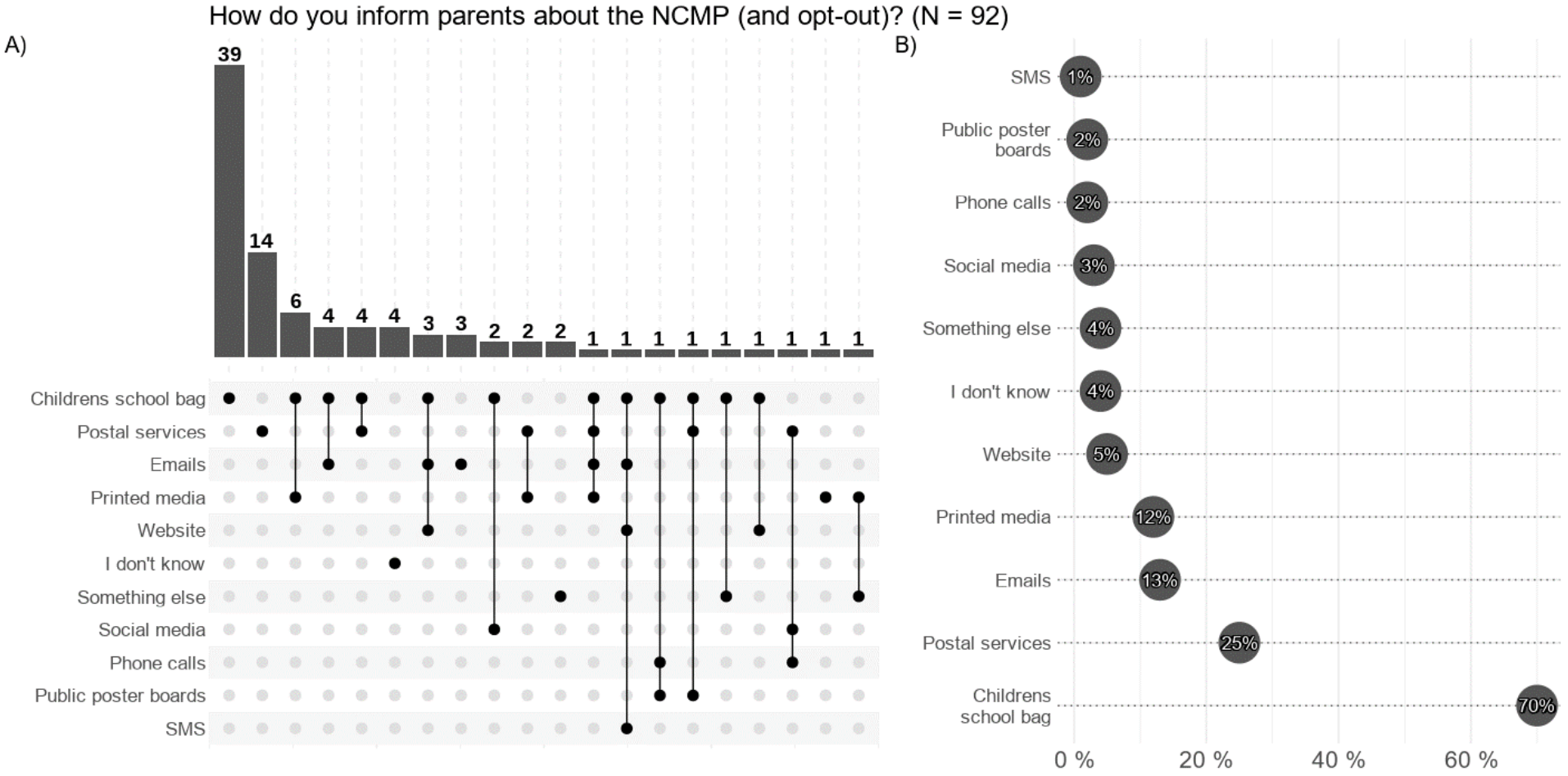

Figure 7: Methods of Informing Parents about the NCMP Measurements

The LGAs primarily used the PHE specimen; however, most (N = 55; 60%) made modifications, and five representatives indicated they had never seen the specimen.

To follow up and gain further understanding of why LGAs change the specimen, I analysed why LGAs change the PHE pre-measurement specimen letter using inductive content analysis (Braun & Clarke, 2006). There were 4 themes – clarifications, language, localisation, and user-driven; see Table 2 in Appendix 3.1.2. Table 2 in Appendix 3.1.2 shows the identified themes and examples across the comments from representatives of LGAs who provided a further explanation regarding why they modify the opt-out letters.

Finally, LGAs were asked whether they provided attachments alongside the opt-out letter: 45 (49%) included attachments; 33 (36%) did not, and 14 (15%) did not provide an answer.

3.4.2.3 Parents' feedback

Seventy-nine (86%) LGAs deliver the NCMP feedback (8% did not, and 7% did not know) to parents. The most common delivery methods were postal services (N = 69, 75%), followed by phone calls (N = 20, 22%). Additionally, 84% (66) of LGAs provide an attachment (e.g., Change4Life Leaflet) alongside the results letter.

The most common combination of delivery methods (see Figure 8, Panel A) were postal services (NR = 45), followed by postal services combined with phone calls (NR = 15). Figure 8, Panel B shows that of those LGAs, most (NR = 55) delivered results to all weight categories; however, 14 LGAs indicated that they prioritise children with statuses outside the healthy weight category, four indicated they only target the upper weight category with the rest of the representatives indicating mixed response pattern.

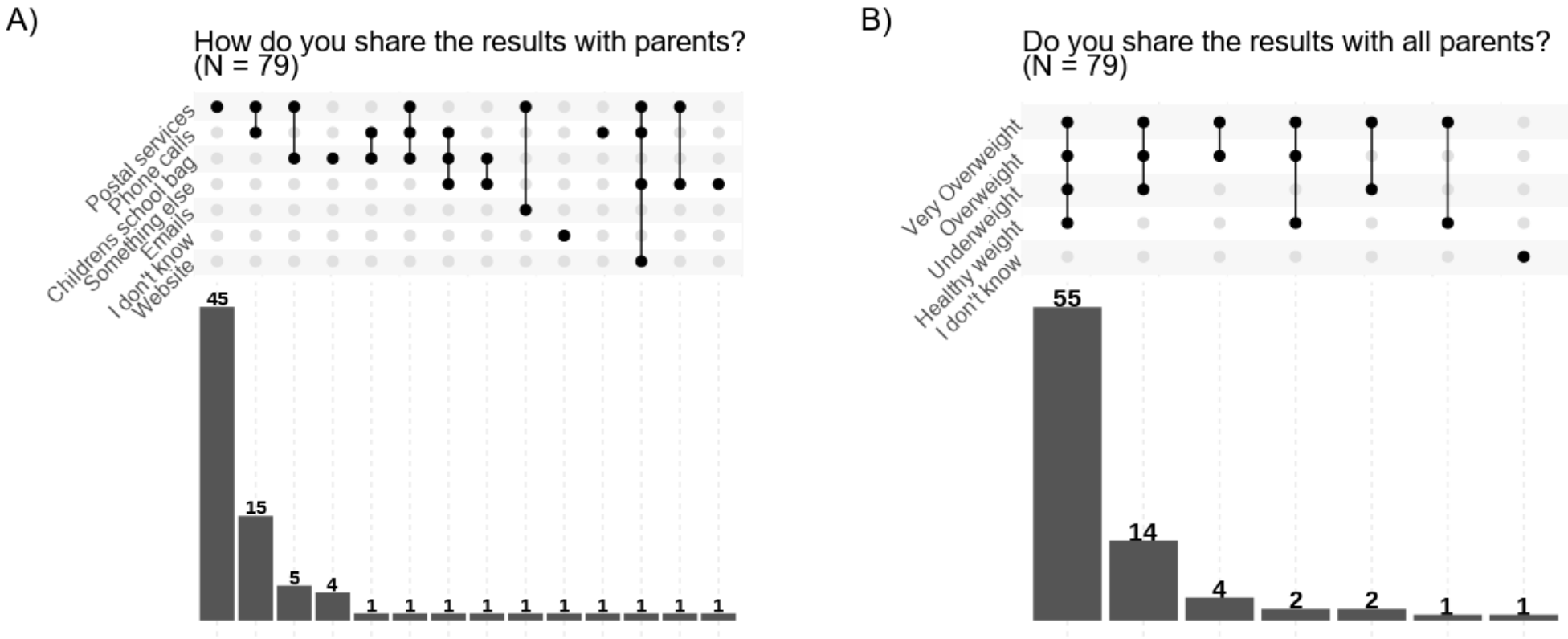

Figure 8: Methods of Delivering Result Letters and Recipients of the Letters

Additionally, 4 LGAs indicated that they only deliver via children's school bags, which PHE discouraged.

Other methods the LGAs deliver the NCMP results letter included:

> *"Coffee mornings", "Home visits", "We will be starting to utilise Parents 'Chat Health' which is an anonymous texting system for parents to raise concerns with the school nursing service", "We highly recommend that the school texts the parents of Year 6 children to inform them to come and collect their child's letters by a certain date. If they do not get collected, they will then go out in the children's school bag."*

The final comment by one of the representatives indicates that children's school bags may be a viable method if LGAs do not regularly use postal services. In this case, parents are encouraged to gather the result letters themselves from their school, but if they do not or cannot, the LGA will use the child's school bag method for convenience. This may also be rationalised by cost-effectiveness, but it does explain why some LGAs may have selected this response in the survey.

Some LGAs do not provide the result letter to all parents; these reasons included prioritising children perceived to be of most need (21; 47%), staff capacity to implement this mechanism (6; 13%), and lack of service provision (2; 4%). This can be illustrated by the following excerpts from the survey responses:

> *"We only send letters to underweight, overweight and very overweight. We had altered the letter a few times but still receive negative feedback from parents regarding the wording of the letter."*
>
> *"Parents have to request through a website for the height and weight of the child and that only appears on the letter sent to them. Some people loose [sic] these letters and struggle to find the information they need."*
>
> *"Parents are advised that they can call the Public Health Commissioner for Children and Young People to find out their child's results."*

As with the opt-out letter, the majority of LGAs - 51 (65%), use PHE's specimen result letter but tailor it to their needs; 23% (N = 18) use it and do not alter it, and 11% do not use it (N = 9). The reasons for changing the PHE specimen result letter centred on five main themes: clarifications, design, language, localisations, user-driven. Table 3 in Appendix 3.1.3.1 shows the identified themes and examples across the comments from representatives of LGAs who provided a further explanation regarding why they modified the parents' feedback.

Finally, I asked the representatives how parents could contact them after receiving the results (Figure 47 in Appendix 3.1.3.2). Most of the representatives indicated that the two most common methods are phone number (NR = 30) and a combination of phone number with email (NR = 17).

3.4.2.4 Proactive follow-up

In the next block of questions, 65 (71%) representatives indicated that their LGAs proactively followed up with parents, 21 (23%) did not, and 6 (7%) did not know.

Figure 9, panels A, B, and C illustrate how LGAs proactively follow-up with parents, whether they contact all parents (or only certain groups based on the weight category assigned to a child), and why proactive feedback is not provided (i.e., finances).

Sixty-five representatives indicated that they deliver proactive follow-up and that they target parents of children identified with the Overweight and Very Overweight (N = 19, 21%); Underweight, Overweight and Very Overweight (N = 19, 21%); and Underweight and Very Overweight (N = 11; 12%) statuses (see Figure 9, Panel B below). Thus, proactive follow-up is focused primarily on groups excluding healthy weight; see Figure 9, Panel B.

The most common combination of methods for proactive follow-up were phone calls (N = 28) or phone calls and postal services (N = 14); see Figure 9, Panel A. Where proactive follow-up was not delivered to all parents of children participating in the NCMP, the most common combination of reasons was the combination of cost-funding and staff capacity to implement (N = 16); see Figure 9, Panel C.

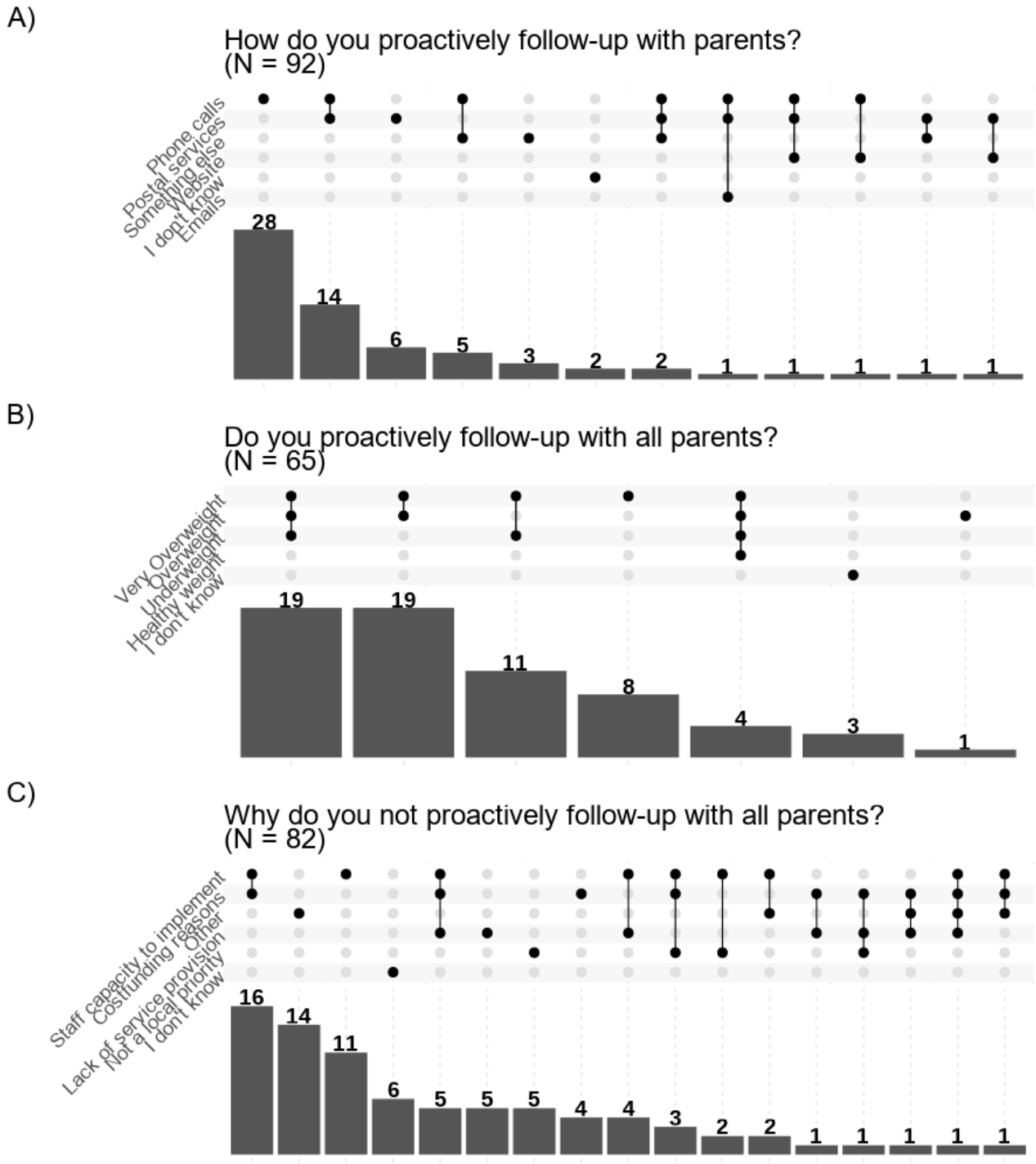

Figure 9: The Questions Regarding the Delivery of Proactive Follow-up

3.4.2.5 Available services

Seventy-four (80%) representatives stated that their LGAs reported having services (as part of healthy weight care-pathways; Tier 1, 2, 3, and universal) available for parents or carers and their Reception year and Year 6 children. Of the 74 LGAs, 32 (35%) indicated a focus on offering access for children identified with overweight and Very Overweight ranges, and 20 (22%) offered access to all weight groups; see Figure 10.

Eleven (12%) LGAs offer services to all but children identified within the healthy weight range (see Figure 48 Appendix 3.1.4, Panel A). Only 5 LGA's representatives responded that there is no service available, primarily due to cost implications (1 representative was not sure; see Figure 48 Appendix 3.1.4, Panel B).

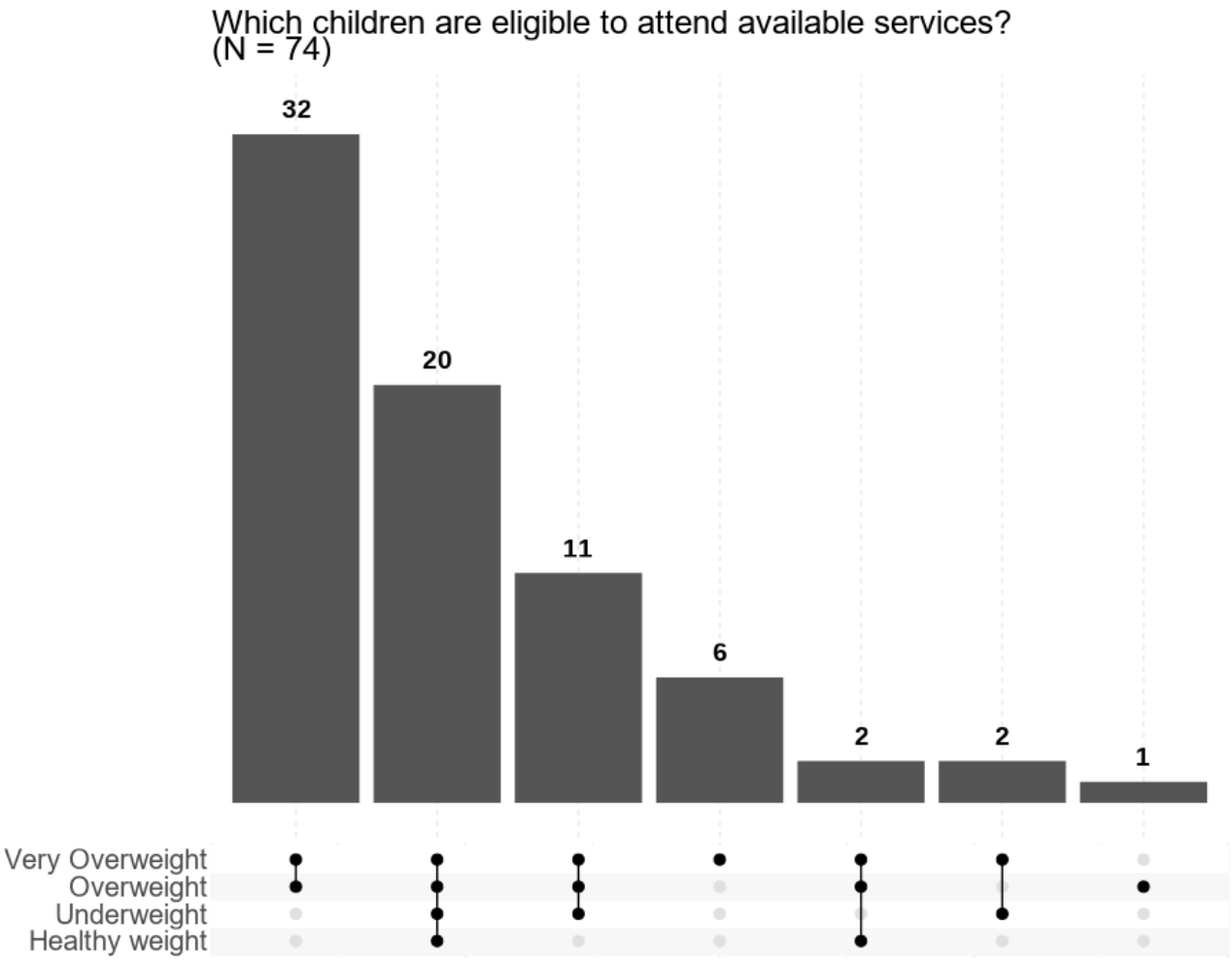

Figure 10: Target Population for the Service Provision

3.4.2.6 Regional differences

Consistency in the NCMP delivery across regions of England was also explored. The regions were based on the "PHE regions" (i.e., London, Midlands and the East, South, and the North).

Figure 49 in Appendix 3.1.5 shows four panels displaying how are the measurement information with opt-out and the result letters delivered (panels A, B), and which children were usually targeted in proactive follow-up and eligible for services (panels C, E).

No remarkable regional differences in how the NCMP is delivered in the regions were observed. This suggests that the NCMP is consistent across different regions of England.

3.5 Genre and Quantitative Text Analysis of Feedback Letters from LGAs in England

The current section, and Section 3.5.4 describing quantitative text analysis, both aimed to answer the second research question of Study 1 – "What variations among the NCMP result letters produced by Local Government Authorities in England exist?". The key results are described below, while further details are presented in the Appendix (3.2 and 3.3).

3.5.1 Codebook

The codebook was created to formalise the process of developing the moves and strategies identified in the letter. The codebook is available in Appendix 2.6, and the document provides definitions for each of the moves and strategies that are further accompanied by examples of text segments. The following sections will provide the full scope of the findings.

3.5.2 Sample characteristics of codes

Three-hundred letters were analysed using NVivo and split into 5 subfolders (Combined; COMB, Healthy Weight; HW, Underweight; UW, Overweight; OW, Very Overweight; VOW). There were 25 letters in COMB, 51 letters in HW, 73 letters in UW, 73 letters in OW, and 78 letters in the VOW folder. The following tables show the total number of coding references and files per each move, strategy, and structural element identified in the corpus.

Table 2 shows each move's relative frequency per letter, analysed over the sum of all letters in the corpus. The table shows that except for Move 05 and 06, all of the remaining moves had large coverage across the corpus.

Table 2: Relative Frequency of Each Move

Moves	Files	% Files
01 Opening phrases	300	100.0%
02 Sharing results	297	99.0%
03 Educating and informing audience	299	99.7%
04 Appeal to action or change	296	98.7%
05 Ensuring privacy	263	87.7%
06 Conclude with pleasantries	223	74.3%

Table 3 shows the relative frequency of each strategy utilised within a given move per letter analysed over the sum of all letters in the corpus. This splits the coverage of overall Moves into their corresponding strategies. The most common move / strategy was Move 04 "Appeal to action or change" with strategy 04.4 "Instructions as suggestions and possibilities" that has occurred in 280 files, which covers 93.3% of sample, and has been referenced 497 (coded).

Table 3: Relative Frequency of Each Strategy within Move

Moves	Strategies	Files	% Files	Ref.
01 Opening phrases	01.1 Acknowledging participation	5	1.7%	5
01 Opening phrases	01.2 Future in the past	9	3.0%	9
01 Opening phrases	01.3 Rationalizing the letter and the NCMP	237	79.0%	268
01 Opening phrases	01.4 Reference the measurement and the letters	275	91.7%	275
01 Opening phrases	01.5 Reference the measurement only	4	1.3%	4
01 Opening phrases	01.6 Underline past consent to the measurement	15	5.0%	15
02 Sharing results	02.1 Acknowledging limitations of the feedback	199	66.3%	209
02 Sharing results	02.2 Concealed condition	19	6.3%	20
02 Sharing results	02.3 Good news healthy weight framing	5	1.7%	5
02 Sharing results	02.4 Providing visuals guides graphs	41	13.7%	48
02 Sharing results	02.5 Sharing with children	53	17.7%	56
02 Sharing results	02.6 Table Alternative	86	28.7%	86
02 Sharing results	02.7 Table Specimen 2014 17	182	60.7%	182
02 Sharing results	02.8 Table Specimen 2018	20	6.7%	20
02 Sharing results	02.9 Written results statement	275	91.7%	276
03 Educating and informing audience	03.1 Comparing children	18	6.0%	18
03 Educating and informing audience	03.2 Compute the BMI yourself	258	86.0%	260
03 Educating and informing audience	03.3 Context of environment	7	2.3%	7
03 Educating and informing audience	03.4 Context of health	238	79.3%	316
03 Educating and informing audience	03.5 Context of stigma	5	1.7%	5
03 Educating and informing audience	03.6 Explaining measurement method	66	22.0%	92
04 Appeal to action or change	04.1 Change is simple argument	125	41.7%	137
04 Appeal to action or change	04.2 Give us feedback	16	5.3%	16
04 Appeal to action or change	04.3 Instructions as directives and obligations	157	52.3%	245
04 Appeal to action or change	04.4 Instructions as suggestions and possibilities	280	93.3%	497
04 Appeal to action or change	04.5 Opted in by default	52	17.3%	53
04 Appeal to action or change	04.6 Peer pressure	21	7.0%	22
04 Appeal to action or change	04.7 Referring service	102	34.0%	120
05 Ensuring privacy	None	263	87.7%	278
06 Conclude with pleasantries	None	223	74.3%	223

Table 4 shows the relative frequency of each structural element utilised per each letter analysed over the sum of all letters in the corpus. The coverage rates indicate that salutations, signature, and sender information were obligatory elements of the letters (i.e., coverage > 90% of files).

Table 4: Relative Frequency of Structural Elements

Moves	Strategies	Files	% Files	Ref.
01 Logo	None	263	87.7%	344
02 Title	None	32	10.7%	33
03 Private confidential statement	None	260	86.7%	262
04 Sender	None	275	91.7%	371
05 Addressee	None	261	87.0%	278
06 Date	None	259	86.3%	268
07 NHS number	None	169	56.3%	170
08 School reference	None	27	9.0%	27
09 Salutation start	None	300	100.0%	300
10 Salutation end	None	287	95.7%	289
11 Signature sender	None	282	94.0%	285
12 Structural DOB	None	4	1.3%	6

3.5.3 Genre analysis findings

The letter specimens produced by PHE are followed to varying extents, and not all of the letters developed by a given LGA use every feature included in the specimen. Thus, all letters follow some degree of standardisation.

The goal of the following section was first to describe the moves and corresponding move strategies discovered across the letters produced by LGAs. Additionally, uncover the genre structure as observed “in the wild”, and provide evidence regarding the variation among the different NCMP letters produced by LGAs in England. From the six moves identified, three are considered key in understanding how the results are delivered. These key moves were “Sharing results” (Move 02), “Educating and informing the audience” (Move 03), and “Appeal to action or change” (Move 04). The selected moves were presented further below in relevance to the research question.

3.5.3.1 Move 02 - Sharing results

This move contained units approximately in the middle of the letter. This was an almost exclusive position for this move. The primary purpose of the move was to deliver the result to parents. Therefore, it was directly related to the communicative purpose of the genre. Typically, the Move did not co-occur with other moves, and Move 01 preceded it. Occasionally, some letters combined graphical elements with text to share the result.

3.5.3.1.1 Acknowledging the limitations of the feedback

The strategy introduced uncertainty into the results and their interpretation. This was most likely done as readers were aware that these measurements might not be perfect, do not reflect individual children, or perhaps even because errors could occur in rare instances. This somewhat downplays the role of the results; perhaps because of this, the strategy was usually “hidden” in a footnote of the letter, and rarely it was directly in the body acknowledging that the measurements are subject to the child’s individuality. This was the second most commonly occurring strategy (209 times) and occurred in 199 files, but as it was hidden, it could have been overlooked by the reader. The strategy usually revolved around the keywords related to “Growth”, the following examples illustrated the use of the strategy in the letters,

Some medical conditions or treatment that your child is receiving may mean that BMI centile is not the best way to measure your child. Your GP or other health professional caring for your child will be able to discuss this with you. (UW letter)

Due to some medical conditions, early puberty or for children who are very sporty and muscular, occasionally BMI Centile may not be the best measure for your child. Your GP or health professional involved will be able to discuss this with you. Frequently referenced. (COMB letter)

3.5.3.1.2 Concealed condition

The second strategy partially rationalised the purpose of the measurement and established the results as unbiased, or at least able to uncover "concealed" conditions. This related to the narrative that the face validity assessments are not reliable – it suggested that parents will have difficulty difficult to tell by eye if the child is or is not with the healthy weight category.

The strategy occurred rarely; it was referenced only 20 times and revolved around specific keywords such as "Difficult to tell", "hard to identify", hard to categorise", "hard to know". The examples below illustrate the use of the strategy,

It can often be difficult to tell just by looking at your child if they are a healthy weight. These results relate to your child at the time of measuring and are an indication of their growth. (OW letter)

We know children come in all shapes and sizes and it is very difficult to tell what a healthy weight is just by looking at them. (UW letter)

3.5.3.1.3 Good news healthy weight framing

This strategy, referenced five times, was specific to some of the healthy weight results, and it informed the reader that their results meant "good news". The strategy also reminded the reader of the importance of maintaining the result (this is absurd given the large number of factors determining a child's weight). The purpose was to reaffirm the results and share them in positive framing. The strategy points towards an assumption that the healthy letters are "good" as this typically occurred in the context of keywords such as "Good", "Great", "Good work", "Good news". The following examples illustrate the utilisation of the strategy:

This is good news. It is important that «FirstName» maintains a healthy weight throughout childhood and into adulthood. (HW letter)

3.5.3.1.4 Providing visuals guides graphs (visual element)

The strategy served the communicative purpose by sharing visuals, graphics, or small pictures in the body of the letter to facilitate understanding of the results. The strategy was purely visual and proved challenging to code. All of the visuals were focused on further explaining the results and predominantly focused on a visual representation of BMI Centiles. The following examples show the variety of different visuals through the corpus of all letters. The selected examples were chosen to represent the different approaches but do not cover all of the letters. The strategy occurred in 41 letters and was referenced 48 times.

The following Figure 11 shows what a visual guide may look like in a combined version of the letter. The figure explains the centiles and plots the associated weight categories as colour codes onto them. The example aims to share the letter's content using visuals that are used alongside text.

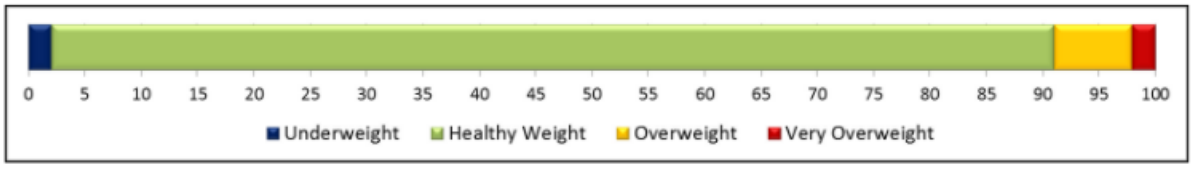

Figure 11: The Example of Visual Guide from a COMB Letter

Further visual examples are presented in Appendix 3.2.1.1 to illustrate the code across various types of letters (Figures 50 to 58 in Appendix 3.2.1.1).

3.5.3.1.5 Sharing with children

The following strategy informed the reader about the potential risks of sharing any part of the results with their child and challenges related to "talking about weight". Usually, the strategy was discouraging parents from sharing the results with their children by either asking them to reconsider whether to share the result, suggesting that children are vulnerable to weight stigma, or stating that the results are meant for the reader (parent) but leaving the decision up to them. This strategy was associated with keywords such as "Share" or "talking to your" and was a relatively well-referenced strategy (56 times). The following examples show the utilisation of the strategy – there were no apparent differences based on the result of the letter,

> *We don't think you should automatically share your child's measurements with them. You may feel sharing this result could be more negative than positive. If you would like advice about talking to your child about their weight go to: www.weightconcern.org.uk/node/134 (COMB letter)*
>
> *Children are vulnerable to the stigma around weight and body image so parents/carers may decide not to discuss these results with them. (OW letter)*
>
> *The results are sent to you, so the decision of whether to talk to your child about them is entirely yours. More information is available at NHS.uk/C4L3. (OW letter)*

3.5.3.1.6 Table Alternative (visual element)

This and the following two strategies are considered a visual element; however, much more standardised than strategy 2.4.

The alternative table was differentiated from the standard PHE letter template table by aesthetic modifications or the addition of further information regarding the child. The strategy delivered the results by sharing the modified table that was not re-using either table from the specimen letter version developed by PHE in 2014 – 2017 or the ongoing version since 2018.

There were 86 such tables across all of the letters indicating that some LGAs modified the table. The examples (5 are provided) of these tables are presented in Appendix 3.2.2.1 (Figures 50 – 58). The selected examples do not attempt to be exhaustive, but they do capture the aesthetic variety of the tables shared in the letters to the parents.

3.5.3.1.7 Table Specimen 2014 17 (visual element)

This strategy delivered the results by sharing the re-used table from the Specimen letter version developed by PHE in 2014 – 2017. This was the most common table at the time of data collection, referenced 182 times, and the following Figure 12 shows the table as re-used by one of the letters. The colours and "»" symbols indicate automatically populated fields.

«Pupil's first name»'s results	
Height (cm)	«Height»
Weight (kg)	«Weight»
Date of measurement	«DOM»

Figure 12: Table in the Specimen between 2014-17 (HW Letter)

No further examples of the table are needed as the table was standardised and did not differ across the letters. The same applies to the following strategy.

3.5.3.1.8 Table Specimen 2018 (visual element)

This strategy delivered the results by sharing the re-used table from the ongoing version of the Specimen letter developed by PHE in 2018. This was also the latest version at the time of writing this project. The table at the time was not frequently used, and I have referenced it only 20 times and across 20 documents. The following Figure 13 shows the table.

«FirstName» «LastName»

Height (cm) «Height» Weight (kg) «Weight»
Weight Status: overweight

Date of measurement «DateOfMeasurement»

Figure 13: Table in the Specimen since 2018 (OW Letter)

3.5.3.1.9 Written results statement

The final strategy of the second move was also the most referenced (276 times in 275 documents). The strategy was usually in the form of a sentence which appeared to be more of a statement than an interpretation of the table. While being heavily referenced, the code was also standardised across the letters and usually used keywords such as "compared to national", "results suggest", "this means", "would be considered to be", "this indicates". The following examples further illustrate that,

> *Compared to nationally set growth charts which show whether your child is growing as expected «FirstName» would be considered to be underweight. (UW letter)*
>
> *The results suggest that «FirstName» is overweight for their age, sex, and height. (OW letter)*
>
> *I am writing to let you know that your child's measurement is above the typical healthy range for their age. The table below shows your child's height and weight at the time of measuring. (VOW letter)*

There were no differences across weight results of the letter except for changing the weight category. In the last example, the language was slightly modified to “above the typical healthy range”, which is effectively avoiding the use of categories such as underweight, overweight, or very overweight. The letters did not use such phrasing.

3.5.3.2 Move 03 - Educating and informing the audience

The third move contained units approximately in the middle of the letter, but the elements of the move could also occur at other places where further explanation was warranted. The move usually closely followed the Move 02 and co-occurred with Move 04. The move aimed to associate the result with consequences and educate the reader about the topic.

3.5.3.2.1 Comparing children

The strategy was interpreting results by comparing the reader’s child with other children. The purpose seemed to educate the reader by giving them the interpretation of where their child was and what it may imply. The comparison was usually made using keywords such as “a majority of children", "most children", "minority of children", "minority of local children" alongside the name of the children who were the subject of the letter. The following examples illustrated the strategy utilisation,

> *Most children should fall in the healthy weight range, with fewer than one in ten in the overweight or very overweight range. (COMB letter)*
>
> *<FirstName> is in the minority of children across the country who are overweight or very overweight for their age. 3 out of 4 children in Reception year have a healthier weight than <FirstName>. (OW letter)*
>
> *7 out of 10 children in Year 6 in Rutland have a healthier weight than <FirstName>. (VOW letter)*

There was not a lot of variation across the letter, but the strategy was relevant to the letters meant for parents of children above or below the healthy weight range. This strategy was referenced 18 times in the corpus.

3.5.3.2.2 Compute the BMI yourself

This strategy suggested computing and rechecking the BMI by visiting the NHS link. This leads the reader to additional resources and further information. It was the second most common strategy in the move – referenced 260 times. The strategy was not varying among a letter (was heavily standardised) and in the majority was a simple statement which referred the reader to the BMI calculator at the NHS websites. It included keywords such as “you can find out”, "www.nhs.uk/BMI", “growing over time”, “Tools/Pages/Healthyweightcalculator”. The following examples illustrate the use of the strategy with a link to the NHS calculator. There were no differences in how the strategy was used between different versions of the letter,

> *You can find out how <FirstName>'s result was calculated, and check how <FirstName> is growing over time, by going to www.nhs.uk/bmi. (COMB letter)*
>
> *You can find out how <Pupil's first name>'s result was calculated, and check how <Pupil's first name> is growing over time, by going to www.nhs.uk/bmi or using the NHS BMI Tracker App. (VOW version)*

3.5.3.2.3 Context of environment

This and the following two strategies framed the measurement result using a health, environment, or stigma context.

The following strategy was referenced only seven times, was framing the information in the context of the environment while educating parents about diet and physical activity. It allowed contextualising the results beyond the medical context, but it was an uncommon strategy to apply in the letters. The keywords usually included phrases such as "modern life", "fast food", "computer games", "modern times", which should be approachable to the readers. The following examples show how the readers encountered the strategy,

> *We know that it can be difficult in these modern times to eat a nutritious diet and get enough physical activity, but it is important to take steps to try to stay healthy. (COMB letter)*
>
> *These days, 'modern life' can mean that we're a lot less active. With so many opportunities to watch TV or play computer games, and with so much convenience and fast food available, we don't move about as much, or eat as well as we used to. (OW letter)*

The strategy seemed to have been the domain of specific LGA rather than something relevant to either result version of the letter.

3.5.3.2.4 Context of health

This strategy educated the reader by informing them about either positive or negative impact of weight on their child's health. It provided the medical context and interpretation of the results. It was the most common strategy utilised in the "context" group and the most common strategy overall in Move 03, which was referenced 316 times across 238 documents. This clearly shows that the dominant framing of the letters is that of the health context, often using phrases such as "health problems", "ill health, "diabetes", "healthy adults", "self-esteem", "evidence suggests", "overweight adults". This varied by the result of the letter as the non-healthy weight letters were exposed more to this strategy than the healthy weight letters. The following are examples of how the strategy was utilised within the corpus,

> *If you aim to eat five portions of fruit and vegetables (these can be fresh, frozen, or tinned fruit and vegetables) and drink 6-8 glasses of water each day, then this is a good foundation for a healthy diet. (COMB letter)*
>
> *A good diet and physical activity are essential to maintaining a healthy weight and healthy growth. (HW letter)*
>
> *Being very overweight can lead to health problems for your child, such as high blood pressure, early signs of type 2 diabetes and low self-confidence. (OW letter)*
>
> *Most underweight children are perfectly healthy, but some can develop health problems. (UW letter)*
>
> *Being very overweight can lead to health problems for your child, such as high blood pressure, early signs of type 2 diabetes and low self-confidence. (VOW letter)*

The strategy could refer to either positive or negative impact; however, the negative impact was more often mentioned in the UW, OW, and VOW (especially the latter two), and the positive occurred almost exclusively in the HW version.

3.5.3.2.5 Context of stigma

This strategy provided the context of weight stigma while reading the letters and further educated the reader about the potential impact of the stigma on their child. The strategy was very rare (referenced five times) and was exclusive to certain LGAs. It included words such as “stigma” or “bullying”,

> *Making sure children have a healthy start in life can help to prevent problems later on, which may include bullying and self-esteem issues, diabetes, and heart disease. (COMB letter)*
>
> *Children are vulnerable to stigma around weight and body image so parents/carers may decide not to discuss these results with them. (HW letter)*

3.5.3.2.6 Explaining the measurement method

The final strategy in the move explained to the reader measurement methods or some other part of the measurements conducted on their children. It did so in a limited space and sometimes was simply a reiteration of the terminology or used methods. The strategy was moderately referenced as it was mentioned 92 times, but there was some variation across the documents in how the measurement method was explained. Typically, the explanation was focused on what is the BMI, or BMI Centile, and how the results were calculated. The following examples illustrate how the strategy was used - noticeably, the strategy was wordy in comparison to other strategies,

> *A 'Body mass index centile' has been worked out from standard growth charts for their age group. The 'BMI centile' falls into one of the weight categories below. (COMB letter)*
>
> *Body mass index (BMI) percentiles for children are calculated using weight, height, age, and gender. The result is a number between 1 and 100. According to NHS guidelines, a healthy BMI percentile is between 2 and 90. If a child has a BMI under 2 or over 90 this may indicate that there is a problem. (HW letter)*
>
> *The BMI centile for children is used by all healthcare professionals and, because it relies on more than appearance, is the best way to see if a child is a healthy weight. (UW letter)*
>
> *Using the results, we have worked out <FirstName>'s body mass index, or BMI, which is a good way of checking if your child is a healthy weight. The calculation compares <FirstName>'s BMI to the average height and weight of a child of the same age and sex and is known as a centile. The centile indicates whether your child is underweight, healthy weight, overweight or very overweight. (OW letter)*
>
> *Body Mass Index (BMI) is calculated using accurate measurements of height and weight. BMI for children is interpreted differently than for adults. The child's age and gender are taken into account and the BMI is converted into a BMI percentile, as on a child growth chart. The BMI percentile then indicates whether a child's BMI is within a healthy range or not. Percentile charts may be familiar to you. They were used to monitor your child's growth in the Red Book that would have been used by your Health Visitor. This may reflect a medical concern or simply that the child is small in build. Doctors may refer to this weight category as obese. This is a medical term used by*

doctors and health professionals to describe a weight that may pose a risk to future health. (VOW letter)

3.5.3.3 Move 04 - Appeal to action or change

This move contained units approximately in the middle of the letter but usually followed up the Move 02 and shared the position with Move 03 as these two moves could co-occur in the same place as the letter. The move appealed to the reader and either suggested or demanded some form of action.

The move seems to extend the original communicative purpose. After providing opening information, sharing the results, and educating or informing the audience about the information – the letter started to appeal to parents to do something. This was stressed further when the results were either above or below the healthy weight. This is interesting because sharing results is not an intervention – it was established to maintain the ethics of the measurements. However, appealing to an action (as in this move) is an intervention, and as such it extends the original purpose.

3.5.3.3.1 Change is a simple argument

The strategy appealed to the reader to action by claiming that the changes which could be implemented are simple, small, and doable. This was a standardised and frequently occurring move (referenced 135 times across 125 letters). It seems that the strategy attempted to increase the perceived self-efficacy of the parents by arguing that the changes required are simple.

Frequently occurring keywords throughout the codes included phrases such as “small change”, “simple change”. The following excerpts illustrate the utilisation of the strategy,

We have included some information that could support you to make simple changes to become more active and lead a healthy lifestyle. (COMB letter)

There are lots you can do to help keep your child a healthy weight. (HW letter)

Simple changes can make a difference to health in the long run. (UW letter)

Although the measurement shows that your child is overweight now, making small changes to diet and lifestyle can help your child attain a healthy weight. (OW letter)

You and your child can make simple changes to be more active and eat more healthily. (VOW letter)

Although the strategy was relatively standardised across the letters, I observed some variation across the result type of the letter. For example, the healthy weight version argues that the reader should keep doing what they do now, but the overweight version stated that they could implement (small) changes to help their child attain a healthy weight.

3.5.3.3.2 Give us feedback

The reader was asked to provide some form of feedback about the letters, services, or the NCMP to the LGA as part of this strategy (e.g., sent an email with their opinion about the letters, fill a survey). This was a rarely occurring strategy despite my preliminary expectations that the LGAs would ask parents for feedback regularly (referenced 16 times). The strategy was using keywords such as “Healthcare experience”, “feedback”, “comments” and was utilised as per the following examples,

Your views are really important to us and can make a real difference. Please give feedback with the QR code or link: www.cambscommunityservices.nhs.uk/fft (UW letter)

We believe that patient's feedback - good or bad - is essential to improving services. To give feedback on your experience of our service please visit www.patientopinion.org.uk (VOW letter)

3.5.3.3.3 Instructions as directives and obligations

This strategy provided the reader with information and requested them to follow some instructions. This was typically a demand, encouragement, provision of a short rationale for the action, or urge using keywords such as “take a look”, “we recommend”, “we encourage”, “it is important”, “please do (go/use)” addressed to the reader directly. This was a framing typical for an interventionist approach, and the strategy was utilised relatively frequently across the letters with 245 references (in 157 letters). The following examples show the utilisation of the strategy,

Take a look at the enclosed leaflet for a few tips. (COMB letter)

For further information on activities in our local area please visit the following link https://www.refreshbwd.com/health-topic/children-and-families/. (HW letter)

Visit www.nhs.uk/change4life for lots of handy tips for a healthy family. (UW letter)

Please do call us NUMBER if you need any further information. (OW letter)

Please see the enclosed leaflet and contact us to take up this offer by post, phone, or email. Post: Phone: Email: Return the enclosed registration form in the FREEPOST envelope enclosed. Call the local child and family weight management service on NUMBER email@nhs.net. Visit NHS.uk/C4L4 for lots of handy tips. (VOW letter)

There was also some degree of variation across the results of the letters, and the strategy was more frequent in the UW, OW, and VOW letters. The directiveness was further intensified in the letters for the readers with children above the healthy weight.

3.5.3.3.4 Instructions as suggestions and possibilities

This strategy used an indirect way rather than demanding action; it suggested or offered the instruction as a possibility. This was commonly presented to the reader using a conditional (“If”) to trigger the action. The keywords identified here were “if you”, “if you would”, “you may”, “some parents”, “you can”. The strategy was an alternative to the previous strategy 4.3., but in many letters, these two strategies complement each other. This strategy was also varied and the most referenced from the theme, with 497 references across 280 documents. The following examples illustrate the occurrence of the strategy across all versions of the letters,

If you would like more support regarding healthy lifestyles, we will be able to signpost you to what is available, alternatively your GP or other health professional caring for your child will also be able to discuss this with you. (COMB letter)

If you need any help or advice, please call us on the number at the top of this letter. (HW letter)

Parents/carers may wish to take this opportunity to give their family a health and lifestyle check using the resources enclosed or the following links:

www.nhs.uk/change4life and www.nhs.uk/ncmp2 to compare their habits with a healthy lifestyle and to make small, lasting changes if required. (UW letter)

If you are happy with Joe's health, activity levels and eating habits this result may not be any cause for concern. However, you might want to discuss this with the GP or the school nurse. They will be able to give you individual advice about this result and any action you may wish to take. (OW letter)

You may find the enclosed leaflets helpful, or you can go online for practical advice at www.nhs.uk/change4life and www.nhs.uk/ncmp4 (VOW letter)

3.5.3.3.5 Opted in by default

The following strategy used an opt-in method to make the reader take some form of service or programme available in the LGA. As such, it was the most direct form of appeal that gave the reader little choice to follow it voluntarily. It usually occurred as a statement that the information has been shared automatically with a service, team, and such who may or will contact the reader. The typical keywords for this strategy were "contact you", "will contact you", "share your contact", "been booked", "opt-out". This strategy was not as frequent (referenced 53 times across 52 documents) as the previous two, and it was specific to the OW and VOW (less so for the UW) versions of the letters; the following examples illustrate the utilisation of the strategy,

If your child is sufficiently under or overweight you will be contacted at a later date offering support and interventions if you so require. (COMB letter)

A member of the school nursing team may contact you in the near future about your child's results. Alternatively you can call the appropriate school health team between 9am and 4.30pm (Monday to Friday) on 0151 495 5254. (UW letter)

A member of staff from the service will call all parents to explain more about what we offer. (OW letter)

You and your child have been booked on to a FREE Mind, Exercise, Nutrition, Do- it 5-7 programme nearest to you. The programme will be starting next term and each session works with parents/carers and their children, involving a range of games, exercises and nutritional advice delivered by a qualified Physical Activity Leader and a Registered Nutritionist. (VOW letter)

3.5.3.3.6 Peer pressure

To facilitate action from the reader, the strategy used a form of verbal peer pressure and showed that the behaviour was done by others, was normal, or frequent. This strategy was thus related to norming (a form of a behavioural nudge). It typically involved keywords with some quantifiers such as "many parents", "many children", "most parents". The strategy, however, was not very common as it occurred 22 times across 21 documents. These examples illustrate how the strategy was used across the corpus – it was mostly present in OW and VOW results. For example,

MoreLife is a healthy lifestyle programme that many children and their families find enjoyable and helpful in giving them lifelong tools for making healthy lifestyle choices. (COMB letter)

Many parents have found the tips on https://www.nhs.uk/change4life-beta/your-childs-weight/home useful in helping them keep their child in the healthy weight range. (HW letter)

Many parents have found tips in the enclosed leaflet and www.nhs.uk/change4life useful in helping making changes. (UW letter)

Many parents like yourself will have received a similar letter and know that their child is fit and healthy. (OW letter)

If, like most parents, this has got you thinking about your child's weight, we recommend having a chat with the Healthy Weight Team to find out more. (VOW letter)

3.5.3.3.7 Referring service

The last strategy of this move referred the reader to serve as the action that the reader should be encouraged to do. The strategy offered emails, numbers, and URLs to mitigate the response and facilitate the action. The strategy featured keywords such as "local provider", "weight management team", "school programme". The strategy was common and occurred in 102 documents, and was referenced 120 times. However, this was mostly related to the OW and VOW versions of the letters. There was an expectation of using this strategy mostly for children above the healthy weight. The following examples show the utilisation of the strategy,

The leaflet enclosed with this letter gives details of NAME group sessions that aim to help families eat more healthily and become more active. The groups run weekly and are free - if you already follow a healthy lifestyle they may help to reinforce your good work. (COMB letter)

Family Information and Services Hub: for information about local services, activities, and organisations URL LINK. (HW letter)

Information on local services for children can be found on the Family Information Service pages at URL LINK. (UW letter)

If you would like to speak to one of us about your child's result, please call our school nursing team on [phone number]. The team can advise you about joining our fun, free, family healthy lifestyles programmes. (OW letter)

Consider joining the REACH (Re-thinking Eating and Activity for Children's Health) programme. REACH is a fun FREE course for families with children aged 4 to 15 years available in LGA NAME. It includes discussions and tips; activities about healthy foods such as food tasting and label reading; weekly games and intergenerational physical activity. To find out more or to register for REACH, call NUMBER, EMAIL, visit www.southglos.gov.uk/reach or ask your School Health Nurse. (VOW letter)

3.5.3.4 Structural elements

Structural elements were components of letters that did not deliver the communicative purpose directly. They were usually aesthetic part of the letters but could serve a persuasive function. Examples were a salutation, a signature, or information about the address. These elements did not have any strategies and occurred outside the body of the letter (in footers, headers, or similar areas).

I consider the structural elements a heavily standardised part of the letter. Therefore, all of the elements below can be effectively described by their label, and further descriptions or

examples are not provided – it would be redundant. For a better overview of how the structural elements, as well as the moves, were used, please see the example letter in Section 3.5.3.5 (Moves projected on the letter; see below).

The structural elements were briefly mentioned in Section 3.5.2. Their further definition is available in Appendix 2.6 (Codebook).

3.5.3.5 Moves projected on the letter

The example letter in Figure 14 below shows the sequence of moves and places where they would be normally expected based on what was observed in the corpus. The place is signified by the position of where the box was aligned in the margin of the example. The example describes each of the move and the purpose of the move. The black circular arrows show the sequence, and the square arrows show the co-occurrence of the moves.

Structural elements are summarised at the top right corner of Figure 14 alongside an overall purpose attributed to them. Specific structural elements are not further described as it is obvious what they refer to; this is further facilitated by the numbers in circles that show the location of each element.

The letter itself is a standardised letter (i.e., the template based on PHE) used in Suffolk CC. This “prototype” of the letter was also the most common.

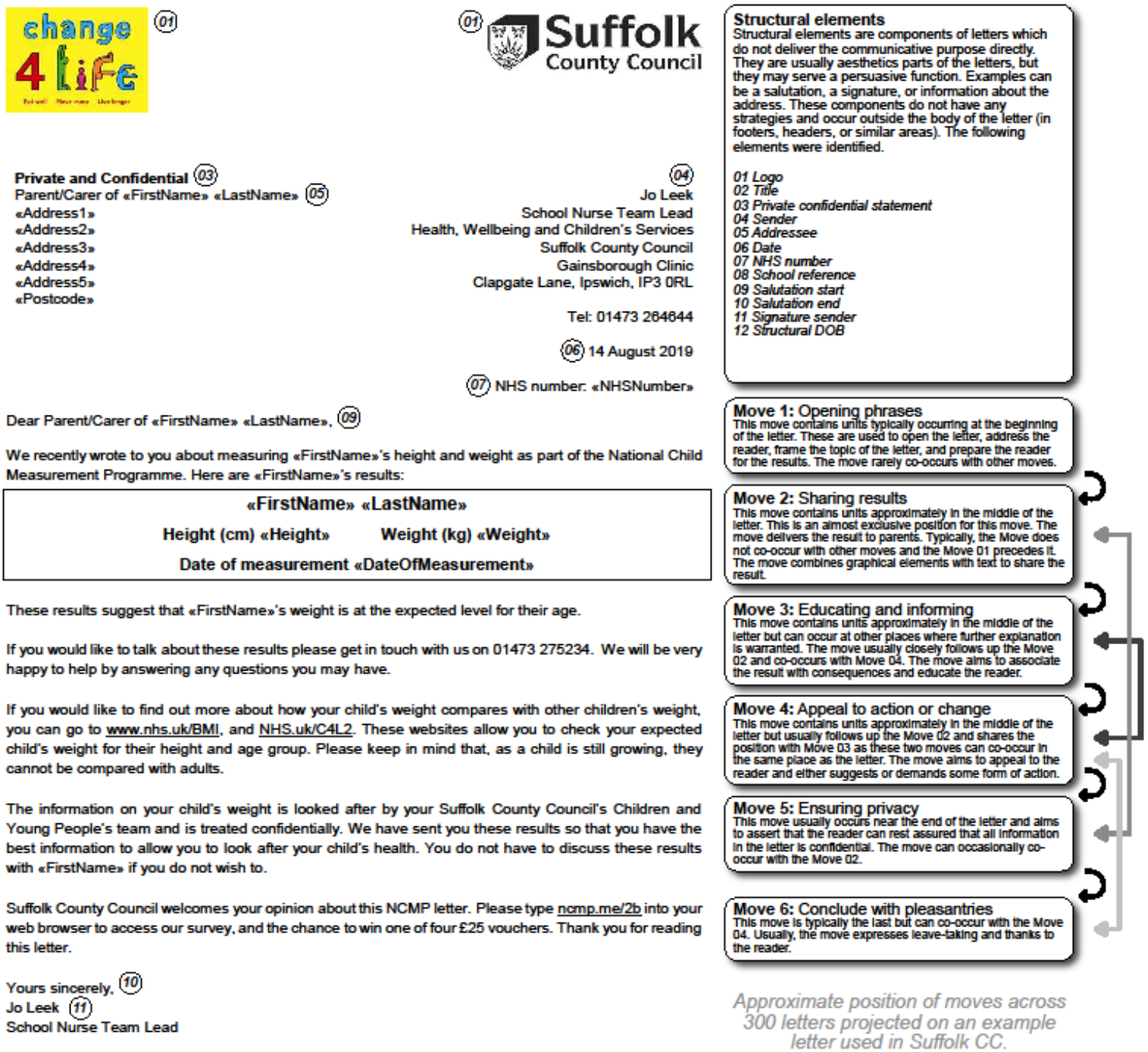

Figure 14: Moves and Structural Elements Projected onto the Letter

3.5.4 Quantitative text analysis findings

The final section of the first study was the quantitative text analysis of the letters identified in the corpus. The primary aim of this section is to investigate the linguistic properties of the moves further, compare these properties across the different weight results of the letters, and provide a further understanding of the essential linguistic features in the documents (i.e., word frequencies, TF-IDF, Feature co-occurrence, Lexical diversity, keyness, and sentiment). The analysis used tokenised corpus with lemmatization and stemming; therefore, where examples of particular words are given, the reader is cautioned that these may appear as unusual, for example, “healthi” instead of “healthy”.

The goal of the current section was to describe the variation that exists within the letters using quantitative text analysis. These results complement the previous section, continuing the BCU approach discussed in the method section. The preparation of the corpus is discussed in the Appendix 3.3.1.

3.5.4.1 Describing the frequency of features

The following sections present a series of graphs that explore the document feature matrix (DFM). The first three graphs show panels from A) to D) (Figures 15 and 16, including Figure 66 in Appendix 3.3.3.1), the final Figure 67 in Appendix 3.3.3.2 show panels from A) to E). The first three figures always show subgroup exploratory analyses by the LGAs (“Group by the letters”; panel A), weight results in the letter (panel B), identified moves (panel C), and identified strategies (panel D). The final figure shows feature co-occurrence across five weight versions of the letters (HW, UW, OW, VOW, and COMB).

All the following graphs (some are presented in Appendix 3.3.3) describe elements of the feature matrix; as such, these graphs are essential to understand the constructed corpus. The DFM is also used in the results sections following afterwards.

Figure 66 (in Appendix 3.3.3.1) shows the plain frequency of the features within the matrix. Panels A and B indicate the features “child”, “weight”, “inform”, “measur”, to be the most common. Also, notice the higher frequency of the word “can” in panel B for UW, OW, and VOW versions, but not the HW version – perhaps the indication of interventionist framing (e.g., You *can* call*…,* You *can* follow these simple…). Panel C and D break further the moves and strategies identified earlier. These graphs also confirm the findings in a quantitative sense; for example, the word *please* frequently occurred in Move 04 (appeal to an action) – as would be logical to expect.

Table 5 and Figure 15 (see further below) shows weighted (relative) frequency – *“the proportion of the feature counts of total feature counts (aka relative frequency)”* (Benoit, 2020, p. 50). This increases the precision of the estimate and shows it in the context of the total number of features. For example, the word “child” occurred in 4% to 5% of all weight versions, but the word/token “healthi” only in COMB, and HW versions, and at 2% (Figure 15, Panel B).

Table 5: Weighted Relative Frequency of the Most Common Tokens in Moves

Moves	Feature	Percentage
01 Opening phrases	measur	7.354%
01 Opening phrases	weight	6.582%
02 Sharing results	child	12.242%
02 Sharing results	result	4.14%
03 Educating and informing audience	can	5.735%

Moves	Feature	Percentage
03 Educating and informing audience	child	4.187%
04 Appeal to action or change	pleas	3.217%
04 Appeal to action or change	can	2.795%
05 Ensuring privacy	inform	11.907%
05 Ensuring privacy	local	7.613%
06 Conclude with pleasantries	hope	20.075%
06 Conclude with pleasantries	use	19.888%

Table 6 and Figure 16 focus on the most frequent features presented in previous figures using the so-called “Term Frequency Inverse Document Frequency” (tf-idf). This value increases as a term appears in a given document while being negatively weighted by the overall frequency of terms across all documents in the corpus (Silge & Robinson, 2017). This gives a convenient heuristic to see important words in the documents. For example, considering the information in panel B, the most unique features of the VOW version of the letter seem to be those focusing on health problems (such as blood pressure).

Table 6: The Most UniqueTokens in Moves (TF-IDF)

Moves	Feature	Percentage
01 Opening phrases	part	1.77%
01 Opening phrases	recent	1.52%
02 Sharing results	treatment	1.71%
02 Sharing results	condit	1.04%
03 Educating and informing audience	www.nhs.uk bmi	1.91%
03 Educating and informing audience	can	1.01%
04 Appeal to action or change	www.nhs.uk	0.79%
04 Appeal to action or change	call	0.65%
05 Ensuring privacy	school staff	5.15%
05 Ensuring privacy	treat	4.84%
06 Conclude with pleasantries	hope	9.58%
06 Conclude with pleasantries	thank	8.91%

Figure 67 (in Appendix 3.3.3.2) narrows down the focus on weight versions as I believe those are the most interesting differences and show which features co-occur (feature co-occurrence matrix; FCM) together in each version. The plots are not weighted, thus based on a simple frequency. The plots effectively highlight the differences between the “good” (panel B) and “bad” (panels C, D, E) letters. While the former informs the parents, the latter pleads them to take action on top of informing them about the results.

3.5.4.1.1 Weighted frequencies

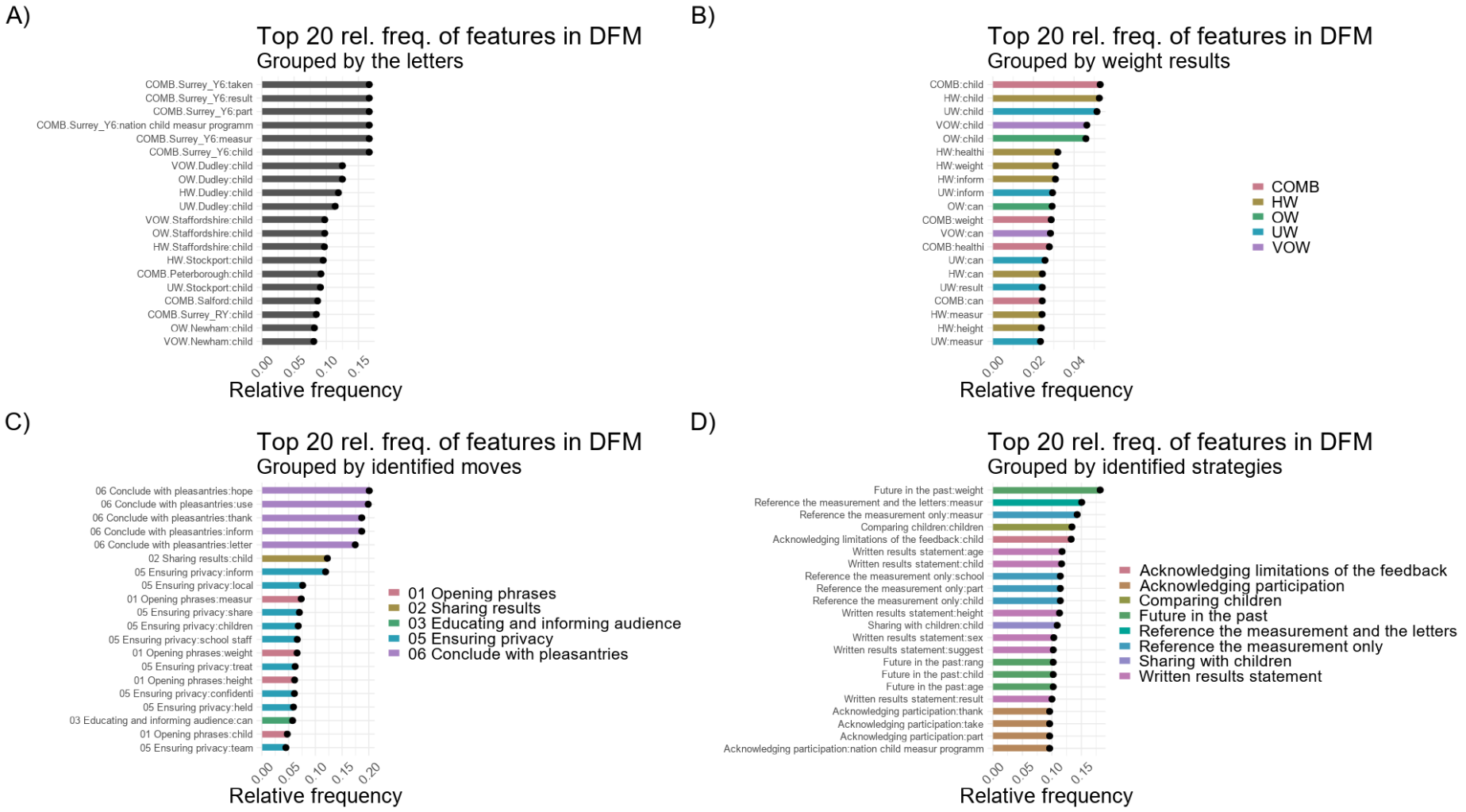

Figure 15: Weighted Relative Frequency of Tokens

3.5.4.1.2 Term Frequency Inverse Document Frequency (TF-IDF)

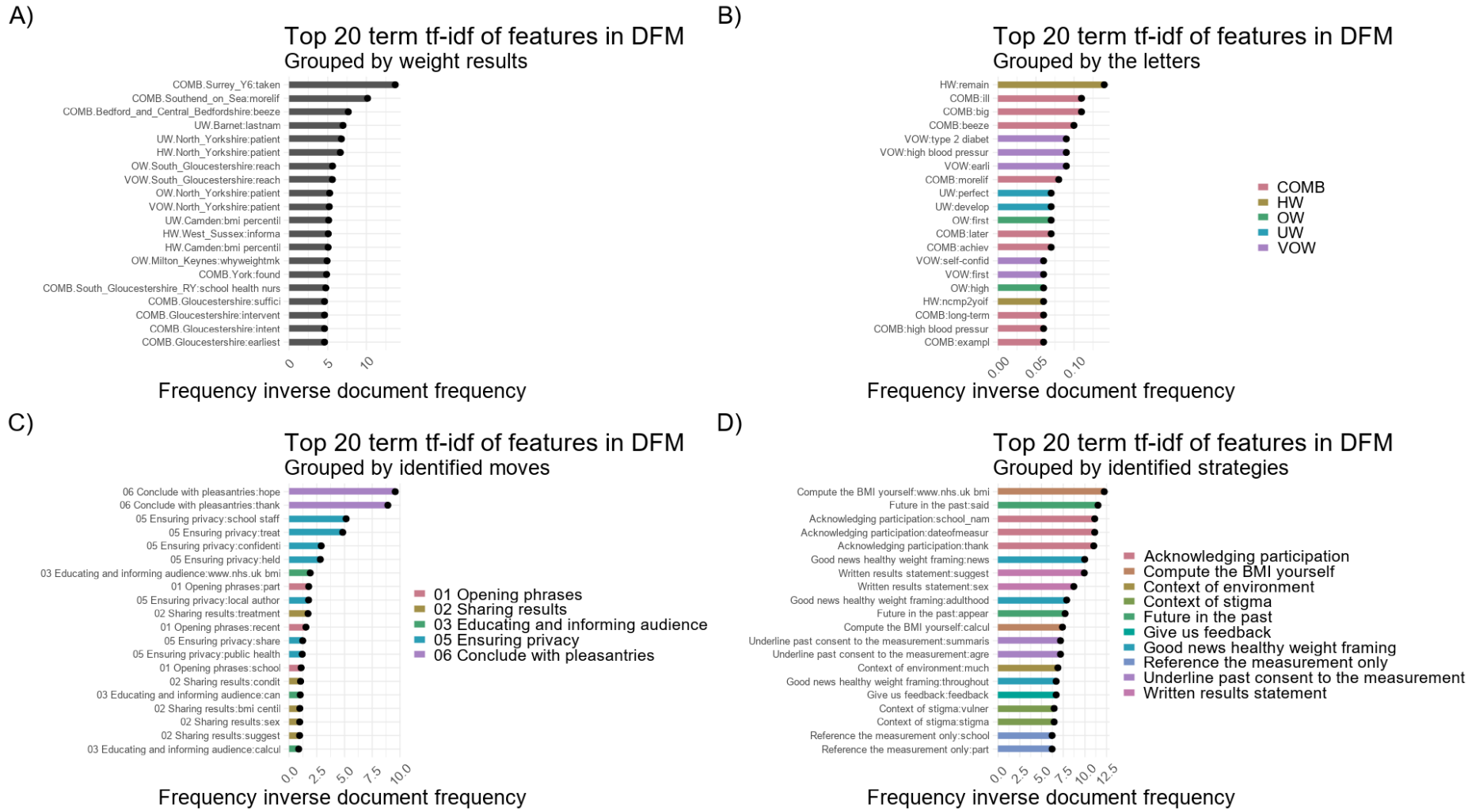

Figure 16: TF-IDF of Tokens

3.5.4.2 Analyses of diversity, keyness, and sentiment

Figure 63 (Appendix 3.3.2) presents the lexical diversity across different weight versions (Panel A) and all letters from LGAs (Panel B). The lexical diversity is based on the number of unique features and the lengths of the documents; thus it can express the complexity utilised to express the message to the reader (Watanabe & Müller, 2019). The computed statistics is the ratio of the total number of tokens/tokens type, or more specifically, Type-Token Ratio or TTR (Benoit, 2020). The number reflects lexical variations; the higher number suggests that the utilised vocabulary to reflect the message is more varied. Panel A shows that the different versions of letters are similarly varied between TTR from 0.4 to 0.8, but the COMB version's TTR suggests that this type of letter uses more varied vocabulary. Panel B shows the variation across letters from all LGAs (the grouping is, therefore, the LGAs). Most letters are within 0.2 to 0.4, which indicates the letters' linguistic complexity is low; in other words, they are simpler. However, some LGAs had relatively complex letters, as shown by the LGAs above the ninth decile. This shows that the letters differ despite being a document produced through guidelines.

Figure 64 (Appendix 3.3.2) presents the keyness – a measure of differential associations among keywords in a target and reference group (Benoit, 2020). In this case, the measure of association is a Chi-Squared test statistic, and the higher values indicate a stronger association. The bars filled with the blue colour indicate the association between the words and the reference (in this case healthy weight version of the letter), while the grey colour fill is used for the target group (other weight versions of the letter). For example, looking at all panels presented in Figure 64, the strongest association for the target group is usually between the word delivering the result and the group, such as "overweight" in Panel C. Interpreting the plot further, the interesting aspect is the focus on weight "problematisation" in all target groups, i.e., the UW, OW, VOW, and COMB versions (using the word "problem") while the reference group (HW) were to "remain" or maintain the status.

The last Figure 65 (Appendix 3.3.2) is the sentiment analysis that was conducted on weight results categories (Panel A), moves (Panel B), and strategies (Panel C). The sentiment analysis was utilised using the Lexicoder Sentiment Dictionary (LSD) implemented in quanteda (Young & Soroka, 2012a; Young & Soroka, 2012b). The purpose of sentiment analysis is to provide a computerised alternative to human coding. A negative or a positive sentiment was coded when a pre-defined word in the dictionary (the LSD) matched the word in a document or corpus. Figure 65 showed that negative sentiment occurred in UW, OW, and VOW letters (to a lesser extent in COMB version), was specifically related to Moves 03 (Educating and informing audience) and 04 (Appeal to action or change), and even more specifically to the strategy focusing on the "Context of health".

3.6 Study Conclusions

The first study delivered a complex outline of the NCMP in England from the national perspective. The following section summarises the key results of the three parts – Descriptive analysis (Part 1), Genre analysis (Part 2), and Quantitative text analysis (Part 3).

3.6.1 Key findings

3.6.1.1 Descriptive analysis

The analysis has highlighted the varied practice and responsibilities in the NCMP. A high proportion of LGAs commission the NCMP to provider organisations, modify the PHE

specimen result letter and include further information about local services. This, as well as the varied modes of delivering the NCMP, and in some instances not performing some of the NCMP mechanisms due to factors such as cost, raises questions about the comparable nature of the NCMP and the ability to highlight good practice that can be translated to other LGAs.

Furthermore, methods of delivering the pre-measurement letter varied; the most common method was in the children's school bag. Most LGAs altered the PHE specimen letter, with a small percentage reporting that they had never seen it.

Most result letters are posted to parents, with few sending the letter via children's school bag. Alongside the result letter, most LGAs include attachments such as healthy eating guides, information about local services, and Change4Life leaflets. Many LGAs do not provide result letters to all children, and in most cases, parents of children assigned within the healthy weight range do not receive the letter.

The cost was the most common reason why LGAs do not provide proactive follow-up and do not have child weight management services. Regrettably, the provision of the NCMP relies on printed materials, and electronic delivery methods remain underutilised, as evidenced in the findings.

3.6.1.2 Genre analysis and individual moves

The analysis identified six essential moves and twenty-eight strategies that occurred in most of the letters. These moves had specific use and place within the letter. Moves 01, 05, 06, and selected visuals from Move 02 are provided in Appendix 3.2.

The first move (01) featured strategies utilised to introduce the letter and set the stage. As such, the move occurred in the early paragraphs of the letter. The two most notable strategies of the move were "Rationalizing the letter and the NCMP" and "Reference the measurement and the letters".

The move that typically followed was "Sharing results" (Move 02). This move was linked directly to the communicative purpose of the genre and was also the most varied move, with nine strategies in total. The four most essential strategies focused on: delivering results in tables from either the early 2017s specimen (coded as "Table Specimen 2014 - 2017") or alternative specimen (coded as "Table Specimen 2018"), providing results as "Written results statement" to the parents, and "Acknowledging the limitations of the NCMP". The strategies were varied between each other but did not vary within themselves.

The follow-up Move 03 frequently co-occurred with the Move 04. These two moves were often intertwined in a single sentence (or a paragraph) about the health consequences of results ("Educating and informing the audience") followed by a sentence providing an appeal to action ("Appeal to action or change"). As opposed to Move 02, these moves varied further depending on the result of the letter. There was a clear tendency to incite action if the result suggested any result different than the healthy weight category. The most common strategies in move 03 focused on computing the BMI ("Compute the BMI yourself") and framing the results in the context of health ("Context of health"). Framing the results in other contexts (such as stigma or environment) were rare. The three most common strategies in the Move 04 appealed to parents that a behavioural change can be small and simple ("Change is a simple argument") and instructed them to do an action either as a directive ("Instructions as directives and obligations") or a suggestion ("Instructions as suggestions and possibilities"). The strategies to instruct parents and incite behavioural actions were some of the most referenced strategies.

This was interesting because it expands the initial communicative purpose of only “sharing the results” to lifestyle intervention.

Move 05 was minimalistic and did not feature any strategies. The Move 05 occurred in various places but usually revolved around statements explaining that results are confidential (“Ensuring privacy”). The structural element “Private and confidential” fulfilled a similar role.

Finally, Move 06 was a phrase indicating the intention of leaving the communication (i.e., “Conclude with pleasantries”). This move also did not have any strategies. The move was a polite conclusion of the letter; however, when the letters were not of healthy weight, it often featured a “hopeful” expectation that a reader will contact an LGA.

3.6.1.3 Quantitative text analysis

The final part utilised frequencies, analyses of linguistic features (e.g., sentiment analysis in Section 3.5.4.2 and Appendix 3.3.2.3), hierarchical clustering, and topic modelling (provided in Appendix 3.3.4 and 3.3.5) to provide further information about the letters’ language and complement the genre analysis.

The most common feature in terms of total and relative frequency in the corpus of the collected letters was the token “child”. This was also the most common feature irrespective of the letter weight version and was usually found within Move 02 – “Sharing the results” and the strategy “Acknowledging the limitations of the results”.

The unique features (i.e., weighting the tokens) allowed nuanced analysis across the various groups (TF-IDF). Each weight category of the letter had a specific token that was the most representative. The most common unique token associated with healthy weight letters was “remain”, while for combined letters, it was “big” and “ill”. The unique tokens confirmed the medicalisation language prevalent within the letters for the very overweight and, to some extent, the overweight letters. These letters included tokens such as “type 2 diabetes”, “high blood pressure”, which was specific only to these types of letters. On the contrary, the underweight letters had a specific acknowledgement “perfect” from the sentence mentioning that most children are “perfectly healthy” even though they were classed with underweight, which seemed to mitigate a possible negative impact of the results. Similarly to weight categories, each move and strategy had its unique features as discussed in the results (for example, “Thank you” in the Move 06). However, the analysis across moves and strategies was less revealing.

The feature co-occurrence further confirmed that the most focused features were “health”, “healthi”, “weight”, “child”, and “can” which were the central features across all five categories of letters (i.e., COMB, HW, UW, OW, and VOW).

Further analytics revealed that most letters’ lexical diversity was within 0.2 to 0.4 TTR, indicating that the letters were less complex and simpler. Importantly, the keyness across weight categories revealed the focus on weight medicalisation across the “non-healthy” weight categories. Finally, the sentiment analysis revealed that these letters are also associated with a negative sentiment as opposed to the healthy version letters. In terms of the moves, negative sentiment occurred most often in the third move (Educating and informing the audience).

4 Study 2 – Enhancing the NCMP Feedback Letters and Measuring Parental Opinions

4.1 Research Questions and Aims

The previous study explored the operational delivery of the NCMP and provided a greater understanding of the rationale behind the result letters. The preliminary results of the first study enabled the development of the letter. This process is further discussed in the current chapter.

Once the letters were prepared, Study 2 aimed to understand how these letters perform compared to the letters issued at local authorities from standardised PHE templates. Specifically, the study had two objectives. First, to understand if the letters are perceived favourably by parents of children with weight status outside the “healthy” weight category (In this sense, “more favourably” referred to parental user experience with the letter.) Second, whether these letters translate into actual behaviours such as calling a school nurse or GP.

Two questions were developed to guide these aims and objectives. The first research question was “What are the opinions of parents or carers about the NCMP result letters?” and the second was “How can the current NCMP result letters be further improved?”. These questions were answered through experimental comparison of the new letters against the standard letters across various LGAs, including Lewisham Borough and Suffolk CC. The first question was, in addition, tested as part of the national survey that was conducted to mitigate the low participant response rate.

The second study approached these questions quantitatively and relied on traditional experimental methods. This was in striking contrast to Study 3, which explored the identical two questions using a qualitative approach.

In Study 2, the survey was used to understand both research questions described above, and the main outcomes were measured from responses to an online survey. Dependent variables referred to specific questionnaire scales, i.e., one dependent variable equalled to one question or category in the measure. These variables were analysed using simple linear regression and logistic regression. Specifically, linear regression was used where the outcome was in ratio or interval level of measurement, and logistic regression was used for ordinal (binary) level. These methods were chosen as they allowed to explain specific relationships among observed variables (these were plotted in advance on DAG (Directed Acyclic Graph) to illustrate the key relationships). The study was also pre-registered, which can be used to prove that the analytical steps were determined prior to data collection (Čadek et al., 2019).

Two scales were included in the survey to guide the research. First was the User Experience Questionnaire developed by Laugwitz et al. (2008), which is a standardised method of evaluating various tools, for example, websites or computer software. The second was a number of questions focusing on the behavioural actions of parents after reading the letters. For example, whether they have contacted GP or shared the letter with children. These two scales are described in the two paragraphs below as part one and part two respectively.

The study started as a cluster randomised control trial but was later re-designed as observational (quasi-experimental) due to insufficient sample size and other challenges discussed further in the method section. These challenges prevented achieving the aims stated above as the findings cannot be presented with confidence. This primarily impacted the findings regarding the behavioural actions of parents (e.g., contacting GP), where robust

sample sizes were required. Therefore, the findings related to the User Experience Survey are presented since an effect was observed.

Some limited evidence showed that parents perceived unfavourably the letter that stated their child was classed outside the healthy range. Specifically, the Attractiveness was lower by -2.24 for letter delivered to children identified as underweight, overweight, or very overweight than the healthy weight children [SE = 0.29, 95% CI - 2.81 to -1.67, $p < 0.05$, Adj. $R^2 = 0.46$]. Similar results (i.e., for letters addressed to children outside healthy weight) were evident for dependability which was -1.53 lower [SE = 0.25, 95% CI -2.03 to -1.04, $p < 0.05$, Adj. $R^2 = 0.37$], efficiency which was -1.46 lower [SE = 0.27, 95% CI -2.00 to -0.92, $p < 0.05$, Adj. $R^2 = 0.29$], perspicuity which was -0.89 lower [SE = 0.34, 95% CI -1.58 to -0.21, $p < 0.05$, Adj. $R^2 = 0.06$], and for stimulation which was – 1.50 for [SE = 0.31, 95% CI -2.13 to -0.88 , $p < 0.05$, Adj. $R^2 = 0.21$].

These selected findings proved potentially the most valuable and demonstrated that parents of children with underweight, overweight, and very overweight status had worsened experience with the letter compared to parents of children with healthy weight. These findings demonstrate the feasibility of measures such as the UEQ (User Experience Questionnaire), which should be used and extended in future studies. In addition, the study provided a methodological contribution and showed that a short feedback questionnaire could be embedded in the letters to measure parental experience with the NCMP.

4.2 Methods of Study 2 – Enhancing the NCMP Feedback Letters and Measuring Parental Opinions

The second study required an open-minded approach as several of the initial designs that were developed for the study were regarded impractical by Suffolk CC. Furthermore, when the study commenced, it faced low response rates from the target population in all sites where was the study deployed. For this reason, the current section will provide a further reflection of the process to clarify the journey of Study 2.

4.2.1 DELPHI Guided Development of the New Letters

The process began between Study 1 and Study 2. After the sampling of LGAs and relevant documents was completed in Study 1, the new letters were developed based on preliminary results. This involved sampling of 10 stakeholders involved in different perspectives of the NCMP (including myself as a principal investigator) who agreed to participate in the development of the letter in an internet-based Delphi process (Cole et al., 2013).

Preparations for the development of the letters for Suffolk commenced in May 2018, when preliminary data were gathered from the survey. Preliminary analyses were conducted on gathered letters from LGAs to understand the letters across local authorities. From then on, the goal was to develop alternative letters. Based on data from the survey, gathered letters, and reviewed literature, the aim was to improve the standard NCMP result letters in the following aspects:

1. Using weight neutral language (e.g., terms such as “overweight” or “very overweight” were replaced with “weight above the expected level for their age”)
2. Avoiding confrontational tone and preferring indirect tone (i.e., giving parents a choice to follow-up with the service was favoured over expecting them to do so) while aiming to be persuasive

3. Simplifying the language in the letters, improving readability, and thus, making them more accessible to a wider audience
4. Using more supportive language, and assuming parents have the required levels of self-efficacy to take actions themselves without being nudged or opted-in by default.

These elements were key to developing the first version of the letters created in July 2018. Two strands of research supported the focus on these elements.

First, there was the previous work of researchers such as Mooney et al. (2010), Syrad et al. (2014), Nnyanzi et al. (2016), and other mentioned in the Introduction section. The authors of these studies investigated parental reactions towards the letters. An especially relevant finding from this strand of research is the lower utility of letters among parents who received the letter outside the "healthy" category for their children. Most of these parents also reported mixed reactions towards the NCMP feedback and typically represented the largest proportion of dissatisfied responses towards the feedback. Additionally, parents complained about the lack of individuality and feelings of shock and disgust (largely due to the terminology).

Second, the preliminary findings from the first study helped to identify parts of letters that were underutilised. Specifically, the initial stages of genre analysis allowed that. Section 4.5.3.8, which describes the moves projected onto the letter, shows the final stage of the analysis. Especially Move 03 (Educating and informing the audience) and Move 04 (Appeal to action or change) helped to generate the new letters. The genre analysis showed that these moves are dominated by elements of direct, assertive language that uses medical information to drive change. Therefore, the new letters had to offer a viable alternative to parents.

Using these two strands of research, the new letters were developed following the visual format of letters issued by the PHE. The letters were developed to be comparable in terms of word count and utilised the same headers and footers. The letters focused on changes in the language and did not include any additional visual elements such as infographics to explain the feedback. They also included identical attachments, links, and other common elements. The rest of the changes aligned with the four bullet points discussed above.

After developing and drafting the first version, the letters were further refined using a modified version of the e-Delphi procedure (Bobeva & Day, 2005; Cole et al., 2013). The Delphi procedure is essentially *"a group method that is administered by a researcher or research team who assembles a panel of experts, poses questions, syntheses feedback, and guides the group toward its goal—consensus"* which allows *"for the introduction and integration of viewpoints, opinions, and insights from a wide array of stakeholders"* (Cole et al., 2013, pp. 512–513). The e-Delphi is the same process with the use of the Internet as the collaboration medium (Cole et al., 2013). The modifications that I have applied followed some pragmatic decisions that had to be applied given the circumstances. The full e-Delphi process (despite being more convenient than traditional Delphi) can take two or more months depending on the number of administrated studies (Cole et al., 2013). However, the challenge was that Suffolk CC originally required the letters to be developed by the end of the school year – after negotiation, they agreed to push the letters until the 17th of August 2018. This was required to ensure that the letters were ready for September 2018, when the measurements were due to take place in Suffolk CC.

To ensure the evaluation and development of the letters on time, the e-Delphi process was simplified into two phases, during which expert stakeholders had an opportunity to review the letters iteratively. An expert was defined as anyone who could provide their feedback because

of their experience with the NCMP. This experience could be either through their research expertise (an academic), direct involvement as a recipient (parent), or provide (school nurse). Notably, such definition of expertise allowed participation of a wide and diverse audience from parents to academics.

The invited experts were asked to provide feedback, opinions, and feelings they had about the letters in each phase. The aim was to gather the opinions of all experts and then synthesise the opinions at the end of each phase and produce the letters that reflect these opinions and address the feedback of all the stakeholders.

To facilitate the process of letter development and allow all opinions to be interactive, the development was hosted on an external website called realtimeboard.com (now miro.com). Miro functions as a whiteboard where letters were uploaded, and the experts could comment and highlight specific parts of the letters with all comments visible to other participants. This ensured the process was interactive, and all participants were able to collaborate. Figure 1 in Appendix 2.2.6 shows a screenshot of how the process looked when hosted on the website (a platform for collaborative feedback).

In the first phase, drafted versions of the new letters were uploaded on Miro, and the experts were given a week to present their views. Once they commented, the reviews were collated, and the new version of the letters were produced. Experts were then invited to participate in a second phase where they shared their views on upgraded letters. Not all experts felt they required any changes. Any further comments were collated again, and the final version of the letters was produced.

The process followed recommendations by Cole, Donohoe and Stellefson (2013), who applied the adapted Delphi process over the Internet and Day and Bobeva (2005) recommendations to guide the design choices. Table 7 below shows the design choices I had taken to apply the simplified Delphi process to evaluate the letters.

Table 7: Delphi Process for Developing the New Feedback Letters

Criteria	The choice for the letter development
Purpose of the study	Development of the NCMP result letters
Number of rounds	Two
Participants	A heterogeneous group of stakeholders
Mode of operation	Remote
Communication media	Internet (Miro.com)
Concurrency of rounds	Sequential

(Bobeva & Day, 2005, p. 105)

The two phases occurred in two consecutive online sessions between the 16th and 27th of July 2018. The following roles of stakeholders were represented: Principal researcher, Parent, PHE Representative, Health Improvement Commissioner, Academic, Service provider, School Nurse Lead. For example, parents were involved because they received the letter, nurses because they do measurements, PHE representatives as they organise the NCMP on the national level. The experts were recruited using convenience sampling, the PHE network, and research contacts. Each expert also represented a distinctive stage of the NCMP process,

the roles were heterogenous, and all opinions could have been considered while developing the letters.

To optimise the final version of letters further, the letters were assessed in terms of their readability using SMOG, Flesch – Kincaid, and Flesch measures, with both versions of letter fairing similarly across all categories (Burke & Greenberg, 2010). An English Language Teaching expert also reviewed the letters as the readability measures felt artificial and did not give me an idea of how well or "unwell" a native English speaker may read them. Professor Ivor Timmis, whose main research expertise is in analysing and teaching spoken language, kindly agreed to review the letters and further optimise them. This resulted in an additional two versions.

The letters were then further shortened and extensively debated with the Health Improvement Commissioner at Suffolk CC until a consensus was reached. This had to reflect any design changes that had to be done in the upcoming second study. The final version was then distributed in Suffolk CC as part of the second study (see the final letters in Appendix 2.4.2).

An additional version was also developed for Lewisham Borough. The version for Lewisham used the final version in Suffolk CC and made some local modifications that the Health Improvement Commissioners approved at Lewisham Borough (Appendix 2.4.2).

Results were four letters for an underweight, healthy weight, overweight, and very overweight result categories in Suffolk CC; and four letters for Lewisham Borough. At the end of each letter was a link requesting the reader to access a survey that was part of Study 2 – the development of the survey is described later in this section. The letter also included an attachment with Healthy tips developed by the C4L campaign, which were not modified. The letters were printed in black and white and scheduled for distribution up to 6 weeks after the measurement in both local authorities.

4.2.1.1 Ethics

The letter development happened as part of the collaborative feedback sessions between Study 1 and 2 and were formed from the panel of experts representing various stakeholder positions. Before participating, these experts were asked to read information about the sessions and provide signed informed consent to confirm their participation. The only information about these stakeholders I had stored was their job title, e.g., academic, PHE representative, and no personal data were stored. Hence, this element of Study 1 did not require special consideration above the ones already made as part of the national survey.

4.2.2 Survey

An online survey hosted on Qualtrics™ was developed to assess the questions proposed above; parents were asked to access an online survey that aimed to measure their opinions about the NCMP result letters and would provide data on how the NCMP letter improved the experience alongside demographic information and how they have used the letter. The survey was designed to collect the primary data as part of the second study; the secondary data were to be provided by OneLife Suffolk and contain information about the service uptake.

4.2.2.1 Survey development and procedure

The development of the survey had to be fast due to multiple changes in design, and the letter development had priority (discussed in the upcoming sections). The survey version for Suffolk

CC was developed in October 2018 and piloted on a convenient sample of colleagues and reviewed by Suffolk CC representatives. The version for Lewisham Borough was nearly identical and was opened for participants in March 2019; finally, the national version followed in July 2019. All versions, as mentioned, were nearly identical. They differed only in demographic questions and localised information sheet and debrief document (See Appendices 2.4.4, 2.4.5, and 2.4.6 for each version).

The survey was designed first to display the information sheet that participants could read with contact details on the researcher. This was followed by the consent form, which was localised depending on survey iteration.

The next section was a block of questions asking about respondents' actions associated with the letter. The questions were planned to measure whether survey respondents acted differently based on the letter version (control, experimental, and weight category) they have received, thus, they were the first dependent variable being measured.

This was followed by a longer section asking about user experience regarding the NCMP letters, an online version of the 26-item long User Experience Questionnaire (UEQ) hosted on QualtricsTM, further described in the measures section below (Laugwitz et al., 2008). The UEQ was the second dependent variable being measured in the survey (the final was the secondary data provided by OneLife Suffolk about the service uptake).

The participants then answered several demographic questions, optionally provided their contact details, and arrived on the final page, the debrief document.

4.2.2.2 Survey accessibility

The survey was accessible using a link that participants were asked to type into their browsers. The links were personalised and shortened using external provider Capsulink™ and were in the following format, for example, https://ncmp.me/1s (no longer active) where “ncmp.me/” was domain hosted on GoDaddy™ that I purchased, and the “1s” indicated a specific version of the letter (in this case the number “1” stood for Underweight result and “s” for Suffolk CC standard version). There were eight versions of such links, each for a specific letter (i.e., 4 different weight category results and 2 conditions). There was no other way to access the link at the beginning of Study 2; however, later – due to the low response rate, I have sent the links via an email to ease the access to the survey. To facilitate participation, an option to win one of four £25 amazon vouchers was offered to all participants who completed the survey and entered their contact details (i.e., phone or email) in Suffolk CC, and £35 in Lewisham Borough under the same conditions. However, for the national version, every participant who completed the survey could choose to donate £1 to one of two suggested charities in the survey until £200 of the total donation was reached.

4.2.2.3 Measures

The following section describes key outcome measures (dependent variables) that were included in the survey. These measures were represented in two blocks where the first block asked a series of questions about the parents' actions regarding the NCMP result, and the second block was the User Experience Questionnaire that measured participants' general attitudes towards the NCMP letter.

4.2.2.3.1 Actions about letter

The first block of the questions was the series of brief “Yes” or “No” items assessing how the parents or carers interacted with the letter and what actions did they take after receiving it.

The questions were similar across all sites; however, the national version of the survey had 4 questions to ensure the survey completion time was shortened while the other two sites had 7. Each question had assigned either high or low research priority depending on how important its evidence was to the research question, and questions with low priority were not included in the national version. Table 8 shows each question, the site where the question was asked, and its research priority. Table 8 is provided here as these questions are used later as dependent variables in Sections 4.6 and 4.7 where findings are discussed.

Table 8: Questions Regarding Parental Actions after Receiving the Feedback Letter

Question	Survey version	Research priority
Did you use the "http://www.nhs.uk/BMI" web link provided in the letter?	Suffolk, Lewisham	Low
Did you use the "NHS.uk/C4L" web link provided in the letter?	Suffolk, Lewisham	Low
Did you contact (e.g., sent an email, called, visited) any lifestyle service because of the letter?	Suffolk, Lewisham, National	High
Did you contact (e.g., sent an email, called, visited) a GP/Doctor because of the letter?	Suffolk, Lewisham, National	High
Did you contact (e.g., sent an email, called, visited) a School nurse or nursing team because of the letter?	Suffolk, Lewisham, National	High
Did you share the letter's result with your child? (e.g., discussed the results, presented them information regarding the result, mentioned their weight).	Suffolk, Lewisham, National	High
After receiving the letter has this changed your opinion of your child's weight?	Suffolk, Lewisham	Low

The following example shows how were the instructions for the questions in Table 8 phrased: “*Please answer all of the questions below. They're related directly to the letter you've used to access this survey.*” (Appendix 2.4.4.4).

The questions were based on recommendations and options available to parents in the letter. The questions were designed to be straightforward, easy to answer, and relevant to a specific behaviour, not constructs, concepts, or other latent variables. Participants had no option to skip any question or indicate they do not remember or do not know as the answer. It was assumed that participants could retrospectively confirm and remember if they engaged in the behaviour or not.

4.2.2.3.2 The User Experience Questionnaire

The second block of questions the participants saw in the online survey was the User Experience Questionnaire (Appendix 2.4.7).

To measure parental opinion regarding the result letters, I have focused on the construct of "user experience". The scoping review did not reveal many validated psychometric measures appropriate to measure the construct; however, one of them – User Experience Survey, was appropriately evidence-based; and, therefore, selected to measure parental attitudes towards the NCMP result letter (Laugwitz et al., 2008). The measure has been developed to assess the user experience of software users and has been validated and tested on several cases and another user context beyond software such as cell phone address book, websites, or other products that allowed the users to interact with it (Laugwitz et al., 2008; Schrepp et al., 2014). The letters were not a case that has been evaluated; therefore, I have discussed the appropriateness of the questionnaire with one of the authors of the measure (Dr Martin Schrepp). The author confirmed that despite the measure being developed primarily to test software, they are aware of other use cases, such as a household appliance. It was suggested that the measure should be retained in its original form to be able to utilise the benchmarks and ensure the instructions are sensible for the participants. It would be optimal also to pilot the measure. The pilot to standardise the measure was unfortunately not an option at the time given the short turnaround and required sample size to assess the measure psychometrically; thus, the measure was kept in its original form and instructions were modified to fit the letter evaluation (See Appendix 2.4.7).

The UEQ consists of 26 items and six factors of Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty (Laugwitz et al., 2008). There is also a short version of the measure (Hinderks et al., 2018); and UEQ+ that was made available in 2019 and included an option to include extension scales on top of the six standard scales (Schrepp & Thomaschewski, 2019). At the time, the best available evidence was for the original UEQ version with six factors (scales); thus, it was the version implemented in the survey (Laugwitz et al., 2008; Schrepp et al., 2017).

The factor structure assumed by the authors is hierarchical, with Attractiveness being the general factor which splits into two "qualities", pragmatic and hedonic (Schrepp et al., 2017). **Attractiveness** is defined as "*Overall impression of the product. Do users like or dislike it? Is it attractive, enjoyable or pleasing?*" with 6 items ranging from -3 to +3 (inclusive of 0) on a Likert scale, for example: "***annoying/enjoyable"*** (Schrepp et al., 2017, p. 41). The pragmatic qualities have 4 items of the same range. They are **Perspicuity** (*Is it easy to get familiar with the product? Is it easy to learn? Is the product easy to understand and clear? e.g., not understandable/understandable*), **Efficiency** (*Can users solve their tasks without unnecessary effort? Is the interaction efficient and fast? Does the product react fast to user input? e.g.: fast / slow*), **Dependability** (*Does the user feel in control of the interaction? Can he or she predict the system behaviour? Does the user feel safe when working with the product? e.g.: unpredictable / predictable*) (Schrepp et al., 2017, p. 41). The hedonic qualities also have 4 items of the same range and are **Stimulation** (*Is it exciting and motivating to use the product? Is it fun to use? e.g., valuable/inferior*), and **Novelty** (*Is the product innovative and creative? Does it capture users' attention? e.g., creative/dull*) (Schrepp et al., 2017, p. 41).

Cronbach's alpha for respective scales is Attractiveness = .89, Perspicuity = .82, Efficiency = .73, Dependability = .65, Stimulation = .76, Novelty = .83 (Laugwitz et al., 2008, p. 70). The

scales assume a hierarchical structure; however, the Attractiveness factor alongside other factors is measured directly, and the authors expect the general factor to correlate with other factors. Despite proclaiming 6 factors measured on 6 scales, the authors have provided evidence of a 5-factor solution of the scale and did not seem to assess the hierarchical structure utilising confirmatory factor analysis techniques (Laugwitz et al., 2008). This potential drawback will be further explored as part of the psychometrical evaluation of the scale.

The UEQ have been presented to participants with the following instructions, as shown in Figure 17:

The letter that you've received contains your child's NCMP measurement result and relevant information. We want to know if the letter communicates the results and information in an acceptable format.

The questionnaire below asks you about the format of the NCMP letter that you've received. The questionnaire consists of pairs of contrasting (i.e.: opposing) adjectives (e.g.: attractive - unattractive). For each adjective, please express your degree of agreement with the format of the letter by ticking a circle (i.e., selecting circle closer to the adjective means you agree more with it).

Please see this example below:

Example:

attractive	○	⊗	○	○	○	○	○	unattractive

The example means that the person "agrees" more with the adjective on left side.

Please tick a circle in every line even if you are not completely sure on your agreement with some of the adjectives.

Figure 17: The UEQ Instructions

Not all items were expected to be relevant; however, the aim was to use the scale as it was developed with all the benchmarks and retrospectively propose scale and item modification once data are available.

4.2.3 Sampling Designs, Challenges, and Recruitment

The study continued the research line set up by the first study. Due to various challenges discussed below and in Appendix 2.3 (Discussing Design Challenges), three major changes to design had to be implemented before reaching the final design. Only the final design is discussed in the upcoming sections. Further description of how the research design developed, the rationale, and discussion of practical limitations at each iteration of the design are explained in Appendix 2.3. Ultimately, Study 2 developed into another site at Lewisham, and as noted before, the first question was further investigated across all schools on a national level.

4.2.3.1 Final Design – Quasi-experimental approach

The standard letters that have been developed by Suffolk CC and used in previous years went to Year 6 on the 9th of November 2018. These letters, however, were delivered with the links that allowed parents to access an online survey and provide their opinion about the letters. The only option for comparison was to deliver the experimental letters to all children in the Reception year. The first of these letters was due to be sent in January and went out between the 15th of January 2019 and June/early July 2018. The longer period for the delivery was due to other health services attached to the Reception year; thus, much more varied measurement dates.

The design of this type is "*similar to experimental research in terms of having treatments, outcome measures, and experimental units. Quasi-experimental research does not, however, use random assignment to treatment conditions, usually because doing so is not feasible*" (Teddlie & Tashakkori, 2009, p. 24). The design evolved in a dynamic research process where all the other options were exhausted, and the quasi-experimental design was the only feasible option remaining (as per further details provided in Appendix 2.3 Discussing Design Challenges). The dynamic element of the research was something accepted as a natural part of applied research and a completely novel experience to experimental research I had conducted in the past (e.g., Flint et al., 2016). This design was thus the acceptable option when the control over variables known as "independent" or "explanatory" was limited – this was a first-hand experience that had a profound impact and something that somehow eluded me when reading methodological literature before the development of the study.

The upcoming sections describe the key variables identified as part of the quasi-experimental design in Suffolk CC and review the practical challenges identified as part of the final design. These practical challenges then give a start to the solutions offered. Finally, the Study 2 section concludes with proposed analyses for Study 2.

4.2.3.1.1 Final Design – Practical challenges

As opposed to previous design iterations, the final design was acceptable for all stakeholders on the side of the NCMP at Suffolk CC. In other words, the only additional work was for the CYP to ensure correct links were attached at the end of each letter.

The design brought research challenges that were difficult to anticipate due to its last-minute implementation. As a researcher, I lost control over the sampling procedure and could not predict which schools received specific letters. Additionally, iterating over three research designs between August and November 2018 took its toll in the required time to ensure the research quality was not compromised. These preparations also involved extensive communication with Suffolk CC representatives and other stakeholders in the area, and the communication often occurred with long delays before every member on the corresponding side met and formulated an appropriate answer.

Suffice to say, the challenges that were to come could have been mitigated if smoother design implementation was in place and each stakeholder could carefully consider all possible issues.

Soon after the letters were sent out in November 2018, it became apparent that the response rates to the survey would be a major challenge. The preliminary estimates suggested that 20% of participants would respond to the survey. However, the response rates were between 0.5% to 1%. Several steps were taken to address the low response rate in the order presented below.

1. Collaborating with Suffolk CC, a series of messages directed to schools in Suffolk were distributed using Suffolk Headlines (an online Newsletter) between January – July 2019. Appendix 2.4.8 shows templates of the messages that were distributed. The messages asked schools to support parents in accessing the survey by informing them about the option to leave feedback. The messages did not improve the response rate of the survey.
2. Personalised e-mails requesting support with the research and encouraging parents to participate were sent to an administrative email of Suffolk schools and addressed to Head Teachers (N = 249). Schools were selected as they are the primary contact with parents. This was done between March – June 2019, and two versions of the

messages were distributed. The first asked schools to share a template using a school email list to parents, but the template simply encouraged parents to look at the letter they had received. Later version changed the template letter by providing links that were possible to use to access the survey. I sent the survey, and in the email, I mentioned collaboration with Suffolk CC and the NCMP team at PHE to support the message's credibility. The mail was delivered using a bulk option of my university email. Of 249 schools I attempted to contact, 32 replied, and only 7 did not distribute the templates to parents. Regrettably, Suffolk CC did not support the delivery of the messages to schools directly across their local authority, which was potentially detrimental to the response rate. The low response rate was also likely a result of internal spam filters at the University mail system I was not aware of at the time. The system probably blocked the delivery of some of the messages as there are internal limits on the maximum number of messages possible to deliver from one email address set up by the mail provider. Even with this, I was aware of 25 institutions that encouraged parents to provide feedback; however, the response rate did not improve.

3. I asked for support from the OneLife Healthy Lifestyle Services Manager in January 2019; however, after the initial agreement to recruit parents through a few schools contacted via OneLife, the collaboration did not result in any recruitment attempts regarding schools. In February 2019, the provider did not confirm whether they attempted to send this to any school but said they encouraged the children's team to ask parents to participate; however, that was about 20 parents. The collaboration with the service manager at OneLife did not bring more participants.

None of the attempts above seemed efficient methods of improving the recruitment rates of parents to the online survey. Consequently, my supervisors and I agreed to run the study on a new site. This resulted in collaboration with Lewisham Borough, who agreed to participate and run the trial in their area. Also, the survey was converted to a national version that could be distributed to any parent in any local authority. Both attempts are described below.

4.2.3.1.2 Lewisham site

The collaboration with Lewisham was initiated in January 2019 when it was clear that Suffolk CC was unable to run the trial and aimed to commence with the trial in Lewisham in March 2019. Contacts were established with Public Health Strategist and Community Matron CYP Public/School Health, who were the key representatives at Lewisham and helped organise the trial's local side.

Across multiple online meetings, we prepared a new experimental version of the letter for Lewisham Borough to be tested alongside their standard (control) version. The preparations were straightforward because the new letter was based on the Suffolk version (Appendices 2.4.2.1 to 2.4.2.9); therefore, it was only necessary to localise the letter (Appendices 2.4.2.10 to 2.4.2.21). The trial was intended to run according to what was described as design 1 in the section above (Sallis, 2014a; Sallis, 2014b). In other words, the trial was CRCT with simple random allocation where both Year 6 and Reception year children's parents had an equal chance to receive either experimental or control version of the letter.

The experimental letter was comparable to the letter in Suffolk. The letter also utilised the same recruitment method for participants and the same online survey accessible using a link at the end of the letter. In addition, the respondents had a chance to win one of four £35 Amazon™ vouchers in Lewisham Borough as an incentive (which was increased to facilitate response rates).

The randomisation was based on the list of schools provided by Lewisham. These schools were checked against the same database utilised in developing the lists for Suffolk (GIAS), and any discrepancies were consulted with Lewisham's representatives, who clarified them. Once the letters were developed and we agreed on experimental and control clusters of schools, the letters were disseminated, which was organised by the representatives at Lewisham. The letters were sent out on the 15th of March 2018 to clusters of participants that were randomly assigned to one of two between-subject conditions. Clusters were 69 schools located in the Borough of Lewisham.

To ensure complete transparency and communicate the design with Lewisham's representatives, the trial was pre-registered on "https://osf.io/jwq2u" as a publicly accessible registration on Open Science Framework (OSF) registries developed by the Center for Open Science (COS). The registry will remain accessible on the OSF as evidence of how the trial was planned and what analyses were conducted.

Despite the increased incentive and improved support from the local authority, the Lewisham site did not have a better response rate than the Suffolk site. To increase the response rate in Lewisham, newsletters were distributed among the schools (Appendix 2.4.8.4), and an email was sent to all headteachers in Lewisham Borough (2.4.8.3) with the request to encourage parents to participate in the survey. Unfortunately, neither method led to an increased response rate.

Considering the issues with recruitment, I concluded with my supervisors that the survey was difficult to access for participants, and we needed to approach the population differently. Specifically, it is possible that asking participants to fill any link in their browser at the end of the result letter was too many steps; the participants may have also overlooked the links at the end as they were not highlighted (letters were in greyscale). For this purpose, we decided to send out a national survey aimed to be delivered directly to parents with support from schools across various LGAs. This final attempt to increase the response rate is discussed in the section below.

4.2.3.1.3 National sampling

The national survey was a strategy to tackle low response rates that did not improve despite the attempts discussed above. Therefore, the decision to do the national sampling was taken in June 2019, and the sampling utilised the modified version of the survey (Appendix 2.4.6), which was shortened to facilitate response rates. Additionally, rather than including participants in a prize draw, they had an option to nominate one of two charities, and upon their successful survey completion, I would donate £1 to a charity they have selected (with a maximum limit of £200). This was done to alleviate the feeling that some participants could be uncomfortable receiving a monetary incentive.

To ensure the survey was accessible, I developed a mail template (Appendix 2.4.8.5) disseminated to all schools in England with a single point of access to the survey. There were no letter-specific links, only one link "ncmp.me/survey" that included all the information, consent, survey, and debrief. The survey was meant to be delivered from school via parental email; therefore, parents could access the survey from within their email on their PC, laptop, tablet, and mobile phones.

To send emails to schools in England, I requested a database of all primary and secondary schools in England from the Department of Education using freedom of information request. In the request (Appendix 2.4.9), I asked for an administrative email or another publicly

available email contact. After filtering out all secondary schools and duplicate email addresses, a database of 18,523 schools was prepared.

Given the sampling frame, the distribution of the survey had to be redesigned as I was already aware of system restrictions regarding spam filtering. The option to send this quantity of email is only viable using commercial third-party services (such as MailChimp™). Leeds Beckett University uses a service known as Campaign Monitor™; therefore, I discussed the option to use the service to deliver emails to schools with the research office at LBU – they agreed, and we collaboratively distributed the emails on 12th July 2019. Of all the emails, 17,623 schools were contacted (after removing contacts previously reached). By the 16th of July, 2,249 schools were registered as "unique opens" and 14,872 as unopened. This was likely because the survey was sent near the end of the academic year. To further facilitate the response rates, Twitter, Facebook, and social forums were approached with a message where I asked the administrators to share the survey or directly shared it myself where possible (Appendix 2.4.8.6).

The strategy utilising campaign monitor was probably most effective as it allowed to utilise a larger sampling frame compared to previous approaches; however, it was utilised too late, and despite its relative utility, only 339 responses were registered in the national survey. Furthermore, of these responses, most were incomplete or invalid; therefore, the sampling did increase only marginally.

As indicated at the beginning of the section, the second study was challenging, and I believe appropriate space was required to discuss the study methods, sampling approaches, and strategies to increase the sampling rate utilised. This should clarify the decisions I have made regarding the methodology of the second study.

4.2.4 Design of Analyses

The survey was designed to be analysed using linear and logistic regression models. This was considered during the survey design and transparently communicated as part of the pre-registered study report submitted to OSF on the 18th of March 2018. As shown in Figure 37 in Appendix 2.4.3, the blocks in the survey were designed to represent corresponding dependent and independent variables. For example, below is the national version of the survey (surveys had a similar logic flow). The blocks "Actions associated with the letter" and "Feedback about the letter" are the two outcome variables (Figure 37 in Appendix 2.4.3). The first contained questions in Table 8 in Section 4.2.2.3.1, and the second was the UEQ inventory. The "Demographic Questions…" was block with explanatory variables and contained information about participants.

Given the quasi-experimental nature of the study, it was appropriate to design Directed acyclic graph (DAG), which helped to show how the analytical process worked. This is discussed below.

4.2.4.1 Outcome variables

As per the OSF report (Čadek et al., 2019), the following outcome variables were being tested:

1. User experience was measured as an arithmetic mean score across six scales in the User Experience Questionnaire (Laugwitz et al., 2008).

2. Parent's interaction was measured by a series of Yes/No questions (7 questions in Lewisham and Suffolk, 5 in a national survey).
3. The number of contacts was measured as the number of referrals to the NCMP public health team. Numbers were provided as secondary data by OneLife Suffolk. This variable was available only in Suffolk CC.

These variables are each represented in the following DAGs, which make "*an assumption linking the causal structure represented by the DAG to the data obtained in a study*" (Hernán & Robins, 2020). These assumptions help to create an analytical model (DAG) that provides graphical representations of assumptions, and given these assumptions, the model can be used in the process of inference (Pearl & Robins, 2018). The quasi-experimental nature of the study is certainly a limitation when I wish to claim causality; however, these graphs are useful guidance showing assumptions where inference of causality is made if there remain no unadjusted biases (Pearl & Robins, 2018).

The 1) UEQ was represented under the following analytical model:

Model 1: User Experience Questionnaire

Figure 18: DAG – User Experience Questionnaire

The 2) parent's interactions and actions have given the letter were represented under the following analytical model:

Model 2: Interaction with the letter

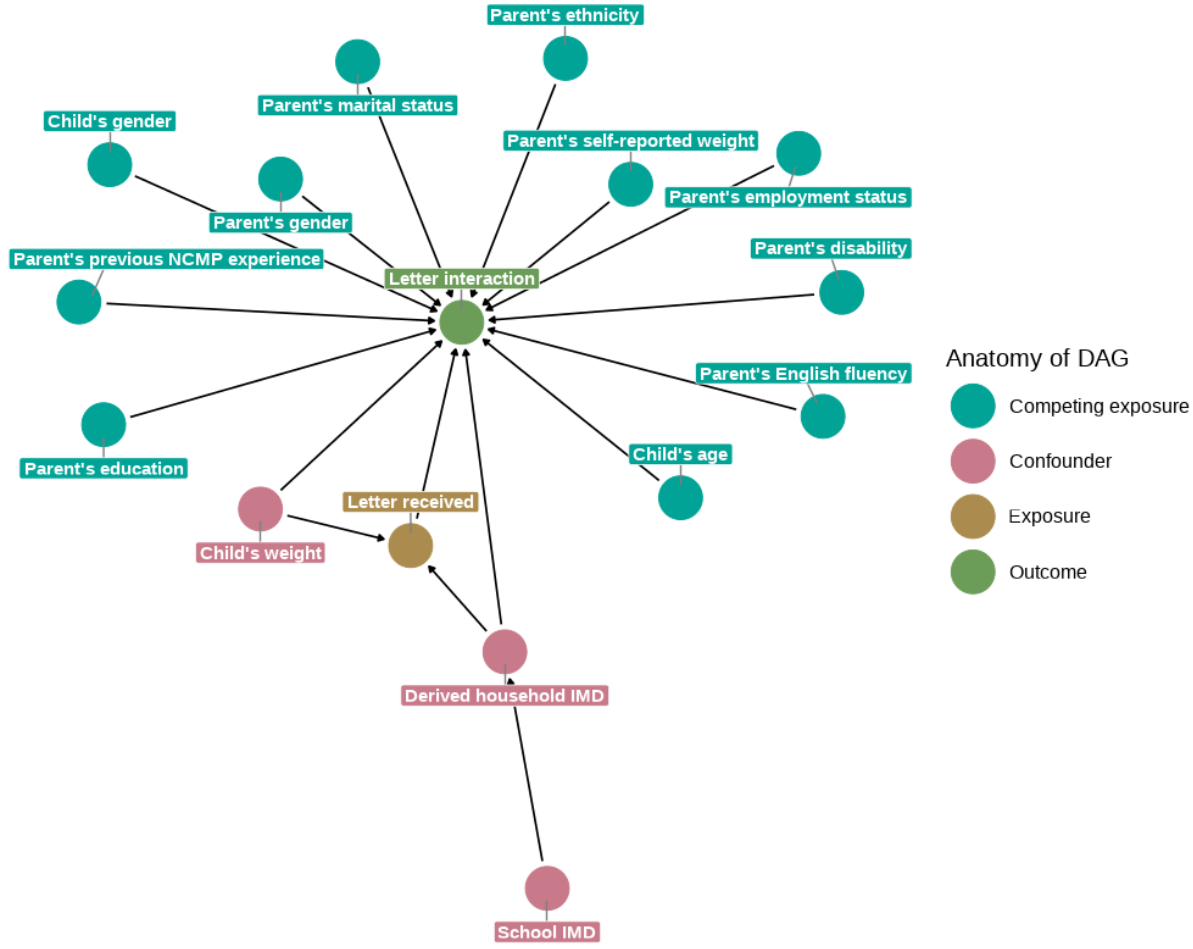

Figure 19: DAG – Interaction with the letter

Finally, 3) the number of service referrals were represented under the following model:

Model 3: OneLife service uptake

Figure 20: DAG – OneLife Service Uptake

4.2.4.2 Survey analysis

The survey analyses were either linear or logistic regression depending on the outcome variables.

Specifically, linear regression predicting user experience was used to explore the impact of the letters with control and experimental conditions as a dummy variable. Given the low sample size, various models were tested, and data were aggregated (e.g., overweight + very overweight).

Logistic regression was used to predict parents' interaction with the letter with control and experimental conditions as a dummy variable. The dependent variables were always a single question, and due to the low sample size, the analyses suffered from similar limitations. A similar model was used to predict the number of contacts/referrals where the dummy variable was also the condition assigned to the participant.

The national survey data used aggregated data from all sites and focused on understanding how the result described in the letter impacts the perception of the letter. Letters were aggregated as “healthy” and “non-healthy”, and the expectation was that the unhealthy letters would lead to a worse perception of the letters. The nature of the data was observational, and no assumption of causality was asserted.

4.3 Ethical Considerations in Study 2

Study 2 was approved with modifications in June 2019 (originally in November 2018) under reference 61319. The completed form is part of Appendix 2.8.2. Study two can be separated into three parts or sites, i.e., Suffolk CC, Lewisham Borough, and national survey sites.

4.3.1 Suffolk, Lewisham, and national sites

The main ethical consideration stemmed from the fact that parents received different letters, experimental and control. Therefore, I had to ensure that the experience resulting from one letter was not worse than from the other for parents, carers and their children.

In the case of the control version, this seemed unlikely as parents received letters that have been used last year. Furthermore, these letters were considered standard and have been created following guidelines developed at PHE. Therefore, it was not expected that the control version would pose significant discomfort to participants as similar letters have been tested and used previously.

Regarding the experimental version; these letters aimed to improve the experience and were the result of the collaborative expert review in a Delphi process. Therefore, the letters were not expected to lead to worsened experiences in comparison to the standard letters.

Parents were informed in Suffolk on opt-out letters that the information between OneLife Suffolk and Leeds Beckett University are being shared; thus, it was not strange if there was a research collaboration. Unfortunately, a similar agreement was not possible in Lewisham. Naturally, it was impossible on the national level; however, after completing any survey, participants had an option to contact researchers, and retrospectively opt-out from the study and the data they had provided in the survey would not be used.

Additionally, in a scenario where participants felt any discomfort, they had an option to contact either me, my DoS, or LREC, who would be happy to discuss the matter with them, and if needed, refer them to help further. The contact details were provided on the first page of the survey and in the debrief document (the last page of the survey).

Any shared data by the participants were stored similarly to Study 1, and it was ensured that data would be anonymised in any reporting. Participants during the survey had an option to share their contact details and opt-in or out of these details being used for further research recruitment. However, if participants did not opt-out, they were contacted for participation in the last study. Of course, they still had the opportunity to decline their participation after being contacted.

4.4 Sample Characteristics of Participants

The sample characteristics of Study 2 can be separated into outcome (dependent) and explanatory (independent). Some characteristics were not used in all study sites to limit the cognitive burden on participants and ensure only the most relevant questions were being asked (Lenzner et al., 2010; Wenemark et al., 2010). Questions were removed or added to

make the survey more accessible and improve response rates. Therefore, the characteristics that have been available in all surveys and are related to further analysis are labelled as “key”, while the other as “optional”. The optional characteristics are included in Appendix 3.5.

4.4.1 Key explanatory characteristics

The following section provides information about key demographic variables. These variables are Child’s result (weight category), Design version, Parent’s Role, Child’s gender, Child’s age (as a category), Parent’s qualification, and Parent’s weight status (total of seven variables).

Data from three sites have been collected, specifically from Suffolk, Lewisham, and National site. After cleaning data and applying exclusion criteria, the total sample size was 86 participants. The exclusion criteria were incomplete responses in outcome variables; responses < 1 minute (suspiciously low); multiple responses (duplicates removal); no consent to use data; and during the analysis, I have also removed any outliers (using multiple criteria).

Given the low sample size, participants from all sites have been grouped. To distinguish between the sites, the national site was labelled as “observational” design, and the Lewisham and Suffolk sites were grouped into “control” and “experimental” groups.

The sample size in the Lewisham site was 10 participants (all received letters indicating their children had a healthy weight, seven received control letters, three received experimental letters). The sample size in Suffolk was 41 (with 17 parents receiving control HW, 14 experimental HW, 2 control OW, 6 experimental OW, and 2 control VOW). Finally, the national sample size consisted of 88 participants with no distinction between the experimental or control group (with 34 parents receiving HW letters, two UW, seven OW, five VOW, and 40 parents who did not disclose the letter type, thus labelled as “missing”).

The overall sample size was 139 participants; however, after excluding participants with an unknown result of the letter (- 40) and additional participants who refused to provide information in other variables essential (see the key explanatory characteristics below) for further analyses (- 13), the resulting sample size was the aforementioned 86 participants which is used in the analyses (while the demographic details are provided for the total).

The following section presents frequency distributions of the key explanatory characteristics. These characteristics are key because they have been used across all sites. The missing category (e.g., Table 9 and descriptions) indicate that the participant omitted the response, felt fatigued from the previous questions, and skipped it, or did not reach this point of the survey and left earlier (the demographic questions were at the end of the survey) in the national survey. Alternatively, the person did not get to this point of the survey (incomplete response).

The first key explanatory characteristic to present is three design types of the feedback letters that were disseminated across different sites (a total of 139 parents provided their feedback). The observational type was received by 88 parents (63% of the total sample), the control by 28 parents (20%), and the experimental by 23 (17%).

From the 139 parents who provided the feedback, 40 participants (29%) indicated that they do not wish to provide their child’s weight result (missing category; this occurred in the national survey / observational design). From the rest of the answers majority of the parents (N = 75; 54%) confirmed their child was with a healthy weight. This was followed by 15 parents who confirmed the results were OW (11%), 7 VOW (5%), and 2 UW (1%). The last group was

found to be particularly challenging for recruitment. However, it was also clear that parents who received healthy weight result for their children might be easier to recruit.

Regarding the child's gender, 42 participants (30%) did not provide any information, and 1 participant refused to share the information (1%). The rest identified their child as a female in 55 cases (40%) and male in 41 cases (29%).

The distribution of child's age in two categories was relatively equal, with 49 parents indicating their child was in Reception year (35%) and 47 in Year 6 (34%). In addition, the same number of missing and refusals were recorded, i.e., 42 (30%) and 1 (1%).

The parent's qualification is shown in Table 9. The number of refusals was 7, and missing responses 42. Notable characteristics of the sample are that 45% (1% with doctoral, 20% with undergraduate, and 24% with post-graduate education) participants obtained some level of a university degree as opposed to 20% (1% with primary school, 7% with GCSEs, and 12% with A-Levels education) of participants with a degree outside the university. This suggests that the sample might be biased towards university holders, given that the proportion of non-university holders in the general population (an estimated proportion of 58%) is higher than in our sample (Clegg, 2017).

Table 9: Parent's Qualification

Parent's qualification	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
Missing	42	42	0.30	30%	30%
University post-graduate programme	33	75	0.24	24%	54%
University undergraduate programme	28	103	0.20	20%	74%
A-Levels or equivalent	16	119	0.12	12%	86%
GCSEs or equivalent	10	129	0.07	7%	93%
Refuse to say	7	136	0.05	5%	98%
Doctoral degree	2	138	0.01	1%	99%
Primary school	1	139	0.01	1%	100%

Parent's identified their role in 83 cases as a mother (60%) and in 13 cases as a father (9%), and 1 (1%) participant refused to declare their role. The remainder, 42 (30%) parents left the survey earlier.

When asked about their own weight status, 1 parent (1%) indicated they live with underweight, 59 parents (42%) responded that they live with healthy weight, 30 (22%) with overweight and 1 with very overweight (1%). Parent's weight status was not declared by 6 (4%) participants and missing in 42 (30%) participants.

Finally, parents were asked if they had any other child and if the child experienced the NCMP and received a letter. From the total of all parents, 32 (23%) parents did have another child and experienced the NCMP in the past, while 46 (33%) had another child but did not experience the NCMP in the past. An additional 16 (12%) parents did not have another child (and could not experience the NCMP previously). The missing values were the same as in the previous figures (42, 30%), and 3 (2%) parents refused to declare this information.

4.4.2 Key outcome characteristics

Like the key explanatory characteristics, the outcome characteristics are separated into key and optional. Additionally, the key characteristics are further separated into two categories of

outcome variables: behavioural actions due to the letter and user experience with the letter. The former relates to parents' actions after reading the letter, while the latter relates to their opinion (user experience) of the feedback letter they received.

The outcome variables that were excluded all related to behavioural outcomes, and the reason for their exclusion was described in the upcoming Section 4.4.3.

4.4.2.1 Behavioural actions

The first behavioural action presented is a question where parents indicated whether they had contacted any service or not. From the total of 139 parents, 7 parents (5%) across all sites have reached out and contacted any sort of service (Tier 1, 2, or 3) after receiving their results letters. The rest was 132 parents (95%) who indicated that they did not contact any service.

Further engagement with services was investigated by grouping parents by the version of the letter they have received. As seen in Table 10, most parents (84, 60%) from the observational group indicated they did not engage, and 4 (3%) did engage with some service. The sample size of the experimental and control groups was small, but even here, most parents did not engage with services (26 or 19% for control and 22 or 16% for the experimental group).

Table 10: Engagement with Services by Letter Design

Design version	Did you contact service?	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
Observational	No	84	84	0.60	60%	60%
Control	No	26	110	0.19	19%	79%
Experimental	No	22	132	0.16	16%	95%
Observational	Yes	4	136	0.03	3%	98%
Control	Yes	2	138	0.01	1%	99%
Experimental	Yes	1	139	0.01	1%	100%

Table 11 shows the relative frequencies of each weight group. Answers of parents of children with UW, OW, or VOW categories should be of particular interest as it was expected that these groups might engage with services. However, the results below indicate that most parents did not engage with services.

Table 11: Engagement with Services by Letter Result

Child's weight status (letter)	Did you contact service?	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
HW	No	72	72	0.73	73%	73%
OW	No	13	85	0.13	13%	86%
VOW	No	6	91	0.06	6%	92%
UW	No	2	93	0.02	2%	94%
HW	Yes	3	96	0.03	3%	97%
OW	Yes	2	98	0.02	2%	99%
VOW	Yes	1	99	0.01	1%	100%

The next variable of interest is parents' potential contact with a GP after receiving the result letter. From the whole sample, 4 (3%) of parents have contacted GP because of the letter, and 135 (97%) did not contact GP.

Table 12 shows the split across the letter versions. Again, similarly to services, the prevalent pattern remained that 97% of parents in the sample did not engage with GP.

Table 12: Engagement with GP by Lettter Design

Design version	Did you contact GP?	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
Observational	No	85	85	0.61	61%	61%
Control	No	27	112	0.19	19%	81%
Experimental	No	23	135	0.17	17%	97%
Observational	Yes	3	138	0.02	2%	99%
Control	Yes	1	139	0.01	1%	100%

Looking at whether parents engaged with GP dependent on the result of the letter turned out to be similar. Table 13 shows the relative frequencies for each weight group. The results indicate that most parents did not engage with services.

Table 13: Engagement with GP by Letter Results

Child's weight status (letter)	Did you contact GP?	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
HW	No	74	74	0.75	75%	75%
OW	No	14	88	0.14	14%	89%
VOW	No	7	95	0.07	7%	96%
UW	No	1	96	0.01	1%	97%
HW	Yes	1	97	0.01	1%	98%
OW	Yes	1	98	0.01	1%	99%
UW	Yes	1	99	0.01	1%	100%

The next variable related to healthcare providers, specifically, the survey asked parents if they contacted the school nurse. Whilst the numbers of parents who made any contact remained consistently low, 9 parents (6%) overall from the total sample contacted the school nursing team. This was the highest number of parents in the context of previous results. The remaining 130 parents (94%) did not contact a school nursing team.

Table 14 did not indicate clear differences between sites, and the number remained low regarding contacting a school nursing team and in line with the previous variables for GP and Services.

Table 14: Engagement with School Nursing Team by Letter Design

Design version	Did you contact the school nurse?	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
Observational	No	82	82	0.59	59%	59%
Control	No	26	108	0.19	19%	78%
Experimental	No	22	130	0.16	16%	94%
Observational	Yes	6	136	0.04	4%	98%
Control	Yes	2	138	0.01	1%	99%
Experimental	Yes	1	139	0.01	1%	100%

Table 15 shows low engagement with a school nursing team across all weight categories of letters as the differences between parents who did contact the school nursing ranged around 1% (or one parent).

Table 15: Engagement with School Nursing Team by Letter Result

Child's weight status (letter)	Did you contact the school nurse?	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
HW	No	72	72	0.73	73%	73%
OW	No	13	85	0.13	13%	86%
VOW	No	5	90	0.05	5%	91%
UW	No	1	91	0.01	1%	92%
HW	Yes	3	94	0.03	3%	95%
OW	Yes	2	96	0.02	2%	97%
VOW	Yes	2	98	0.02	2%	99%
UW	Yes	1	99	0.01	1%	100%

The last outcome behavioural variable was whether parents shared the results with their children or not. Of all parents, 85 (61%) did not share the result, while 54 (39%) shared or otherwise discussed it with their children.

Table 16 shows this from the perspective of the letter design, and primarily the comparison between control and experimental versions was of interest here. In the group that has shared the results, 18 (13% of the total sample) parents received the control version, and 7 (5% of the total sample) parents received the experimental version. In the group that did not share the results, 10 parents (7% of the total) received the control version, and 16 (12% of the total sample) received the experimental version.

Table 16: Sharing Results with Children by Letter Design

Design version	Did you share results with children?	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
Observational	No	59	59	0.42	42%	42%
Experimental	No	16	75	0.12	12%	54%
Control	No	10	85	0.07	7%	61%
Observational	Yes	29	114	0.21	21%	82%
Control	Yes	18	132	0.13	13%	95%
Experimental	Yes	7	139	0.05	5%	100%

As seen in the previous table, whether parents shared results had a greater variability than previous outcome characteristics. However, a child's weight was possibly the most important indicator of whether results got shared or not. Table 17 shows that it indeed might be the case. Most parents who have shared results have received a healthy weight result (37, 37%). However, there were still 38 parents (38%) of children with HW results who decided not to share the news after becoming aware that they had healthy status.

Table 17: Sharing Results with Children by Letter Design

Child's weight status (letter)	Did you share results with children?	Frequency	Cumulative frequency	Relative frequency	Relative percentage	Cumulative percentage
HW	No	38	38	0.38	38%	38%
OW	No	13	51	0.13	13%	52%
VOW	No	5	56	0.05	5%	57%
UW	No	2	58	0.02	2%	59%
HW	Yes	37	95	0.37	37%	96%
OW	Yes	2	97	0.02	2%	98%
VOW	Yes	2	99	0.02	2%	100%

4.4.2.2 User experience questionnaire

The previous paragraphs have referred to behavioural outcome characteristics and focused on parents' actions in response to receiving the NCMP letter. The following paragraph shows the results of the User Experience Questionnaire (Laugwitz et al., 2008). The focus is on overall experience with the letter as measured across several domains such as Attractiveness (overall impression), Dependability (feeling in control), Efficiency (effort required to use), Novelty (is it innovative or creative), Perspicuity (accessibility and ease of understanding), Stimulation (is it exciting or motivating) (Schrepp et al., 2014). It is not expected that all items are relevant given the primary purpose of the questionnaire is to measure interaction with software, but the results will indicate which items performed well or not.

Table 11 in Appendix 3.4.1 shows the initial summary statistics of each item in the questionnaire using the sample size described in previous sections. The items have been recoded, and the questionnaire uses means as the final scores (but it is more indicative to look at the domains rather than individual items). The first notable observation from the table is that each item has attained its minimum and maximum values. The scale should be utilised across all values when it is used. In this case, the range of each item is -3 (horribly bad) to +3 (extremely good) (Schrepp, 2019). The statistics about dispersion, such as IQR, SD, Variance, and SE, can provide particularly useful information about the performance of individual items. Ideally, the items can differentiate well and do not centre too close to the mean values. Indeed, the SD indicates that most items did vary to some extent; however, I would expect items with low IQR and SD to be less informative than values with higher values. Unfortunately, the variance could be a bit higher in the current context; however, this might be limited due to the sample size or novel use of the questionnaire. SE of variance is close to 0.1, resulting in Lower and Upper CI moving approximately 0.5 around the mean values of each item. Such value might be considered high for items that have little effect in the current context but reasonable for other items. Finally, most values seem to be around 0.5 of mean value with a median at 0 or 1, indicating that participants did not feel particularly opinionated. The values I had not mentioned thus far are Skew, Kurtosis and sum of individual scores. The last is not particularly useful in this context. Variables are considered skewed or flat if either skew or kurtosis is above zero. In this context, I consider values within the absolute value of 0.5 to be reasonably symmetrical; however, values above this cut-off are skewed to either side, flat or peaked. For example, such an item might be “not understandable VS understandable” with the skew of -1.52 and kurtosis of 1.21. Ultimately, rather than providing statistical estimates, it is simpler and more intuitive to provide a visual examination which is available in Appendix 3.4.1 in Figure 81.

Appendix 3.4.1 in Figure 81 shows the visual representation of all available items which have been described in the table above. These help to also confirm potential underlying issues with items with high values of skewness and kurtosis (> 0.5), values of IQR = 3, values of mean close to three, but with low variance values (e.g., close to 1), and high SD values (close to 2 SD). Items with these issues are “complicated VS easy” (UEQ 13), “not understandable VS understandable” (UEQ 2), “confusing VS clear” (UEQ 21), and “cluttered VS organized” (UEQ 23). Furthermore, any items which I would not expect to be a good fit for the medium of letters such as “slow VS fast” (UEQ 9), “inferior VS valuable” (UEQ 5), “inventive vs conventional” (UEQ 10), “usual vs leading edge” (UEQ 15), “creative vs dull” (UEQ 3), are worth examining closely.

By visual examination of the plot in Appendix 3.4.1 in Figure 81 and Table 11 in Appendix 3.4.1, the following can be stated about the items:

- Some items show values close to the mean values (zero), which might indicate that the items were not allowing participants to evaluate a given quality in the context of letters. Simply put, the items were not a good fit for the letters, as indicated earlier. Of the items where I have expected this, only items UEQ 5 and 10 seem to have been centred around mean; however, there are other items that seem to perform poorer. For example, UEQ 11, UEQ 17, or UEQ 26 are items where it may have been difficult for participants to evaluate the given quality in the context of letters.
- As indicated earlier, the items UEQ 2 and UEQ 23 seemed to have been skewed towards positive values (negative "right" skewness). This is confirmed visually, indicating that the items were perhaps too "easy" in this context. This is also the case for item 15 despite reasonable skewness and kurtosis values.
- Items UEQ 13 and UEQ 21) seem to be performing well despite the high values in skewness and kurtosis.

The following Tables 18, 19, 20, and 21 focus on factors or components (depending on how these are theoretically defined) of the questionnaire. The word "factor" will be used to describe the mean scores across a group of several items because this framework was used to derive them by the original authors of the questionnaire (Laugwitz et al., 2008). The factors are more relevant for the interpretation than individual items which have more meaning for a psychometrical evaluation, and it would not be right to interpret results based on one or two items which are meant to be part of a whole scale.

The first Table 18 describes overall scores across all factors without further grouping any factors across other variables. This is similar to Table 11 in Appendix 3.4.1 regarding the items. However, it is worth explaining some of the computations occurring in the background. Min and max values of factors are not utilising the maximum and minimum (from - 3 to + 3) values of each scale, although all items did utilise the full range. This is because the overall score for each factor is computed in the following two steps.

First, an average of items forming a given scale for each individual was computed (a row means across columns representing specific items). Second, the resulting average for each factor of each individual is then averaged across all individuals (a column mean computation across all rows of individuals), which gives the final factor score. As the computation uses an average, it can result in values that were not presented in the original scale, such as 2.5 or below the maximum. It is important to be aware that the factor scores below need to be considered as sample average, not individual's average.

The following observations can be made about Table 18 below:

- Novelty and Perspicuity factors do not reach the full potential of the scale in comparison to other factors. While the values are entirely plausible, it would have been likely that at least one participant reached the maximum/minimum value. In the context of lower maximum values, it is not surprising to see negative-sum scores for Novelty and the reverse for Perspicuity. This may underline that these factors were skewed towards either of the tail and perhaps not able to differentiate very well all of the qualities in the context of the letter. This is also supported by narrow IQR for novelty and negative median value which is only -0.25 from zero.

- The dispersion matrices, i.e., IQR and SD (and variance), indicate that the factors varied reasonably well for all participants; however, the Novelty factor may not have worked very well for the letters as both IQR and SD are closer to zero.
- Most factors are relatively close to the mean and median values except for the Perspicuity. However, only Novelty seemed to have lower variance, indicating that other factors were probably somewhat suitable for respondents to evaluate the qualities of the letters.
- SE was reasonably low, and both Lower CI and Upper CI indicated ranges that did not include zero; thus, they were reasonably narrow, which I was hoping for.
- Novelty and Perspicuity seemed to have been the most skewed factors, both being negatively skewed. Outside the Novelty, no other factor seemed to have been particularly peaked or flat looking at the kurtosis.

Table 18: Central Tendency of the UEQ Factors

Factor label	Count	Min	Max	Sum	IQR	Mean	Median	SD	Variance	SE	Low. CI	Up. CI	Skew	Kurtosis
Attractiveness	139	-3.00	3.0	57.17	1.50	0.41	0.50	1.48	2.18	0.13	0.15	0.67	-0.59	-0.12
Dependability	139	-3.00	3.0	89.00	1.38	0.64	0.75	1.17	1.37	0.10	0.44	0.84	-0.27	0.12
Efficiency	139	-3.00	3.0	108.00	1.75	0.78	0.50	1.18	1.40	0.10	0.58	0.98	-0.17	0.29
Novelty	139	-3.00	1.5	-64.25	0.75	-0.46	-0.25	0.88	0.78	0.07	-0.60	-0.32	-0.98	0.60
Perspicuity	139	-2.25	3.0	198.25	1.75	1.43	1.75	1.33	1.77	0.11	1.21	1.65	-0.81	0.02
Stimulation	139	-3.00	3.0	63.50	1.50	0.46	0.50	1.43	2.05	0.12	0.22	0.70	-0.47	-0.09

The observations made about Table 18 above are presented visually with Figure 21 below.

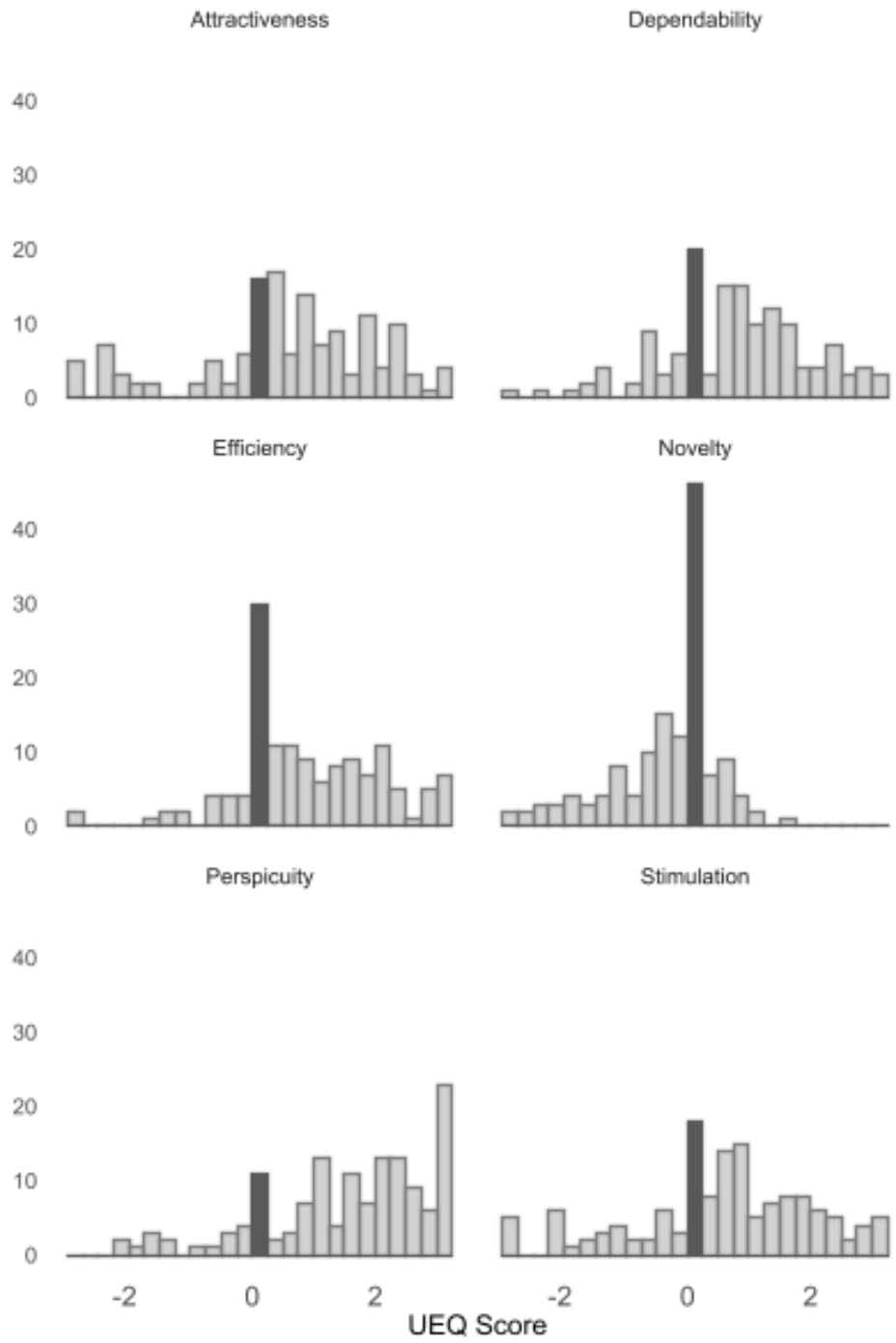

Figure 21: Visualised Summary of the UEQ Factors

The Perspicuity factor is negatively skewed, and so is the Novelty; however, the mean values cantered close to zero make it difficult to judge visually. There is also another issue with the Stimulation factor, which has the mean values overrepresented, and it may have been difficult for participants to decide how exciting or motivating the letters are.

Some interpretations of the results are possible at this stage. First, the standardised interpretation of the means as suggested by the author is "*that values between - 0.8 and 0.8 represent a neural evaluation of the corresponding scale, values > 0.8 represent a positive evaluation and values < - 0.8 represent a negative evaluation"* (Schrepp, 2019, p. 5).

The factors are described as per bullet points below:

- *Attractiveness: Overall impression of the product. Do users like or dislike the product?*
- *Perspicuity: Is it easy to get familiar with the product? Is it easy to learn how to use the product?*
- *Efficiency: Can users solve their tasks without unnecessary effort?*
- *Dependability: Does the user feel in control of the interaction?*
- *Stimulation: Is it exciting and motivating to use the product?*
- *Novelty: Is the product innovative and creative? Does the product catch the interest of users?*

(Schrepp, 2019, p. 2)

Using the standardised interpretation and adapted Table 19 below, the only factor which indicates positive evaluation based on the potential range of values given the 95% CI around the mean of the letters is the factor of Perspicuity. The factors of Dependability and Efficiency may potentially reach those values provided the upper CI; however, it is less certain. Other factors are neutral given mean, lower CI and upper CI values.

Table 19: Central Tendency of the UEQ Factors

Factor label	Mean	SD	SE	Low. CI	Up. CI
Attractiveness	0.41	1.48	0.13	0.15	0.67
Dependability	0.64	1.17	0.10	0.44	0.84
Efficiency	0.78	1.18	0.10	0.58	0.98
Novelty	-0.46	0.88	0.07	-0.60	-0.32
Perspicuity	1.43	1.33	0.11	1.21	1.65
Stimulation	0.46	1.43	0.12	0.22	0.70

Interpreting the results above, there is 95% confidence that the average perspicuity is close to 1.43 with an estimated range between 1.21 – 1.65, indicating that parents on average perceived the letters as clear and easy to get familiar with. Similarly, there is 95% confidence that the average Efficiency factor is close to 0.78 with an estimated range between 0.58 – 0.98, indicating that parents perceived the letters to be a medium requiring relatively effortless interaction. Other variables (including Dependability which was above 0.8 only by 0.04 using the upper CI) have been in the neutral range, and parents probably did not feel particularly opinionated about them.

The issue with the interpretation above is that it does not take account of the differences across the letters, especially the final result, which is expected to play a key role in forming the opinion about the letter. The following Tables 20 and 21 further show the factors as grouped by child's result and design of the letters. I have already provided the essential interpretation of the psychometrical aspect of Table 19 with factors in the previous sections; therefore, in the following paragraphs, I will interpret only the key results relevant to the groups. Tables 20 and 21 below focus on the most important metrics – *Count* (to see the sub-sample split), *Mean*, *SD*, *SE*, and *Confidence Intervals*.

Table 20 shows the split across the child's weight which is one of the key explanatory variables. To ease the interpretation, the tables below are shaded across each factor of the UEQ. I have expected to see a difference between groups of parents who received the letters with other results than "healthy weight" and a group of parents who received the "healthy weight" result. Investigating the table below, there is clear evidence that means of all groups

with “non-healthy” letter results perceived the letters less favourably. This pattern occurs to all factors except Perspicuity, where parents seemed to have to vary less. The clearest example is between the VOW group and the HW group. Parents between these two groups have rated the letters in contrasting ways, especially across Attractiveness, Dependability, Efficiency, and Stimulation factors. The problem might be unequal group size; therefore, the next table could better explain the results.

Table 20: Central Tendency of the UEQ Factors by All Childs’ Weight

Factor label	Child’s weight	Count	Mean	SD	SE	Low. CI	Up. CI
Attractiveness	HW	75	1.03	1.05	0.12	0.79	1.27
Attractiveness	OW	15	-1.00	1.83	0.47	-2.01	0.01
Attractiveness	UW	2	-0.08	0.59	0.42	-5.42	5.26
Attractiveness	VOW	7	-1.98	1.18	0.45	-3.08	-0.88
Dependability	HW	75	1.10	0.93	0.11	0.88	1.32
Dependability	OW	15	-0.02	1.20	0.31	-0.68	0.64
Dependability	UW	2	0.00	0.71	0.50	-6.35	6.35
Dependability	VOW	7	-0.93	1.10	0.42	-1.96	0.10
Efficiency	HW	75	1.18	1.04	0.12	0.94	1.42
Efficiency	OW	15	0.07	1.36	0.35	-0.68	0.82
Efficiency	UW	2	-0.25	0.35	0.25	-3.43	2.93
Efficiency	VOW	7	-0.75	1.06	0.40	-1.73	0.23
Novelty	HW	75	-0.38	0.84	0.10	-0.58	-0.18
Novelty	OW	15	-0.68	1.29	0.33	-1.39	0.03
Novelty	UW	2	0.00	0.00	0.00	0.00	0.00
Novelty	VOW	7	-0.29	0.94	0.36	-1.17	0.59
Perspicuity	HW	75	1.74	1.24	0.14	1.46	2.02
Perspicuity	OW	15	0.43	1.39	0.36	-0.34	1.20
Perspicuity	UW	2	1.25	0.71	0.50	-5.10	7.60
Perspicuity	VOW	7	1.00	1.92	0.73	-0.79	2.79
Stimulation	HW	75	0.95	1.10	0.13	0.69	1.21
Stimulation	OW	15	-0.52	1.86	0.48	-1.55	0.51
Stimulation	UW	2	-0.38	1.24	0.88	-11.56	10.80
Stimulation	VOW	7	-1.07	1.33	0.50	-2.29	0.15

In Table 21, I have merged the HW and Non-HW categories. The pattern of the merged categories is closer to each other than to the HW; therefore, the merging is one option to increase the limited sample size of all groups. This will be further discussed in the limitation section.

The following table highlights the differences in “healthy” weight categories and “non – healthy” weight categories. The largest difference is observed for attractiveness, indicating that the participants favour that particular user experience domain less. These descriptive data are better understood with a t-test shown below.

Table 21: Central Tendency of the UEQ Factors by Merged Childs' Weight

Factor label	Child's weight	Count	Mean	SD	SE	Low. CI	Up. CI
Attractiveness	HW	75	1.03	1.05	0.12	0.79	1.27
Attractiveness	Non HW	24	-1.21	1.65	0.34	-1.91	-0.51
Dependability	HW	75	1.10	0.93	0.11	0.88	1.32
Dependability	Non HW	24	-0.28	1.18	0.24	-0.78	0.22
Efficiency	HW	75	1.18	1.04	0.12	0.94	1.42
Efficiency	Non HW	24	-0.20	1.25	0.26	-0.74	0.34
Novelty	HW	75	-0.38	0.84	0.10	-0.58	-0.18
Novelty	Non HW	24	-0.51	1.14	0.23	-0.99	-0.03
Perspicuity	HW	75	1.74	1.24	0.14	1.46	2.02
Perspicuity	Non HW	24	0.67	1.50	0.31	0.03	1.31
Stimulation	HW	75	0.95	1.10	0.13	0.69	1.21
Stimulation	Non HW	24	-0.67	1.64	0.33	-1.35	0.01

The following Table 22 shows that all of the differences except for the factor of Novelty were significant below $p < 0.05$. The reader can look at the column "Estimate", which shows a difference between the estimate of one group minus the estimate of other groups. For example, Estimate = HW – Non-HW where for the first column this would be 1.070 - (-1.061) = 2.131. On a scale from – 3 to + 3, a difference of 2 is large, and so is the associated p-value. The tests are likely to suffer from unequal sample sizes, but the results highlight the differences from the above table. While considering possible limitations due to the sample size and sample representativeness, it is clear that there is an indication of the difference of user experience between those who receive the "non-HW" and "HW" letters. The letter perception of parents receiving the "healthy" messaging is favourable as opposed to parents receiving any other results. This will be fully explored in the upcoming sections.

Table 22: T-Test Estimates of the UEQ Factors by Merged Childs' Weight

Factors	Estimate	HW	Non HW	Statistic	P.value	Parameter	Low. CI	Up. CI	Method
Attractiveness	2.131	1.070	-1.061	5.526	0.000	22.499	1.332	2.930	Welch Two Sample t-test
Perspicuity	0.893	1.735	0.842	2.303	0.030	25.045	0.094	1.692	Welch Two Sample t-test
Efficiency	1.230	1.216	-0.013	4.081	0.000	26.703	0.611	1.848	Welch Two Sample t-test
Dependability	1.471	1.142	-0.329	4.826	0.000	24.264	0.842	2.099	Welch Two Sample t-test
Stimulation	1.449	0.989	-0.461	3.814	0.001	23.561	0.664	2.234	Welch Two Sample t-test
Novelty	0.016	-0.444	-0.461	0.060	0.952	24.602	-0.547	0.580	Welch Two Sample t-test

The last key outcome characteristic in Table 23 below is comparing the differences between the intervention type of the letter. As already emphasised in the control letter, I issued a standard council letter. In contrast, I issued a modified version of the letter in the experimental version, predominantly focusing on reducing the occurrence of weight-related language and providing a more neutral experience. The observational group are various LGAs recruited to boost the overall sample size, but they can be generally considered a pseudo-control group. The table below does not seem to show a meaningful difference between both versions and how the parents experienced them. Unfortunately, the option to further group these versions by the result of the letter is not feasible as it would result in very small sample sizes per group.

Table 23: Central Tendency of the UEQ Factors by Design of Letter

Factor label	Design	Count	Mean	SD	SE	Low. CI	Up. CI
Attractiveness	Control	28	1.11	1.49	0.28	0.54	1.68
Attractiveness	Experimental	23	0.83	1.52	0.32	0.17	1.49
Attractiveness	Observational	48	-0.05	1.43	0.21	-0.47	0.37
Dependability	Control	28	1.36	1.04	0.20	0.95	1.77
Dependability	Experimental	23	0.74	1.05	0.22	0.28	1.20
Dependability	Observational	48	0.43	1.15	0.17	0.09	0.77
Efficiency	Control	28	1.24	1.12	0.21	0.81	1.67
Efficiency	Experimental	23	1.14	1.18	0.25	0.62	1.66
Efficiency	Observational	48	0.48	1.26	0.18	0.12	0.84
Novelty	Control	28	-0.29	0.92	0.17	-0.64	0.06
Novelty	Experimental	23	-0.24	0.86	0.18	-0.61	0.13
Novelty	Observational	48	-0.57	0.94	0.14	-0.85	-0.29
Perspicuity	Control	28	2.04	1.03	0.19	1.65	2.43
Perspicuity	Experimental	23	1.48	1.55	0.32	0.82	2.14
Perspicuity	Observational	48	1.16	1.40	0.20	0.76	1.56
Stimulation	Control	28	0.99	1.29	0.24	0.50	1.48
Stimulation	Experimental	23	0.97	1.26	0.26	0.43	1.51
Stimulation	Observational	48	0.10	1.45	0.21	-0.32	0.52

As in the previous instance, I am repeating the idea of a preliminary follow-up t-test to show the differences clearly. As discussed above, Table 24 confirms that the differences between the control and experimental letter versions are not meaningful. This is supported by high p values and small differences between Control – Experimental versions. The confidence intervals also support the uncertainty of the result.

Table 24: T-Test Estimates of the UEQ Factors by Design of Letter

Design	Estimate	Control	Experimental	Statistic	P.value	Parameter	Low. CI	Up. CI	Method
Attractiveness	0.278	1.141	0.863	0.583	0.563	34.645	-0.690	1.247	Welch Two Sample t-test
Perspicuity	0.450	2.038	1.588	1.057	0.300	26.282	-0.425	1.325	Welch Two Sample t-test
Efficiency	0.028	1.308	1.279	0.076	0.940	32.213	-0.731	0.787	Welch Two Sample t-test
Dependability	0.557	1.365	0.809	1.608	0.117	33.354	-0.147	1.260	Welch Two Sample t-test
Stimulation	-0.044	1.000	1.044	-0.105	0.917	34.191	-0.899	0.811	Welch Two Sample t-test
Novelty	0.167	-0.288	-0.456	0.593	0.557	36.516	-0.405	0.739	Welch Two Sample t-test

4.4.3 Optional outcome characteristics

The optional characteristics all relate to the behaviour outcomes of the letter. They have been excluded because not all sites have used these questions and were reconsidered as less important than previous behavioural outcomes. While an analysis would be possible, the outcome and interpretation would be severely limited and probably not meaningful without a further follow-up study which would recruit higher sample sizes.

The first characteristic in this group was the proportions of parents who used the NHS BMI calculator (www.nhs.uk/bmi). From the total of 139 parents, 88 (63%) were not asked this question, 26 (19%) answered that they did not use the calculator, and 25 (18%) used the BMI calculator.

The next question parents were asked was if they visited any of the C4L (Change 4 Life) links delivered as part of the feedback letter. From the total sample, 88 (63%) parents were not

asked this question, 39 (28%) indicated they never visited C4L URLs, and 12 (9%) parents visited the URLs.

The final optional outcome characteristic question asked parents if receiving the letter changed their opinion of their child's weight. As with the previous two questions, 88 (63%) were not asked the question. From the remaining parents, 8 (6%) indicated that the letter did change their opinion about their child's weight and 43 (31%) said they did not change their opinion.

4.5 Assumptions and Data Processing

Number of assumptions and data processing steps were made. For example, assessment of a correlational structure, variable selection, and discussion of regression assumptions. These are carefully discussed in Appendix 3.6.

4.6 Findings Regarding the User Experience

The first outcome variable analysed was the UEQ (User Experience Questionnaire). Firstly, the measure was recoded according to manuals provided by the authors of the questionnaire, and the computation was re-implemented from the Excel document provided (Laugwitz et al., 2008). Next, the overall scores were computed (the factors) which were then used as individual outcome variables. These factors were: Attractiveness, Dependability, Efficiency, Novelty, Perspicuity, and Stimulation. Section 4.2.2.3.2 provides a detailed discussion about the scale scores and Appendix 3.4.1 shows complementary visualisations.

The user experience model was based on the DAG presented in the method section. However, the conceptual model had to be updated given the information provided in Section 4.4.3. where I discussed excluded variables and rationale to do so.

Model 1: User Experience Questionnaire (updated)

Figure 22: Updated User Experience Questionnaire DAG

Figure 22 presents updated DAG to reflect the situation where the sample size was insufficient and several variables were rendered unusable.

The upcoming sections will report the results of each model with the name of the section relating to the outcome variable that is analysed, i.e., Attractiveness, Dependability, Efficiency, Novelty, Perspicuity, and Stimulation.

The section presents only the plots showing predicted values of the outcome variables plotted against the explanatory variables of the final model. For conciseness, diagnostic plots, tables, and regression tables with final models are included in Appendix 3.7; however, their place in the appendix is referred to throughout the text.

4.6.1 Attractiveness

The first outcome variable assessed in the UEQ was attractiveness which measured the overall impression of the product (Schrepp, 2019, p. 2).

While holding all of the variables constant, the final model (Table 19 in Appendix 3.7.1) shows a significant difference between the non-HW versions and the HW version of the letters. Participants' overall impression whilst receiving the letters indicating that their child lives with underweight, overweight, or very overweight statuses was - 2.24 lower than those of participants receiving the healthy weight result while holding the other variables constant. Similarly, the impression with the letters was lower by -0.31 and -0.75 for the experimental and observational versions of the letters, respectively, compared with the control versions.

The model (Table 20 in Appendix 3.7.1) also explained 48% of the variance in the data, which is reasonable given the poor sample size.

Figure 23 (below) shows the differences in attractiveness scores between the letter versions. The visualisation indicates that participants favoured the version that classified children with HW over the version that classified them with non-healthy (i.e., underweight, overweight, very overweight) status. Somewhat less conclusively, the control version of the letter was favoured over the other versions of the letter.

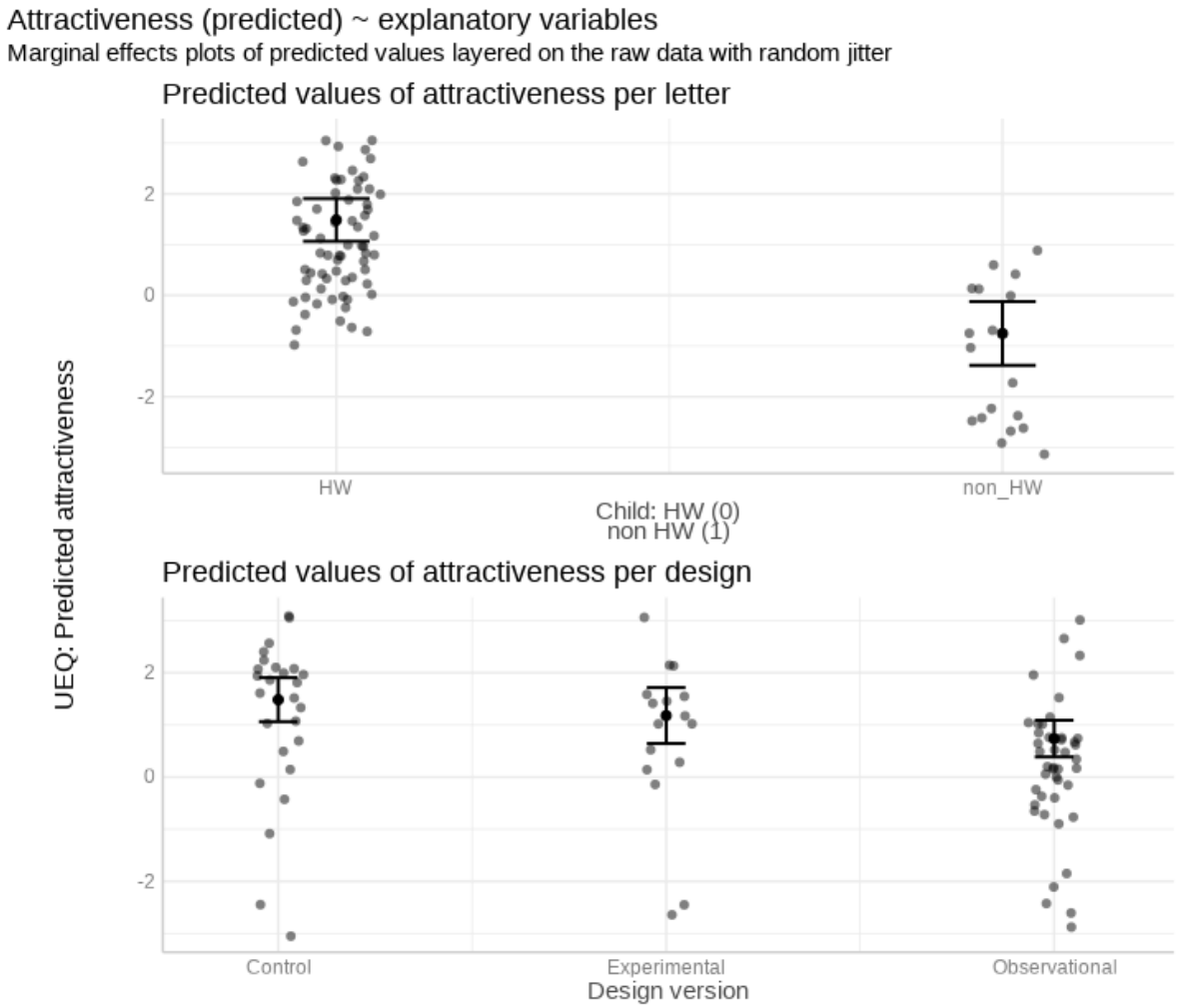

Figure 23: Final Model Predicted Values for Attractiveness

4.6.2 Dependability

The second outcome variable of the UEQ was dependability – An indication of how much the users felt in control of the interaction (Schrepp, 2019).

The final model without outliers is presented in the Appendix 3.7.2 (Table 24 and Table 25 in Appendix 3.7.2). Significant statistics occurred for both the weight category of the letter and design version. The results suggest that the parents who received the underweight, overweight, or very overweight version felt - 1.53 less in control of the interaction with the letter than parents who received the healthy weight version while holding all of the variables constant. The finding was also significant for the observational version, and participants felt -0.72 points less in control with this version compared to the control version of the letter. The experimental version was not significantly different from the control version. The final fitted model explained approximately 37% of the variance, while the leftover variance could be attributed to external factors and errors.

The visual representation of the results is provided in the following Figure 24. Again, the design differences are less noticeable, and the weight category findings have more importance.

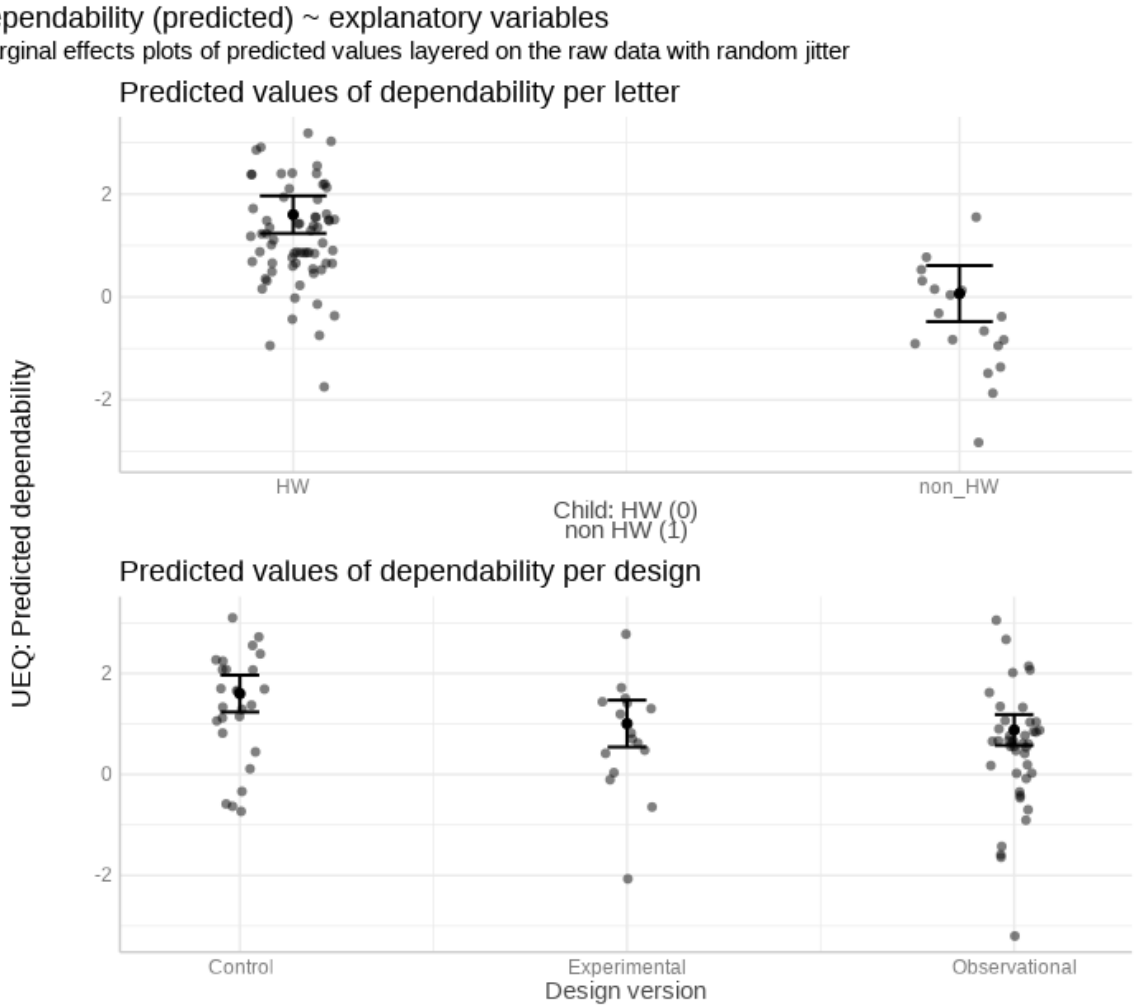

Figure 24: Final Model Predicted Values for Dependability

4.6.3 Efficiency

The third variable, efficiency, described whether the users could solve their tasks without unnecessary effort (Schrepp, 2019, p. 2).

The final model in Table 29 in Appendix 3.7.3 revealed that parents receiving the underweight, overweight, or very overweight versions scored the letter as -1.46 points worse on the

efficiency scales while holding the other variables constant – that would suggest parents felt the interaction with the letter required more effort. No other variables were significant. The model also explained about 29% of the variance while attributing the rest to the error and other unaccounted effects (Table 30 in Appendix 3.7.3)

Further visualisation as per Figure 25 reveals the pattern discussed in the paragraph above – there is a clear difference between the values of efficiency between the HW and non-HW versions of the letter.

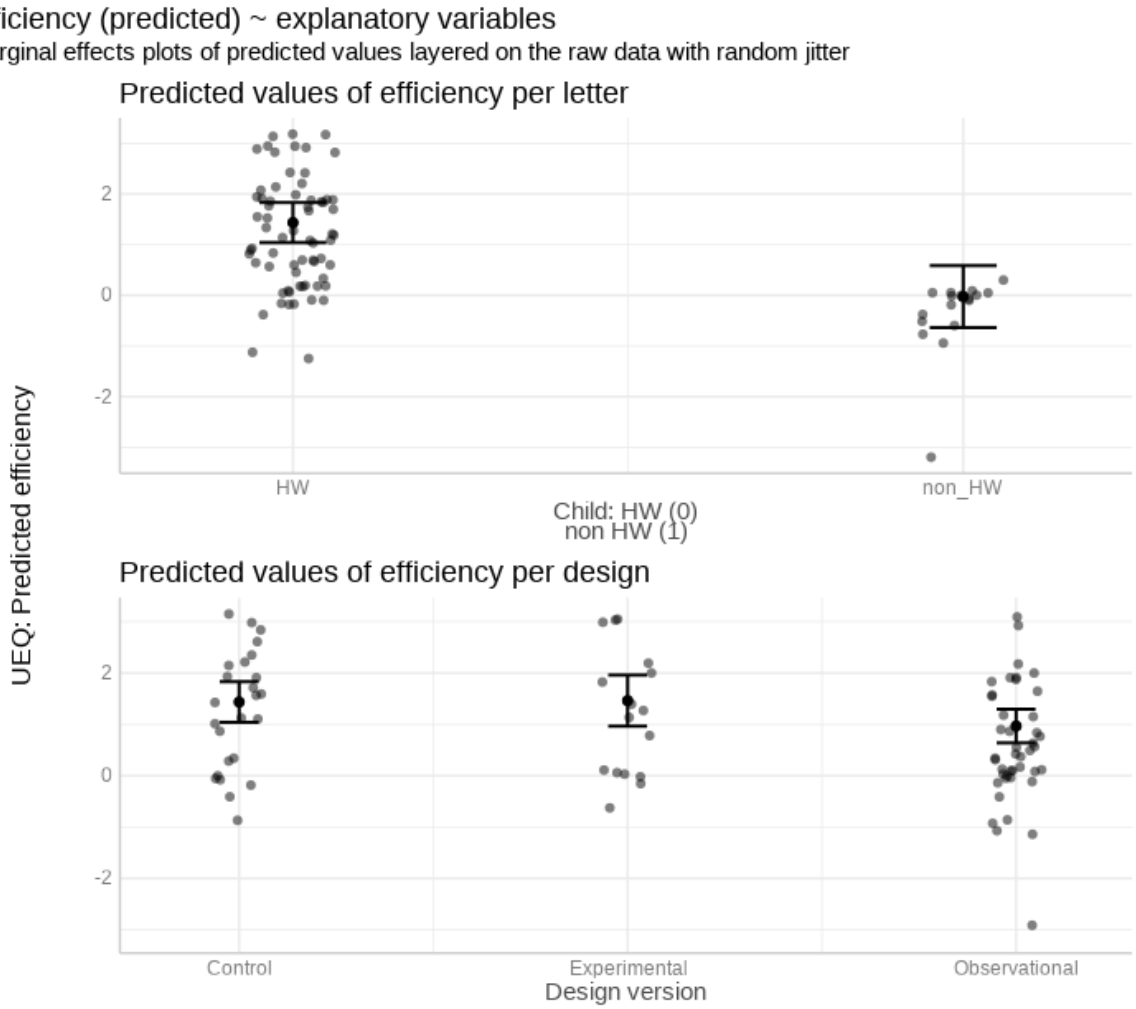

Figure 25: Final Model Predicted Values for Efficiency

4.6.4 Novelty

The fourth variable focused on the novelty of the letters and assessed whether parents found the letter innovative, creative, and interesting (Schrepp, 2019).

The final model (Table 37 in Appendix 3.7.4) showed that education was negatively associated with novelty, as the participants with higher education seemed to think the letter was -0.61 less novel than the participants with lower education while holding the other variables constant. The model explained little variance, only about 8% (as per Table 38 in Appendix 3.7.4).

The final Figure 26 of this section shows that although the education was a significant variable, there is a large degree of overlap between both levels of the education category. The overall conclusion regarding the final novelty model is that it is a null finding.

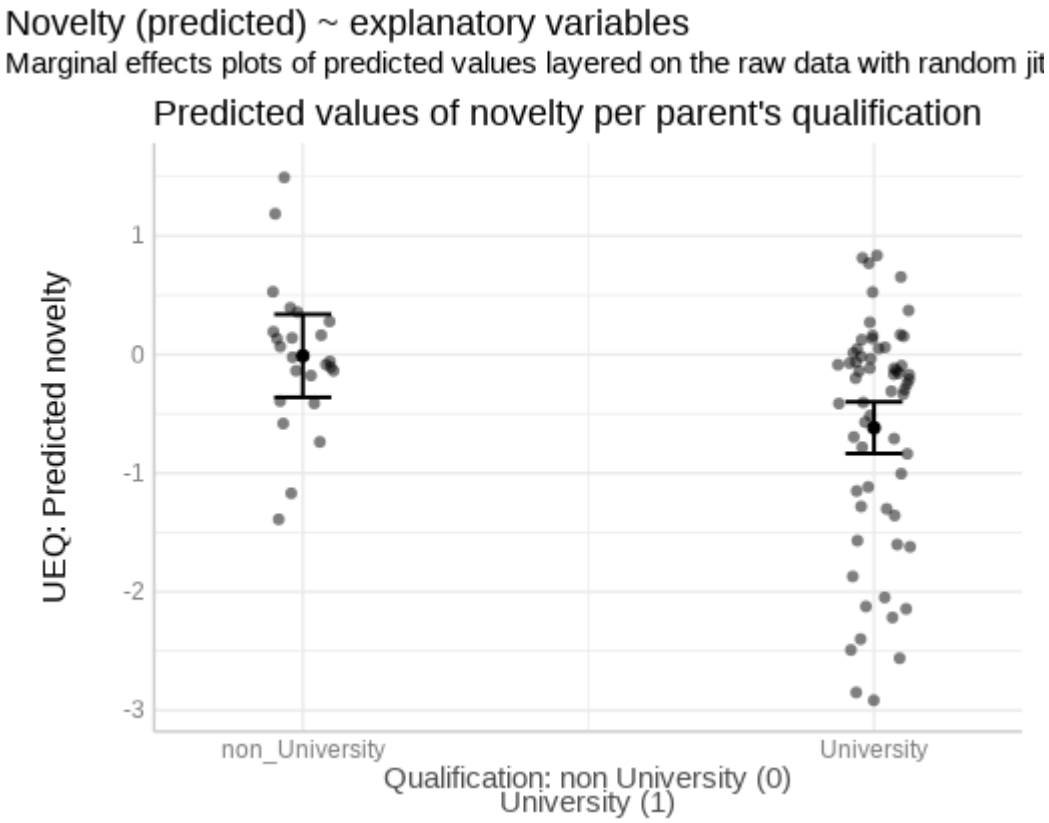

Figure 26: Final Model Predicted Values for Novelty

4.6.5 Perspicuity

Perspicuity measured how easy was it to get familiar with the product or letter in this case (Schrepp, 2019, p. 2).

The final model used only the weight category variable. Again, the perspicuity showed a similar pattern to other variables used in most of the previous models – the score was associated negatively with the weight status in the sense that parents who received underweight, overweight, and very overweight versions reported – 0.89 points lower perspicuity scores than parents receiving healthy weight versions (Table 42 in Appendix 3.7.5).

However, the model was not particularly good as it explained a negligible amount of variance, 6% and had relatively high AIC and BIC scores compared to any of the previous models (Table 43 in Appendix 3.7.5).

Figure 27 shows the visual representation of the perspicuity scores as determined by the weight category. The results indicate that while significant, most of the differences seemed to be fuelled by cases on the tails and the distribution largely overlapped.

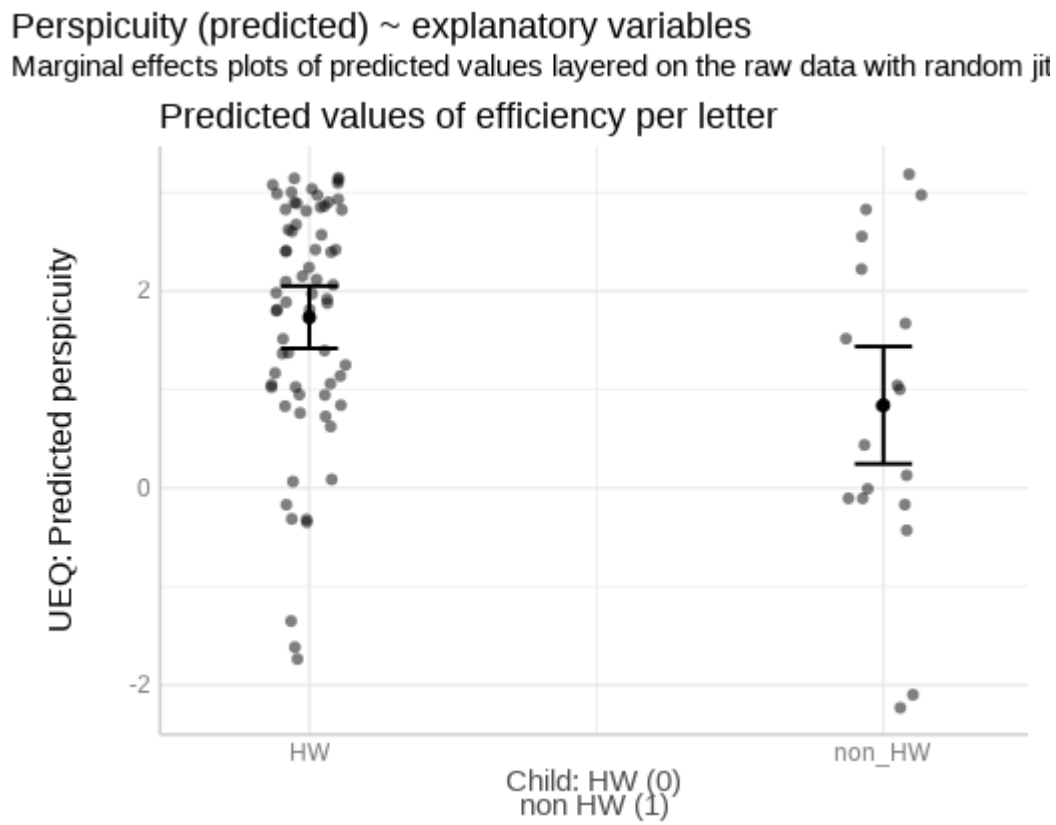

Figure 27: Final Model Predicted Values for Perspicuity

4.6.6 Stimulation

The last outcome variable – stimulation, measured whether the product (letter) is motivating or exciting (Schrepp, 2019, p. 2).

The final model predicted (Table 47 in Appendix 3.7.6) that parents who received underweight, overweight, or very overweight letters regarding their child's weight perceived the letter as -1.50 less stimulating than parents with healthy weight results while holding all other variables constant. This was statistically significant with reasonable standard error. The second variable – parent's weight was not a statistically significant predictor and had a high standard error. The model predicted roughly 21% of variance as per Table 48 in Appendix 3.7.6.

The visualisation below (Figure 28) shows the effect clearly; however, it should be noted that the difference is not as large given that the distribution somewhat overlaps.

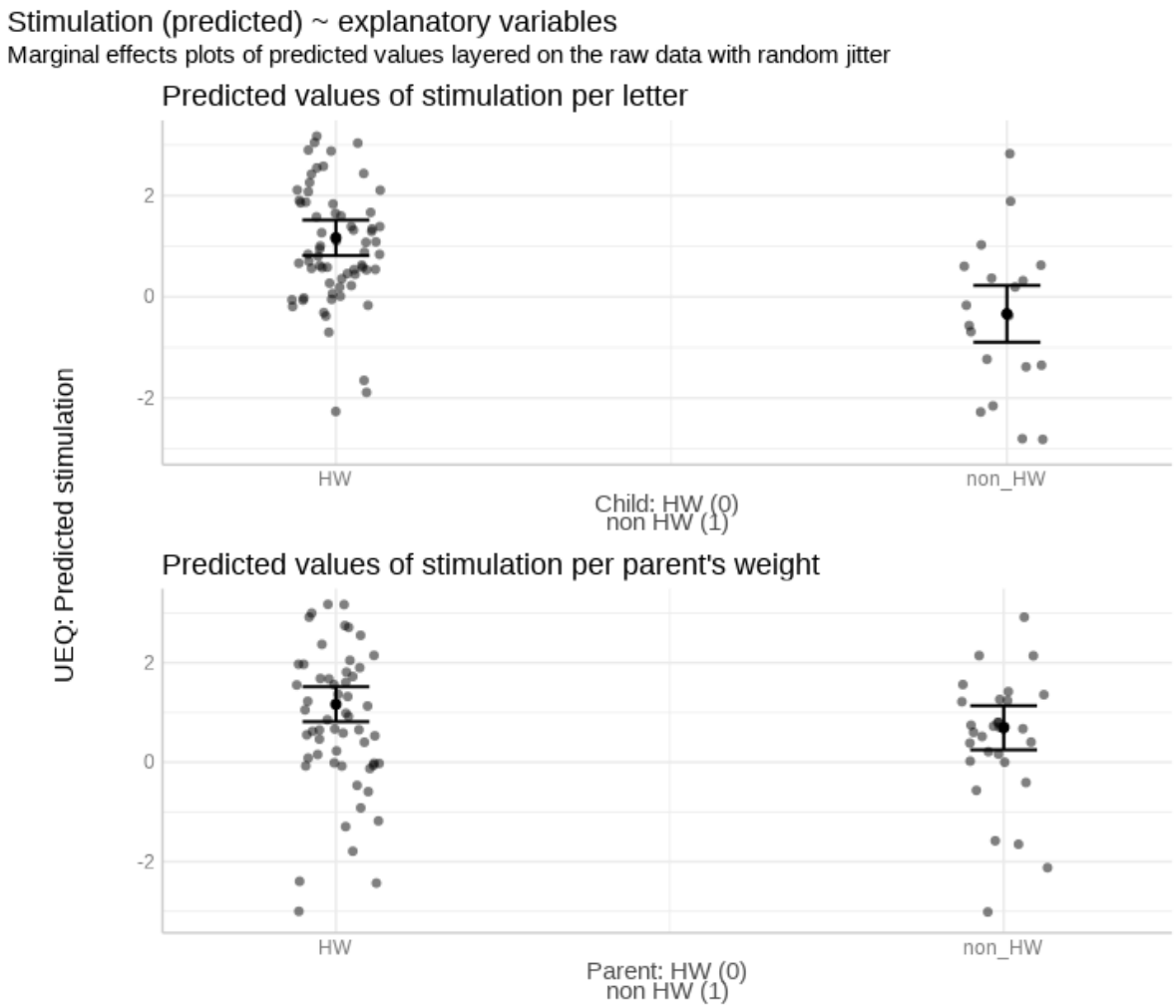

Figure 28: Final Model Predicted Values for Stimulation

4.7 Findings Regarding the Interaction with the Letter

The second set of outcome variables related to the interactions readers had with the letters they received. Four simple (Yes or No) questions were investigated as part of the survey: whether parents contacted service, GP, school nurse, or shared the results with their child. These were the four variables left after removing three variables as discussed in Section 4.4.3. Descriptive statistics were provided in Section 4.4.1.

The removal of explanatory variables affected this set of models as well. Figure 29 is the updated casual inference DAG that reflects the changes discussed in Section 4.2.3. and extends the previous conceptual model provided in Section 4.2.4.

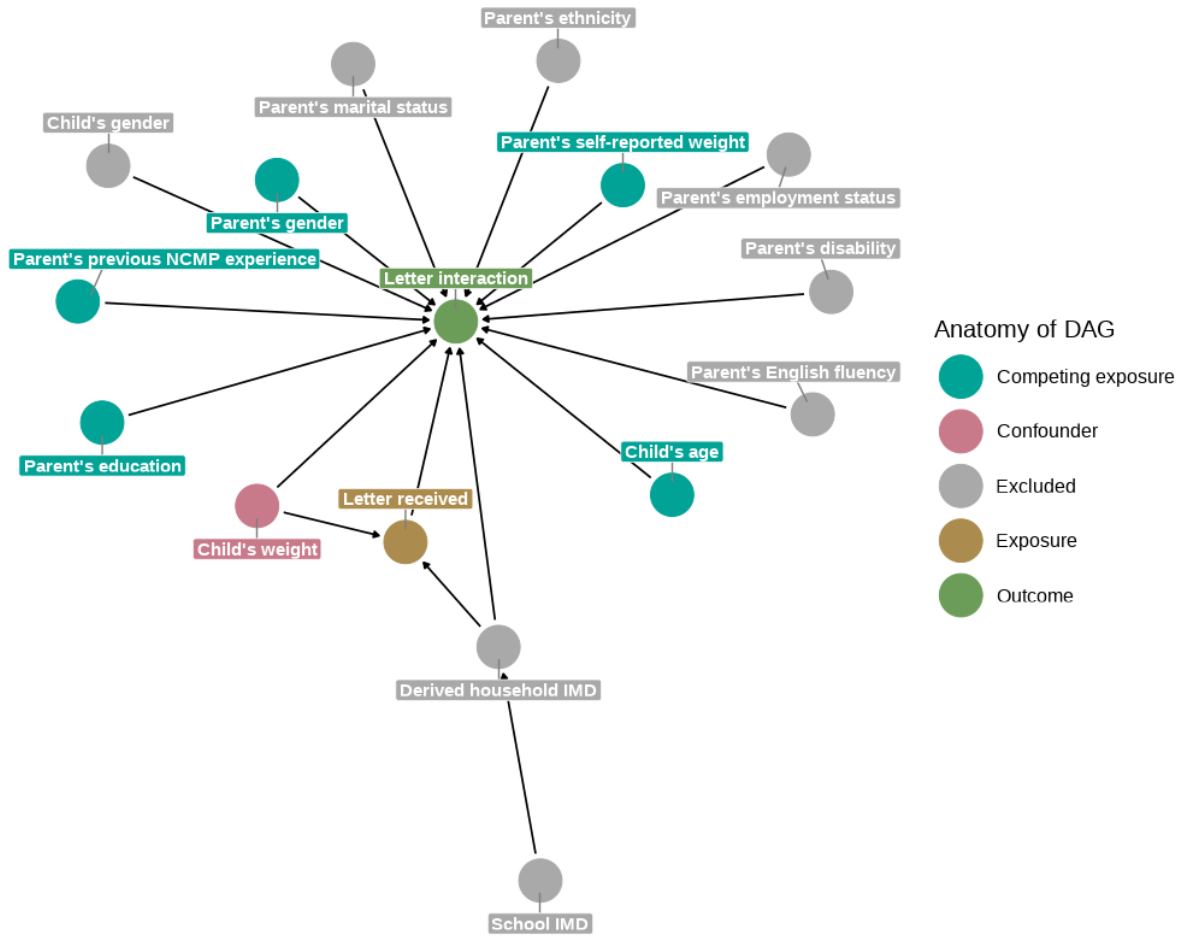

Figure 29: Updated Interaction with the Letter DAG

The findings of the behavioural outcomes are presented in Appendix 3.8.

4.8 Notes Regarding the OneLife Service Uptake

At the beginning of the project, there was an ambition to measure the uptake from the NCMP into the services provided by OneLife. Unfortunately, this was not possible for several reasons. Summarising the most important, the communication with different stakeholders showed a lack of a common platform where projects such as this one could be carefully planned and prepared. There was also a considerable time delay for any requests to be implemented; for example, when I asked the OLS to ask parents about the referral routinely, it took several months to implement the feature and then weeks to get information about how it was implemented.

Obtaining the data was equally time consuming and as there was no simple way of sharing the data. When the OneLife supplied me with the data, I got access to 141 parents who had children either in the Reception or Year 6. Unfortunately, of those parents, only 3 were

indicated as referred from the NCMP (between 2018 to 2020). This meant that the outcome variable could not be measured, and the last aim remained unfulfilled. This can be represented in the following visualisation in Figure 30, an update of the conceptual DAG where the outcome variable is labelled as excluded.

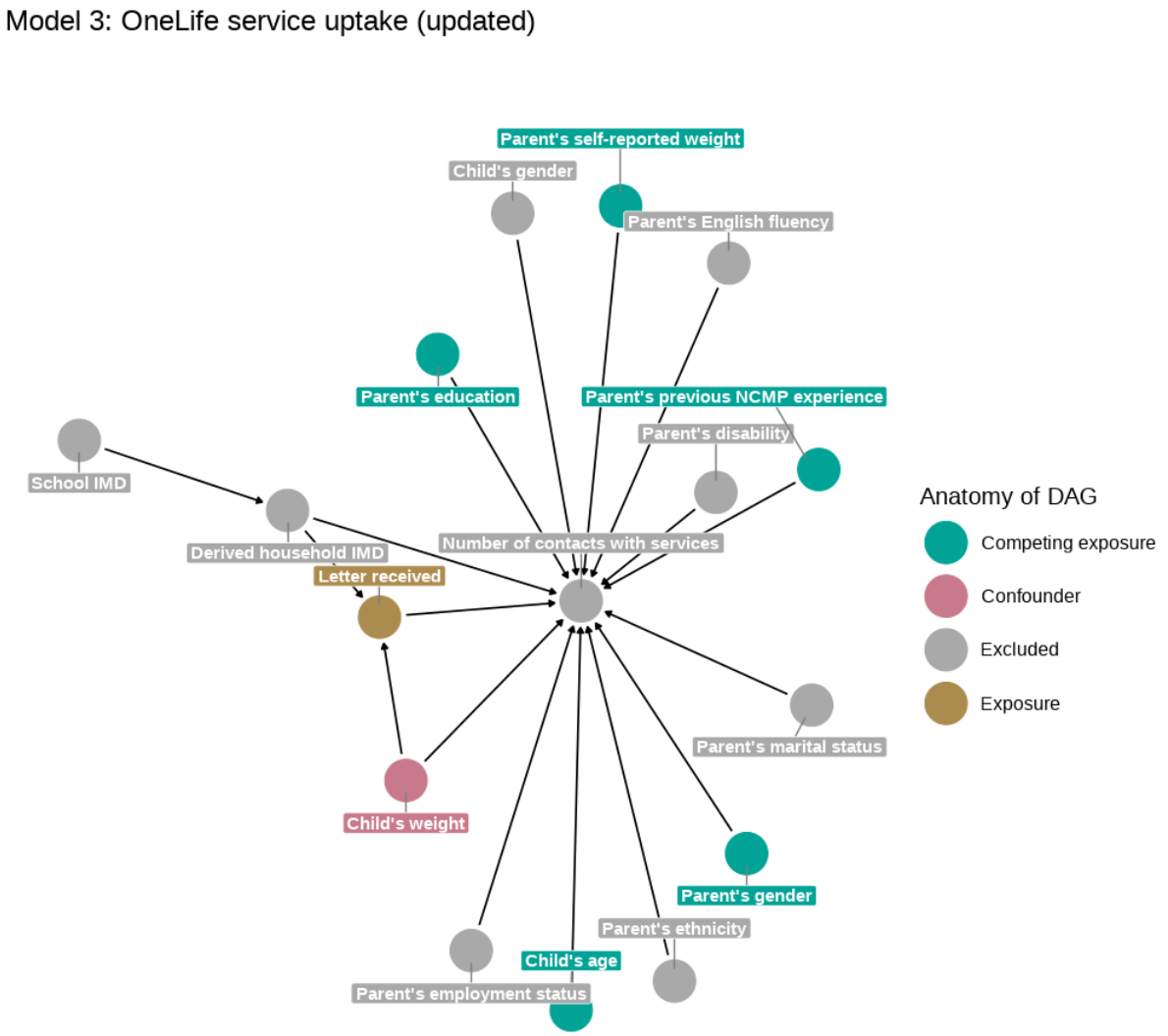

Figure 30: Updated OneLife Service Uptake DAG

4.9 Study Conclusions

The second study's conclusions will summarise the user experience questionnaire findings. The section will not discuss the service uptake as the data were insufficient. As indicated earlier, parents viewed the letter that stated their child was classed outside the healthy range unfavourably. In addition, the study provided a methodological contribution and showed that a short feedback questionnaire could be embedded in the letters to measure parental experience with the NCMP. These findings demonstrate the feasibility of measures such as the UEQ, which should be used and extended in future studies.

4.9.1 Key findings

4.9.1.1 User experience

The six factors of the user experience scale predominantly showed that the category of weight results is the most important predictor from the set of explanatory variables used.

The attractiveness was severely impacted by this variable as the final model showed significant difference between the non HW versions and HW version of the letters. Participant's impression when the letter result was underweight, overweight, or very overweight was - 2.24 lower than when the result was healthy status [SE = 0.29, 95% CI - 2.81 to -1.67, $p < 0.05$, Adj. $R^2 = 0.46$]. Similar patterns (i.e., decreased user experience with non-healthy weight letters) occurred across the remaining factors: dependability had coefficient -1.53 [SE = 0.25, 95% CI -2.03 to -1.04, $p < 0.05$, Adj. $R^2 = 0.37$], efficiency -1.46 [SE = 0.27, 95% CI -2.00 to -0.92, $p < 0.05$, Adj. $R^2 = 0.29$], perspicuity -0.89 [SE = 0.34, 95% CI -1.58 to -0.21, $p < 0.05$, Adj. $R^2 = 0.06$], and finally stimulation -1.50 [SE = 0.31, 95% CI -2.13 to -0.88, $p < 0.05$, Adj. $R^2 = 0.21$]. The only factor that did not seem to be relevant for the weight category was Novelty where the results seemed associated with parental education of parents who achieved university level of education. These parents perceived the letters as -0.61 less novel as opposed to parents who did not acquire university education [SE = 0.21, 95% CI -1.03 to -0.19, Adj. $R^2 = 0.08$].

4.9.1.2 Behaviours

The findings regarding behaviours after receiving the letter were challenging to analyse due to the low sample size, and most models except for the fourth model (Sharing results with children) suffered from the perfect separation due to the sample size. The findings are available in Appendix 3.8.

4.9.1.3 Methodological contributions

In addition to the contributions above, Study 2 can serve as a feasibility project that illustrates potential challenges relevant to the NCMP themed research. The findings show that including brief feedback inside the NCMP result letters might be helpful in terms of tracking the opinions of parents. However, this feedback must be incentivised and accessible to ensure sufficient sample sizes.

5 Study 3 – Evaluating the Standard NCMP Parental Feedback Letters and their Enhanced Version

5.1 Research Questions and Aims

The previous study provided some insights into how parents perceived the letters. In relevance to Study 3, the User Experience Questionnaire provided differences among parents of children with weight outside the healthy weight category and those assigned with the healthy weight category. Additionally, the study illustrated some of the typical challenges that similar research with parents as participants could face. In some way, the previous study did not answer the questions sufficiently, and the comparisons between the letters proved to be challenging to draw. In effect, the final study was of great importance as it allowed to approach the questions in greater detail.

The key aim of the third study was to understand how parents perceived standard and experimental letters. The objective was then to provide parents with a situation where they can compare the letters and focus specifically on the issues such as overall impression of the letters, specific sentences and words, perception of the tone, and their immediate reactions after receiving the letters. Parents were also motivated to discuss potential suggestions for improvement of each letter and where they wished the letter would approach the act of sharing the results of their child's weight differently.

As indicated, the two questions from the previous study have remained the same; only the approach has shifted from quantitative to qualitative. Therefore, the questions were "What are the opinions of parents or carers about the NCMP result letters?" and "How can the current NCMP result letters be further improved?" These questions were addressed in 20 semi-structured phone interviews where parents or carers were given an opportunity to express their opinions regarding the newly developed routine feedback and the standard letter.

Although the previous study initially aimed to be an intervention, Study 03 abandoned this ambition and focused fully on the evaluation of the letters. Accordingly, the participants were asked to answer questions regarding the letters as part of a semi-structured interview and the acquired data were analysed using framework analysis.

The framework analysis was used to guide the interpretation of transcripts collected from the interviews. The method was further supported by computer-assisted qualitative data analysis software (CAQDAS) NVivo Pro v12. This provided greater management of the data and made coding, indexing, and charting of the data easier.

Seven key themes were identified as part of the framework analysis from the interviews. These themes were, "Moment of receiving the result letter", "Experience with the experimental letter", "Experience with the standard letter", "Changing the experimental letter", "Changing the standard letter", "Parental recommendation for the NCMP", and "Discussing the result with children". From all key themes, four themes were considered as important findings thanks to their relevance to the research questions and aims. These important themes were "Experience with the experimental letter", "Experience with the standard letter", "Changing the experimental letter", "Changing the standard letter". These all related directly to the result letters, which was of key interest in previous studies. In general, the themes indicated that when parents evaluated the very overweight or overweight version, they favoured the experimental over the standard version. This was rationalised by the appreciation for less threatening language,

neutral tone, weight neutral and non-medicalising language, and attempts of the letter to appear supportive. However, parents who received the version with the healthy weight category felt more neutral about both versions and occasionally felt that because the standard version used the term “healthy” weight, it appeared more positive. Finally, one parent who evaluated the underweight versions favoured the standard version over the experimental as they have appreciated it acknowledged that their child could be “healthy” despite the weight status below the healthy weight. Parents also favoured the supportiveness and neutrality of the experimental letters but disfavoured the fact it had a sentence that appeared as if children were compared. Last, parents favoured the clarity and conciseness of the standard letters but disliked the medicalising tone and language that was felt as inflammatory.

5.2 Methods of Study 3 – Evaluating the Standard NCMP Parental Feedback Letters and their Enhanced Version

The final study continued the evaluative process of the NCMP results letters from a qualitative approach. In practice, the questions of the second study were carried into the third study and were analysed with a qualitative method – structured phone interview.

5.2.1 Sampling Design

The study commenced in July 2019; however, since most parents enjoyed summer holidays until August 2019, most participants were recruited between October 2019 and November 2019, and the last respondent was recruited in the first week of December 2019.

The sampling procedure utilised contacts gathered as part of Study 2 and contacts received from OneLife Suffolk service provider. The contacts were largely two-phased. First, participants who provided an email were sent a message where I have asked them to consider participation in the semi-structured interviews either on Skype or via phone (Appendix 2.5.1.1). There were not many responses to the email. Therefore, I followed up and phoned every participant who provided their contact details. Participants who replied to an email were typically those who also engaged in Study 2, while participants who were accessed through the service provider typically responded only after a phone call. Two participants were also referred by someone else who did the interview; however, snowball referrals were usually rare, and participants did not seem keen on providing additional contacts.

Besides contacts available from the two sources mentioned above, I developed and distributed messages across Facebook parental groups (10 such groups were identified and contacted), Twitter, and forums for parents (Appendix 2.5.1.2). These strategies, however, were not successful as they did not reach or were largely ignored by the target audience.

Semi-structured phone/skype interviews were selected because this data collection method seemed to give the most flexibility to parents who are typically busy during the day at work and during the evening with their family responsibilities. Thus, the phone was acceptable for all but one parent who wished to conduct the interviews via Skype. However, no video streaming happened during any interviews, and no participants saw me, neither I saw them, and only audio recordings were taken with consent from participants. To ensure that the method was systematic, I developed an interview script (Appendices 2.5.4 and 2.5.5) that I carefully followed and did not deviate from. All interviews (except for one via Skype) were recorded on an external recording device and later transcribed using manual transcription and machine learning on Google’s cloud service.

As part of Study 2, I attempted to contact 33 participants from Suffolk CC, 9 from Lewisham Borough, and 20 from the national version of the Study 2 survey. From the OneLife Suffolk database, I contacted 68 parents, and two additional parents were referred by another person from the database (all contacted via phone). Participants who were keen on participating in the phone interview had either the option to schedule a date using links provided in the email or via phone when I talked with them. While most participants were able to participate in the interview as scheduled, some rescheduled, cancelled or did not pick up the call at the date when the interview was scheduled. Where possible, I attempted to follow up again and sent a text message; however, after two attempts, participants were not pursued further, and it was assumed they had decided not to participate in the interviews. At no point were any participants I contacted hostile or impolite; however, some expressed concern and frustration with the NCMP process and politely declined to join as they saw no point in providing feedback.

5.2.2 Sample Size

I attempted to contact a total of 132 participants using email, phone, and text messages and successfully interview a total of 27 participants. Subsequently, the response rate was 21% using time and resource-intensive sampling techniques.

Seven participants were included in the pilot, while the other 20 participants were included in the main study. Most participants were from Suffolk CC, followed by Lewisham Borough.

Data saturation was discussed with the supervisory team, and we agreed to determine an optimal sample size based on the pilot. The optimal sample size was determined as 15 – 20 participants since the preliminary findings from the pilot and expertise of supervisors did not suggest that further themes would be discovered with a large sample size. The saturation was also purposely restricted by the semi-structured interview format, which aimed to investigate specific research aims.

5.2.3 Interview Process

To ensure each participant was systematically reviewing the letters and the procedure was not biased, I employed a semi-structured interview process.

Once participants agreed to participate in the interview, I sent them an information sheet, two letters labelled as Sample A and Sample B, and access to an online consent form hosted on Qualtrics™ (Appendix 2.5.3). I delivered the letters by post for one participant since they specifically requested this method over delivering the letters using their email.

Before participating in the interview, participants also completed a consent form. If they had not been recruited from the survey, they were asked a few demographic questions to ensure every participant provided basic information and I was aware of their essential background information.

To ensure participants were not influenced by which letter was received or evaluated first, I switched labels of the letters for every odd participant (i.e., Sample B was control instead of experimental version). Thus, participants did not always review the control (PHE-based version) letter or experimental (developed collaboratively at the LBU) first. This was not always possible when multiple participants cancelled their interviews at the last minute; however, I had to keep the same letter first only twice out of all 20 responses.

Additionally, since some participants were from different local authorities, I always ensured that the letters they were receiving were localised to the LGA they were from. Furthermore, I

ensured that I was aware of their LGA prior to the interview by asking them over the phone. The localisation was ensured by replacing logos, footers, and headers of the letter, but the body and attachments remained to keep the letters always the same. Therefore, the evaluated letters were at all times from Suffolk CC. This was tested during the pilot process with 7 participants.

The interview manual (Appendices 2.5.4 and 2.5.5) was developed with a focus on the research question and aimed to make participants evaluate both letters and compare them; thus, participants would help me to understand which version they prefer and why. There were 17 questions with an expected interview time of 15 – 20 minutes which was accurate; rarely did participants go below or above this range.

The interview structure started with verbal consent and immediately followed with “basic information” questions confirming if and when participants received the letters. These were starter questions aimed to warm-up participants and ensure there were no issues.

This was followed by another easier set of questions about participants' actions toward the letter. These were four questions that were somewhat similar to the block of questions in Study 2, which also asked about actions. It was expected that participants would not have any difficulty answering these; however, few participants used these to give story-like explanations of how the letter impacted them. This occurred without any facilitation or encouragement from my side.

Then we moved to the evaluation of letters and looked firstly at letter sample A, and then at letter sample B. I made sure that each participant was given the same questions, as well as each letter; however, if a participant answered two questions at the same time, I followed the latter question as a reassuring question, e.g., “So you have said that…, do you wish to add anything?”. If I had not done that, the interview would have felt a bit too artificial and structured. The letters were evaluated in terms of their language and across multiple levels of linguistic evaluation with a focus on sentences, words, and context such as participant's feelings (tone) towards the letter. I also aimed to understand the genre of these letters by asking a participant to describe the letters in one or two words. Participants were always asked the same questions about each letter and then were asked to compare both versions directly.

Once they had evaluated the letters, I asked participants what I have considered the most sensitive information: whether they have shared the results with their children, and why yes or no. Then I asked if any letter felt more “sharable” even if this was a hypothetical scenario. I ensured this was the last question as I have considered it more sensitive.

I did not feel any participant was concerned, stressed, or agitated during the interview. Therefore, the interviews did not seem to put participants in an uncomfortable position.

5.2.4 Framework analysis

Framework thematic analysis (or simply framework analysis, method) is “*a matrix based analytic method which facilitates rigorous and transparent data management*” that uses thematic framework to “*classify and organise data according to key themes, concepts and emergent categories*” (Ritchie & Lewis, 2003, p. 220). The method shares a similar analytical path to the approach developed by Braun and Clarke, known as thematic content analysis (Braun & Clarke, 2006; Ritchie et al., 2013). However, as opposed to thematic content analysis, the authors of framework analysis suggest adding further steps such as data summaries and displays as part of the analytical process (Ritchie et al., 2013).

As discussed in Section 2.1.3 (Pragmatism), pragmatic philosophy guides the research inquiry with analytical flexibility where the researcher can compare the acquired knowledge with their experiences. However, the experiences need to be analysed systematically, and the analysis needs to be guided by methodology; otherwise, the experiences may be biasing the research inquiry. The framework method fits the pragmatic approach well as it provides a methodological and structured way of scrutinising data collected in the context of applied policy research (Goldsmith, 2021; Ritchie & Lewis, 2003). Thus, framework analysis was developed to fit the needs of research developed in an applied context where actionable outcomes have significant importance (Ritchie & Lewis, 2003; Ritchie & Spencer, 2002).

The framework method provides several steps that guide the analytical journey and help produce reliable data interpretations (Furber, 2010; Goldsmith, 2021; Ritchie & Lewis, 2003; Ritchie & Spencer, 2002). Richie & Spencer (2002, p.178) describe the following five steps that are taken as part of the framework analysis: 1) familiarization, 2) identifying a thematic framework, 3) indexing, 4) charting, 5) mapping and interpretation. Although presented sequentially, the authors urge caution to interpret the process mechanically. In practice, the steps are interconnected, and the process often requires a creative approach. The steps are briefly described below and situated in the context of Study 3.

First, the researcher starts with a process known as familiarisation, where the goal is to immerse in data and gain familiarity with the data by reading and re-reading transcripts (Ritchie & Lewis, 2003; Ritchie & Spencer, 2002).

In the current study, I had the benefit of being a sole analyst, and there was also a smaller number of interviews to analyse (i.e., 20) and a relatively generous timeframe. In practice, the immersion involved re-listening to the interviews, taking notes of re-occurring answers, and going back to the interview questions and research aims to ensure the objectives were met.

The second step is a process of abstraction and conceptualisation (ibid). The researcher starts to form themes around data and draws initial indexes. These are typically fairly descriptive and closely linked to specific paragraphs or sentences.

Since this stage, I utilised what is known as CAQDAS programme, specifically NVivo Pro v12. This facilitated organisation and data management as it was not needed to use margin of the page to reflect on the process. I started also to conceptualise the initial draft of my codebook (Appendix 2.7) that would later mature during its usage at the stages of indexing, charting, and mapping.

The third stage is known as indexing. In this stage, the researcher uses the thematic framework to index (or fit to) particular parts of text or other type of data (ibid).

I recorded my thematic framework into a codebook and then used it while revisiting each interview section and coding particular sentences or paragraphs in NVivo. The codebook was evolving as further interviews were indexed. This process also allowed me to return to themes, refine them, and move any codes to different themes to ensure they are sufficiently abstract.

In the fourth stage, the researcher summarises data and arranges them according to their reference to a particular theme or by cases (ibid). This allows to further reduce the data into manageable sections that are then easier to interpret (Furber, 2010).

In this study, I arranged the data into thematic charts where each participant was referenced with a specific theme. These charts were constructed inside NVivo and summarised to see across which participants particular themes occurred. This also allowed to identify common

themes and themes that were less common and further refine any definitions of themes or codes.

In the final fifth stage, the researcher collates all data together and begins to interpret them as a whole (ibid). This process synthesises the previous steps, and as the researcher scrutinises their research questions, they aim to define concepts, describe phenomena, create typologies, or provide explanations using the available data (ibid).

I was guided in this process by my research questions and aims for the interviews. The most important topic that emerged was the comparison of experimental and standard letters. Therefore, the focus was on drawing out the themes that discussed parents' experiences with the letters and their suggestions to improve either version of the letters further. The assumption was that both letters could provide elements that are beneficial in some situation, and by comparing these letter versions, it was possible to highlight these elements.

These stages allowed systematic analysis of gathered data. This was further eased by the utilisation of CAQDAS that significantly reduced data management burden. However, the downside of reliance on CAQDAS is that proprietary software is limited to users who own licence. I would also like to stress that the writing process played a significant role in the development of the final themes as I had to determine what is important in the context of the overall project.

Finally, the reporting of the results was assessed using COREQ guidelines (Tong et al., 2007). The authors of the COREQ provide a 32-item checklist that was used to the quality of Study 3. The completed checklist is attached in Appendix 3.11.

5.3 Ethical Considerations in Study 3

The final study was approved in June 2019 under reference 61078. The approved form can be found in Appendix 2.8.3.

The last study required participants to be involved in the semi-structured phone interview. Participants were either enlisted in the study from the previous second study or as part of a data-sharing agreement between Leeds Beckett and OneLife Suffolk. In both cases, participants had first to consent for their contact details to be used in such a way and still had an option to decline after being contacted.

No visual information between participants and researcher were being shared; thus, only audio was recorded. The fact that audio was recorded was mentioned in the information sheet, consent form, and I have also reassured at the beginning of each interview that participants consent for the interview to be recorded. All participants (27, 20 in the study, 7 in the pilot) provided all aforementioned consent forms, and it was not necessary to take notes as an alternative for the interview being recorded.

Once the interviews were recorded, they were transcribed, further anonymised, and the original audio was deleted once the transcription was sufficiently detailed.

It did not seem that any participants felt any form of discomfort during the interviews; however, similarly to the previous study, in case of any discomfort, they had an option to terminate their participation, further discuss this with me, my DoS, or contact LREC. In addition, the information was always shared with participants as part of the debriefing document. Where possible, the documents were emailed; on one occasion, they were posted.

5.4 Sample Characteristics of Parents

Twenty participants were interviewed. The following Table 25 shows demographic information available for these participants. The demographic information was collected either from one of the surveys in Study 2 or as part of the consent that had to be submitted before the interview (where the information was missing). In some cases, the information was not asked or provided to allow participants control over the information they wished to provide.

Table 25: Sample Characteristics of Interviewed Parents

Demographic information	Response	Frequency	Percentage
Child's age category	Not asked	12	60%
	Reception year (aged 4 - 5)	5	25%
	Year 6 (aged 10 - 11)	3	15%
Child's gender	Female	6	30%
	Male	2	10%
	Not asked	12	60%
Result in the NCMP letter	Healthy weight	7	35%
	Overweight	9	45%
	Underweight	1	5%
	Very overweight	3	15%
Parent's disability	No	1	5%
	Not asked	19	95%
Parent's employment	Not working (disabled)	2	10%
	Not working (retired)	1	5%
	Working (full-time employee or business owner)	5	25%
	Working (part-time)	10	50%
	Working (self-employed)	2	10%
A parent is an English speaker	No	1	5%
	Yes	19	95%
Parent's ethnicity	Mixed	2	10%
	White	18	90%
Does a parent have any other children?	No	2	10%
	Yes, and they have received the NCMP	11	55%
	Yes, but they have not received the NCMP	7	35%
Parent's highest qualification	A-Levels or equivalent	4	20%
	GCSEs or equivalent	4	20%
	University post-graduate programme	10	50%
	University undergraduate programme	2	10%
Parent's role	Father	1	5%
	Mother	19	95%
Parent's weight status	Healthy Weight	10	50%
	Overweight	7	35%
	Underweight	1	5%
	Very overweight	2	10%
Letter type reviewed first	First experimental	10	50%
	First control	10	50%

Table 25 contains several important information that should be discussed here before the analysis, several variables with a large number of “Not asked” option – Child’s age, gender, and parent’s disability, will be excluded. The result letter for parents was the only variable where I have tried to have a relatively equal split between healthy weight categories and the other categories. This has been achieved in a ratio of 7 (healthy weight) to 13 (other). The other variables were not controlled similarly. Few are particularly biased towards one or the other level, such as parent’s role (only 1 father), parent’s ethnicity (only 2 non-white), and parent’s native language (only 1 indicated to be a non-native speaker). Variables that were reasonably represented across different levels were parents’ employment status, parents’ weight status, and whether they had other children who received the NCMP. Unfortunately, a parent’s qualification was biased towards upper levels.

The variable that I have given special attention to when interpreting the results and conducting the interviews was the NCMP result of the children. I felt that this if anything else, determines most of the parental experience with the letter. However, some other variables had similar potential such as having an older child who received the letter as well, and child’s age. These variables did naturally open up as themes during the interview, but I did not feel it was needed to facilitate the interview in their direction further.

Finally, additional Table 26 in Section 5.5.3 below shows parents’ characteristics associated with individual respondents (anonymised).

5.5 The Analytical Process of Framework Analysis

Data from all interviews were analysed using the framework method as described in the method section (Ritchie & Spencer, 2002). The method is suitable in the context of applied policy research. The following sections describe the findings from the final stage of framework analysis. The focus is on Themes 2, 3, 4 and 5 that compared the experience with letters and parents' suggestions to change the letters. The remaining Themes 1, 6, and 7 are in Appendices 3.10.1, 3.10.2. and 3.10.3, respectively. The findings and reporting were further assessed using the COREQ checklist in Appendix 3.11.

5.5.1 Codebook

As in Study 1, the codebook was created to formalise the process of how the codes were developed and provide definitions for each code and theme. The codebook is available as Appendix 2.7. The codebook also provides examples for each of the codes, but further details are shared in the following section and contextualised as part of the findings.

5.5.2 Sample characteristics of codes

A total of 20 interviews with parents was transcribed for the final sample. From these interviews, as shown in Table 78 in Appendix 3.9, 7 themes were identified with 53 codes within them, and 615 references were created (please note that a single reference is an instance where I coded a segment of text). Most references were made for Themes 02 and 03, specifically 02.3 Describing the positive sentiment (of the experimental letter) with 42 references, and 03.3 Describing the positive sentiment (of the standard letter) with 29 references. The least references were made for suggestions made by the parents across Themes 04 and 05 with regards to changes to the experimental and standard letters, respectively. These were often cases where a parent suggested a distinctive change that was unique to their own experience. Both prevalent and rare codes are useful for the overall analysis. The themes which were not coded across all participants (i.e., they were not

identified with some parents) were Themes 04 (did not occur in 2 interviews), 05 (2 interviews), and 06 (9 interviews).

In terms of references per themes, the theme with the most references was Theme 01 (135 references, 22%), followed by Theme 03 (127 references, 21%), and then by Theme 02 (124 references, 20%), Theme 05 (80 references, 13%), Theme 04 (72 references, 12%), Theme 07 (45 references, 7%), and concluding with Theme 06 (32 references, 5%). However, the prevalence of overall references/segments coded within each theme do not suggest any theme was unreasonably favoured as opposed to another theme. This is important for Themes 02 to 05 as they relate to comparisons of different letter versions; for example, the themes referring to changes of standard (13%) and experimental letters (12%) both have a similar prevalence of references.

5.5.3 Anonymised demographics describing individual parents

Table 26: Demographics of Interviewed Parents

Nickname	Child Age	Child Gender	Child Weight Result	Parent's Employment	Parent English	Other Children	Parent's Qualification	Parent's Role	Parent's Weight	Sample A
Parent 01	Reception year (aged 4 - 5)	Female	Healthy weight	Working (self-employed)	Yes	Yes, but they have not received the NCMP	University post-graduate programme	Father	Healthy Weight	LBU Exp Letter
Parent 02	Reception year (aged 4 - 5)	Female	Healthy weight	Working (self-employed)	Yes	Yes, and they have received the NCMP	University undergraduate programme	Mother	Underweight	LGA Con Letter
Parent 03	Year 6 (aged 10 - 11)	Female	Healthy weight	Working (part-time)	Yes	Yes, and they have received the NCMP	University post-graduate programme	Mother	Healthy Weight	LGA Con Letter
Parent 04	Reception year (aged 4 - 5)	Female	Healthy weight	Working (part-time)	Yes	Yes, but they have not received the NCMP	GCSEs or equivalent	Mother	Overweight	LBU Exp Letter
Parent 05	Year 6 (aged 10 - 11)	Female	Healthy weight	Working (full-time employee or business owner)	No	Yes, but they have not received the NCMP	University post-graduate programme	Mother	Healthy Weight	LGA Con Letter
Parent 06	Reception year (aged 4 - 5)	Male	Healthy weight	Working (full-time employee or business owner)	Yes	Yes, and they have received the NCMP	University post-graduate programme	Mother	Overweight	LBU Exp Letter
Parent 07	not asked	not asked	Healthy weight	Not working (disabled)	Yes	Yes, and they have received the NCMP	GCSEs or equivalent	Mother	Overweight	LBU Exp Letter
Parent 08	Reception year (aged 4 - 5)	Male	Overweight	Working (part-time)	Yes	Yes, but they have not received the NCMP	University post-graduate programme	Mother	Overweight	LGA Con Letter
Parent 09	Year 6 (aged 10 - 11)	Female	Underweight	Working (part-time)	Yes	Yes, and they have received the NCMP	University post-graduate programme	Mother	Healthy Weight	LBU Exp Letter
Parent 10	not asked	not asked	Overweight	Working (part-time)	Yes	No	A-Levels or equivalent	Mother	Overweight	LBU Exp Letter
Parent 11	not asked	not asked	Overweight	Working (part-time)	Yes	Yes, and they have received the NCMP	A-Levels or equivalent	Mother	Healthy Weight	LGA Con Letter
Parent 12	not asked	not asked	Overweight	Working (full-time employee or business owner)	Yes	Yes, and they have received the NCMP	GCSEs or equivalent	Mother	Overweight	LBU Exp Letter
Parent 13	not asked	not asked	Very overweight	Working (part-time)	Yes	Yes, and they have received the NCMP	A-Levels or equivalent	Mother	Healthy Weight	LGA Con Letter
Parent 14	not asked	not asked	Overweight	Not working (retired)	Yes	Yes, but they have not received the NCMP	University post-graduate programme	Mother	Very overweight	LGA Con Letter
Parent 15	not asked	not asked	Overweight	Working (part-time)	Yes	No	A-Levels or equivalent	Mother	Healthy Weight	LBU Exp Letter
Parent 16	not asked	not asked	Very overweight	Not working (disabled)	Yes	Yes, but they have not received the NCMP	University post-graduate programme	Mother	Healthy Weight	LGA Con Letter
Parent 17	not asked	not asked	Very overweight	Working (full-time employee or business owner)	Yes	Yes, and they have received the NCMP	University post-graduate programme	Mother	Very overweight	LGA Con Letter
Parent 18	not asked	not asked	Overweight	Working (part-time)	Yes	Yes, but they have not received the NCMP	University undergraduate programme	Mother	Healthy Weight	LBU Exp Letter
Parent 19	not asked	not asked	Overweight	Working (full-time employee or business owner)	Yes	Yes, and they have received the NCMP	University post-graduate programme	Mother	Healthy Weight	LBU Exp Letter
Parent 20	not asked	not asked	Overweight	Working (part-time)	Yes	Yes, and they have received the NCMP	GCSEs or equivalent	Mother	Overweight	LGA Con Letter

5.6 Findings of the Framework Analysis

The following section discusses in detail the findings across four selected themes and their codes identified as part of the interviews with 20 parents (who received the following letters – Healthy weight 35%, Overweight 45%, Underweight 5%, Very overweight 15%). The themes were selected based on their relevance to the research questions and aims posed earlier. The remainder of the themes (seven key themes were identified) is presented fully in Appendix 3.10. Demographic characteristics of each parent are available for review in Table 26 from Section 5.5.3 (above).

Each major theme is presented at a higher header level – e.g., Section 5.6.1 (reads as Theme 2). The theme provides definition (also see the Codebook in Appendix 2.7) and overall description but does not include any excerpts. Second, the individual codes are listed in the lower header level – e.g., 5.6.1.1 (reads as Theme 2 Code 1). The codes include the definitions from the coding notebook, analytical summaries, and interpretations with excerpts from interviews. The analytical summaries are observations taken whilst reading the interview transcripts.

The following sections will be using the language that is part of the NCMP letters to present the four themes. Therefore, simplifying things by using sentences such as "*Parents have received healthy weight status for their child*" or "*HW status*" and where the word "*status*" is not explicitly stated, it is assumed. Hence, a sentence such as "*Parents with the very overweight result*" refers to the result of the letter, not to the parent, or any of their child. It is also more transparent to refer to the letters by their four BMI categories in the first instance to easily distinguish them. I am finding it impractical to the state instead of *"very overweight letter"* something such as "*a letter which has stated a 'very overweight' result category"*. Occasionally the categories will also occur in their abbreviated form, i.e., HW (healthy weight), UW (underweight), OW (overweight), and VOW (very overweight).

5.6.1 Theme 2 – Experience with the experimental letter

The "Experience with the experimental letter" theme (Theme 2) describes how parents experienced the experimental (created by the principal investigator) letter. The experience is described across codes exploring parents' feelings, opinions, and impressions about the experimental letter and whether the letter feels encouraging.

5.6.1.1 Feelings about the letter tone

The code relates to segments where parents described their emotions about the tone of the experimental letter.

Analytical summary: Parents who have previewed the HW letter felt that the tone was a matter of fact, neutral, upbeat, positive, helpful, supportive, and anxious, while the parents who received the other weight results felt the letter tone was professional, patronising, formal, important, condensed, judging, did not offend, guilt inducive, anxious, helpful, gentle, pleasant, friendly, and supportive.

The tone of the experimental letters has triggered a mixed range of emotions among parents. What is illustrated further is why some parents may have felt positive and favourable feelings while others had predominantly negative emotions when they were asked to judge the tone of the experimental letter. The common denominator for most parents was the letter result they had received.

Based on findings from Study 2, the result was expected to determine the overall sentiment towards the letter. However, as illustrated below, the language interacted with the result letters in a nuanced manner. For example, when the experimental version was delivered to parents with children in a healthy weight, they often felt the letter did not feel positive or negative, in other words, neutral, as illustrated below.

> *I think it's a pretty neutral tone. There's no negative to it. I suppose you could say that because they've put on there if you want to discuss these results, so that could be helpful if you wanted further information that option is there. So, I'd say neutral and positive. (Parent 04, HW)*

Some parents expressed this with healthy weight results as they appreciated the letter as "inclusive", such as per the following example.

> *It's a good letter. It's inclusive, helpful, supportive. (Parent 03, HW)*

The reactions to the tone of the experimental letter were more mixed with the results from other than healthy weight categories. A parent with the underweight result felt across several codes that the letter was condescending and did not like the way it was phrased.

> *I guess a bit patronising. (Parent 09, UW)*

This parent did not enjoy that the letter suggested that there might be an "issue" with their child being underweight and explained that across multiple other codes, as illustrated later.

A common reaction from parents of children with overweight and very overweight results was that they were not "thrilled" by the result in the experimental letter, but the letter tone was appreciated as attempting to be non-offensive. For example:

> *Well, I just think they got to put it one way or another. It wouldn't offend me telling me that my child's weight is above expected for their age, it doesn't offend me, and I think it's actually quite good that they've got that One Life Suffolk website and the phone number for any help. (Parent 12, OW)*

Others perceived the tone as supportive. This will be discussed further when comparing the letters; however, see below for now.

> *Well, I still feel guilty and ashamed that I've let my child become overweight but (note: standard letter sample) made me feel very anxious about his health very quickly whereas this one I feel is more like actually we can help you with this, don't panic. Much more supportive. (Parent 17, VOW)*

The tone was an overall feeling, the first reaction on an emotional level parents had about the letter. To those receiving healthy weight result, the letter felt a bit lukewarm, one parent with underweight result preferred if the letter was phrased the result differently, and parents of children with overweight and very overweight results generally found the tone to be supportive, and attempting to help. This feature of the experimental letter could be best described as "non-polarising". The letter did not seem to make parents take extreme positions towards the results.

5.6.1.2 Describing the negative sentiment

The code contains segments about the language of the experimental letters that parents viewed negatively and unfavourably.

Analytical summary: Parents who have reviewed the experimental HW result letter indicated negative sentiment in cases where. They disliked the sentence about comparing children, felt that the letter contains phrases which are too formal, the letter made them feels as if they are pushed to decide in a specific way and do not have the freedom to decide for themselves (e.g. whether to discuss results with children), the disliked sentence about discussing weight with small children, though the letter compares children with adults because of the BMI, the term “expected weight” was not as positive, criticised the use and reliance on BMI. Parents who have reviewed the experimental result letter other than HW indicated negative sentiment in cases where. Some parts of the letter felt patronising; the letter should better use visuals or logos to communicate instead of providing more text, school nurse contact was not perceived as helpful, the sentence about children who may experience social difficulties because of their weight was disliked, and so was the sentence mentioning comparison of children.

The analytical summary shows a range of topics and sentences that caused parents to perceive the letters in negative sentiment. Negative sentiment can be defined here as an overall negative or unfavourable opinion of a paragraph or sentence in the experimental letter. The following excerpts illustrate the key passages where the language has triggered such sentiment. Further, the section discussing the changes in Theme 4 will focus on issues raised by parents in detail.

A recurring theme across the letter that many parents perceived as negative was the sentence mentioning comparisons with children. This is mentioned as sentiment because it often “spoiled” the overall experience with the letter. For example, the following excerpt illustrates that precisely:

> *(…) as I said before I don't like the one which says “If you would like to find out more about how your child’s weight compares with other children’s weight” - I don't like that one. (Parent 02, HW)*

Other parents felt unfavourable about the sentence, which aimed to make parents aware of potential issues while discussing weight-related topics with children. The sentence also coloured the letter in negative sentiment. They may have been perceived unfavourably also because they somehow felt as if they were limiting their parent’s agency and freedom to choose.

> *I suppose it’s a bit odd saying you do not have to discuss these results with Ian if you do not wish to. (Parent 03, HW)*

Parents felt the above mentioned in overweight and very overweight experimental letters for the following sentence.

> *The same paragraph, so we have sent you these results, so you have the best information to allow you to look after your child’s health. I think most parents would argue that they’re already doing that. (Parent 08, OW)*

One parent was also concerned about attempts in the experimental letter to explain why it made certain recommendations.

> *I don't like the one that says at the end..."We offer this support because research shows that children can experience social difficulties because of their weight", that for me is making a lot of assumptions and it kind of destroys the rest of the letter*

which is quite encouraging and reassuring and then that at the end... (Parent 18, OW)

These accounts prove that despite the best attempts to create a letter that avoids negative opinions, parents found several instances and segments that have caused such sentiment. These were specific to the experimental version and to some extent, to the result parents have received. However, omitting most of the parts that triggered these reactions would not change the overall message of the letter. Thus, the necessary adjustments to make the letter more appealing are minor.

5.6.1.3 Describing the positive sentiment

The code contains segments about the language of the experimental letters that parents viewed positively and favourably.

Analytical summary: Parents who reviewed the experimental HW result letter indicated that the following induced positive sentiment – appreciated the sentence stating that the letter is providing information and that they can use to help them look after their child, felt the letter is inviting and encouraging, i.e., not forceful, felt the letter is supportive, it is nice to know that the results are positive (at expected level), appreciated the letter is referring to previous measurement/communication. Parents who reviewed the experimental result letter with other than HW indicated that the following induced positive sentiment – felt the letter is kinder, softer, and sensitively worded, feels nicer and gentler for going little around, avoids/does not focus on the overweight or very overweight labels, appreciated it does not medicalise or list all the diseases (and by doing so does not induce guilt), felt that suggesting contacting school nurse / getting their support is beneficial and felt good when thanked for reading the letter, appreciated bullet points with information such as how to contact the OLS, felt the letter is not offensive, provides support, is less scary, nicer, and tries to help, appreciated that it feels like they are not being talked down/to and that the letter is encouraging and not judging.

The summary notes from the analysis show that there was an array of segments that can be highlighted as inducing a positive sentiment. The following excerpts and interpretations highlight those I think were the most important in the context of the interviews.

Parents appreciated when the letter gave them the impression that they were in control, and it was up to them to decide how to use the information. The example is below.

So, the one which says, "We have sent you these results so that you have the best information to allow you to look after your child's health." – It's quite nice. (Parent 02, HW)

They also appreciated when the letter invited them to discuss any issues with a school nurse/service/or such and expressed that it felt welcoming. The "inviting" aspect is illustrated below.

I think I prefer this letter because … this letter straight up says if you would like to talk about these results please get in touch with us on X, Y and Z and we would be very happy to help by answering any questions you might have. It's more inviting. (Parent 03, HW)

Parents who received the overweight and very overweight results appreciated when the wording attempted to phrase the result sensitively, avoided abrupt or fear inciting language. These examples illustrate this well:

> *(…) it's not specifically stating the same as what was in the previous letter and it's just wording, it's just more sensitive. In this letter, sample B, it's more sensitive. The wording in this letter is not so harsh as the first one. (Parent 14, OW)*

This revolved largely around the usage of the term overweight and very overweight. This term caused backslash among most parents and was not perceived as helpful, especially when paired with language that appeared to "threaten" their child with various medical conditions.

> *I think the language used in letter B is a lot more maybe nicer, a lot more, because they're not using the word overweight, you know, they're going round about it a little bit better because they're saying it's above the expected level rather than your child is overweight so I think, you know, the words used in letter B are a lot more gentler, a lot more nicer which may help some parents, encourage some parents maybe to, you know, phone to seek help or, you know, like get in contact and things like that. (Parent 11, OW)*

The same way the experimental letter has caused negative sentiment, it has made the letter more approachable to parents who are not receiving the "good" news. The evidence shows that there have been various instances where parents felt good about the letter for several reasons. Some of it was due to sensitive wording, other was since it allowed parents to be in control, other that it altogether avoided certain terms (overweight).

5.6.1.4 Overall impressions (Describing the letter)

The code contains segments where parents share their overall opinion and description of the experimental letter.

Analytical summary: The impression of parents with HW results about the experimental letter was that it – felt like a formal letter which does not require reading or attention, technical, standard, informative, positive, simple & easy to read, official-looking, unclear, factual, like a letter from GP. Parents who have received the other weights have expressed that the experimental letter – contains a lot of text, centres around the box which draw focus, is informative, unnecessary, readable, stages the information and is not too direct, is to the point, neutral, not aggressive, is too wordy, provides immediate support, nicer, friendly, detailed and throughout, informal, and friendly, supportive.

Where the tone referred to the feelings, the sentiment to opinions, the impressions referred to the first glimpse parents got from the letter – an early reaction to the experimental letter which could be either positive or negative, and may cover a little bit of everything. These were usually simple description that would not fit the earlier codes. The following quotes and interpretations highlight the most important features of this code.

A somewhat frequent response from parents across various weights was that the letter was perceived as "standard", "NHS-like", or "GP-like". As illustrated below.

> *So, I would say it's, you know, a standard response that is being sent out to a lot of people at one time. Pretty standard. (Parent 04, HW)*

Other parents were very precise in the way they would describe the letter, for example:

Informative and positive. (Parent 01, HW)

Parents also referred to whether they felt the letter was readable or not. The following shows a parent who felt the letter could be read well, staged into sections well, and such.

> *Right so the way it's laid out is more readable. Yeah, you can read it better. It's done in stages so hence it stated about the weight of your child, then it's gone with these results suggest that, he's above the expected levels for their age, right, that's not directly coming out and saying "right, you're child is obese or overweight". (Parent 14, OW)*

Others felt that the writing was excessive, and they would need to sit for a little while to get all the information from the letter.

> *It's not as easy to read. It looks a lot more writing, so it looks a lot more, it just looks too many words, too much writing to be able to take in the information. (Parent 11, OW)*

These were usually generic reactions that resulted from asking parents to provide the overall description of the letter. Parents often noted the letter's length, and while they appreciated the wording, they thought it was a little bit wordy. They usually felt the letter was standard and formal, similar to what they would expect from GP or NHS.

5.6.1.5 Potential to motivate

The code contains segments where parents discuss how encouraging or discouraging the experimental letter appears to be.

Analytical summary: Parents across different weights have described the motivational element of the experimental letter as – neither motivating nor lacking motivation, a matter of fact, self-explanatory, neutral, encouraging because it is supportive or refers to services, encouraging as it avoids medicalisation (OW, VOW, UW), encouraging as it is printed in colour, discouraging because it points at a problem and feels patronising (OW, VOW, UW), discouraging because it compares children, discouraging as it is not personal.

Most of these statements can be applied across all weight categories of children. The code covers whether once parents read the letter, they felt like they were inspired or motivated by it. I felt that it often depended on a specific part of the letter, such as the colour of the font, some word or sentence. The following excerpts and interpretations show why parents may have felt the experimental letter was discouraging, encouraging, or neither.

Some parents did not feel that the experimental letter was encouraging or discouraging. This was already captured across codes that described the letter as neutral to some extent. I had the impression that parents with a healthy weight result felt it was very factual letter though.

> *The general tone of the letter if neither encouraging or discouraging, the fact that the sentence says Ian's weight is at the expected level for their age that fills me with confidence but it's not a happy or sad letter, it's just factual. (Parent 06, HW)*

I previously referred to a parent who was discouraged by the letter because it referred to the "underweight" status as a "problem". Contrary to that, in their opinion the standard letter acknowledged that the child still can be healthy. It seemed common for parents to be discouraged by such sentences which were a trigger for negative reactions. The example sentence is below.

Well I guess discouraging because it's kind of very clearly saying that there's a problem that you need to sort out so they're not saying that this is normal or it's okay and you've got, I don't know, I just think it's kind of very much saying that you've got a problem that you need to deal with and, I don't know, I just think the sort of recommending what you do and telling you what to do is patronising really. (Parent 09, UW)

On the contrary, parents who received overweight often appreciated the avoidance of the word "overweight" or "very overweight" in the letter which in turn motivated them.

Yeah, it's understandable. It's probably not, it's not as affecting because you haven't said overweight, you've said above the expected, I think that's a bit kinder, above the expected level for their age would be a slightly, yeah, that's a much kinder way to put it. (Parent 08, OW)

It would be another sentence, such as "comparing" children, that would re-trigger negative emotions and discourage parents in their own words.

I would probably say a little bit more discouraging just because really, it's relating to comparing with other children. (Parent 20, OW)

The above provides evidence that single word or sentence may discourage parents from doing anything further. It was indeed a balancing act when choosing the words and if nothing else it showed how important language could be in determining whether a parent feels encouraged or discouraged by the letter. This does not mean "encouraged" parents would contact a service or school nurse; however, it seems logical to assume that it may facilitate such action.

5.6.2 Theme 3 – Experience with the standard letter

The third theme describes how parents experienced the standard letter (issued by LGA). The experience is described across codes exploring parents' feelings, opinions, and impressions about the standard letter and whether the letter felt encouraging. The codes are intentionally kept the same in Themes 02 and 03. Most of the descriptions provided to Theme 02 above can also be applied in the following theme; however, the examples are specific as well as the overall summaries and experiences or opinions of parents with the standard letter. The code reliability makes the findings more robust, especially since the letters were presented to participants randomly.

5.6.2.1 Feelings about the letter tone

The code relates to segments where parents described their emotions about the tone of the standard letter.

Analytical summary: Parents who have previewed the HW standard letter felt that the tone was – supportive, neutral, or slightly positive, lighter, and engaging, fine and factual, straightforward, structured and pleasing, professional, positive because it announced that the child is in good health, and positive for its focus on lifestyle. Parents who have previewed the standard letter for other weight groups felt that the tone was – professional but being told child was OW was infuriating, different, more positive, less patronising, uninterested, unreadable, the OW label left a negative impression, medicalising, assumptive, harsh, unoffensive and straightforward, abrupt, rude, scary, not very nice, prickly and irritating, judgemental, patronising, directive, blaming, simpler.

There is a variety of reactions from parents towards the letter's tone. The following excerpts and interpretations aim to provide what I believe are the key findings regarding this code.

The important distinction from the experimental version of the letter was the reactions of parents who have received the healthy weight results as they have perceived the tone as positive compared to the experimental version – this was perhaps because "expected" was switched with "healthy". The following excerpt illustrates this.

> *So again, pretty neutral. I'd say it comes across a little bit more positive, it's been worded differently but the information is still there, but it says you can find out the child results are calculated and check how Ian is growing over time by visiting this website, so it comes across a bit more friendly instead of just like you can do this. It says growing over time and obviously that implies that they can change things, I like that, it's a bit more positive. (Parent 04, HW)*

Other parents receiving healthy weight result letters liked that the letter mentions the word lifestyle, which has set up a positive feeling about the tone.

> *Yes, it is different. It says seeing if you're child's weight was in the healthy range for age, sex and height and it can help make informed choices about their lifestyle. So, yeah, the word lifestyle. (Parent 07, HW)*

However, these reactions regarding the letter's tone were not shared by the parents who have received the overweight or very overweight results. As per the example below, they have indicated that they do not like certain elements of the standard letter.

> *Yeah, I would say I don't like the tone of this letter, the reason why being is the bit I don't like it says if your child is overweight now they are more likely to grow up overweight and that's not necessarily true. (Parent 10, OW)*

Other parents explicitly stated they do not like the associations between the result and potential health problems in the future which made them feel about the letter in an unpleasant way.

> *Well, it's not very nice is it? To have that written in there is not a very nice thing to write is it? Yeah, it goes on about health problems, it's not a very nice letter to get is it? (Parent 13, OW)*

I felt that the experimental and standard letter offered a different experience for both parents who received the "good" and the "bad" news letter. Therefore, I delved deeper into where I though these differences occurred in the section describing the changes parents suggested for each of the letters. However, the evidence above showed that changing wording results in different feelings about the letter's tone and different experiences.

5.6.2.2 Describing the negative sentiment

The code contains segments about the language of the standard letters that parents viewed as negative and unfavourable towards them and their children.

Analytical summary: Parents who have reviewed the standard HW result letter indicated negative sentiment in the case where they – did not like the idea they would have to call somewhere; Parents who have reviewed the standard result letter other than HW indicated negative sentiment in cases where they have – experienced misclassification into OW category which was offensive irrespective of how helpful such letter attempted to be, sex was used instead of gender, the letter was assumptive of weight status, disliked the OW

label, the OW label made the letter discouraging and some parents wanted to simply bin it, OW label spoiled the rest of the letter, sentences which were perceived as scary, sentences which medicalised the child, sentences which made the parent feel bad or guilty, and language which was perceived as inflammatory, false, annoying, too direct, judgemental, or not nice.

The striking feature in this code was disproportionate feelings towards the sentiment from parents who received the HW results as opposed to parents who received other results. This will be illustrated across the following excerpts. The evidence reviewed seemed to suggest that parents with HW did not find the sentiment to be negative (at "worst" it was neutral); this is as indicated by the following:

> *You haven't told me what the free support you offer is so I'm not really sure. I don't really want to call either. I hate having to call people. I'd much rather be able to do it myself rather than having to talk to somebody. As if you're going to phone up and say, "what's this free support?" and then the person at the other end of the phone is going to be "I don't know, what are you talking about?" (Parent 06, HW)*

The above was the only evidence of a parent with a healthy weight result to indicate that the letter has caused a negative sentiment. This was a completely different story when the results were overweight or very overweight.

For example, the following excerpt indicates how one parent experienced what they suggested was a misclassification to incorrect weight category.

> *It's stating the obvious but at the same time, I think I wouldn't be reading it to be helpful regardless because you've told me child who's not overweight is overweight so I've taken offence so regardless of how nice and helpful, I mean I can see that it's trying to point me to lifestyle changes. I can see that's given me a number to call for advice so I can see that it's trying to be helpful but I'm of the opinion that my child is not overweight so why must I ask for help. I don't need any help. (Parent 08, OW)*

Another parent who received result with overweight status indicated that the letter feels inflammatory because it implies their children will become adults with overweight.

> *Yeah, one second. I almost find that more inflammatory with it saying about the weight now and then growing up as an adult because I think sometimes when they're small that's not necessarily the case. Sometimes they go through stages where they fluctuate and I know it says that there is more likelihood, but I think that could cause people to feel a little bit annoyed personally (Parent 18, OW)*

Finally, a parent who received a very overweight result noted they did not like the letter and its suggestions to various health-related illnesses.

> *Well, one or two words, it says that she's very overweight and, yeah, I didn't like this one really because it just says that she's overweight and these are the health things that can happen. (Parent 16, VOW)*

The standard letters performed relatively well for parents who received healthy weight results, clearly further demonstrated in the code below. However, it did so while literally infuriating parents who received overweight and very overweight letters as shown by the evidence presented in this section. The standard letters provided less balanced experience and seemed much more polarising than the experimental letters.

5.6.2.3 Describing the positive sentiment

The code contains segments about the language of the standard letters that parents viewed positively and favourably.

Analytical summary: Parents who reviewed the standard result letter with HW indicated that the following induced positive sentiment – reference to taking the advantage of free support, laid back tone, accounting for both sex and age of the children, having an option to double-check how results were calculated using the BMI tool, that the letter was informative, professional, factual, practical, well-written, sensible, it was nice to be thanked for reading the letter, it was good to know their child was with healthy weight and contained positive result, explained why the information was provided, confidentiality was kept, and it promoted lifestyle choices and NHS. Parents who received the standard result letter for other weights indicated that they liked that the letter was – polite and thanks for reading, kept the information confidential, did not require any phone contacts and considered underweight results to be possibly healthy weight too, was inoffensive, included Change 4 Life, and was easier to read.

There were nuanced differences in how parents felt about the positive sentiment when the result of the letter was highlighted. The following excerpts and interpretations bring forward the key information from the summary above. This illustrates well that the standard letter works better for parents with healthy weight result. However, there were still positive aspects both parents can highlight.

One parent who received a healthy weight letter indicated they preferred the design and felt that the statement that their child is of "healthy weight" feels warmer and more positive overall. This was not that surprising as the previous letter aimed to "neutralise" the experience. See the following example:

> *Again, it's factual but I prefer this letter. I like the table in the middle. I like things to be lined up properly whereas the other one was just a bit of a higgledy-piggledy box in the middle. This explains as well like seeing as your child's weight is within the healthy range for their range can help you make informed choices about their lifestyle. So, they're telling you why they're giving you this information not just giving it to you and again it says these results suggest that your child is a healthy weight for their age, sex, and height. It's nice, it's just warmer. (Parent 06, HW)*

Interestingly, the letter felt well for a parent with an underweight result. This was because the letter underlined the possibility that most children with underweight status can be "perfectly healthy". However, it did not suggest children can be perfectly healthy if they receive the overweight result. The following illustrates the experience of the parent with the underweight result.

> *I think the one that says most underweight children are perfectly healthy, that's kind of framing it in a much more positive way so I kind of like that (Parent 09, UW)*

The parent in the segment above also highlighted an important feature of public health messaging – framing. The letter positively framed the case by admitting that some children can be perfectly healthy. The wording was not drastically different from the experimental version, yet it produced a favourable experience for the parent.

Finally, parents who received the overweight version appreciated some features of the letter; for example, one parent indicated they liked the closing sentence where they were thanked.

> *I am just looking for anything that I liked. Yea, "Thank you for reading this letter - we hope this information is useful to you. Please call and take advantage of the free support we offer. Suffolk CC welcomes your feedback", all of that I like. (Parent 19, OW)*

This evidence illustrated the discrepancy between the versions of the letters (both experimental/standard); at this stage, the evidence showed that these letters produced both positive and negative sentiment across different linguistic elements.

5.6.2.4 Overall impressions (Describing the letter)

The code contains segments where parents shared their overall opinion and description of the standard letter.

Analytical summary: The impression of parents with HW results about the standard letter was that it is – relaxed, C4L is eye-catching, the letter is more informative, the bold font, the result box is clear, the result is positive, the layout is well-designed and clear, the letter is straight and simple, the other impressions were that the letter is factual, pleasing, and informative. Parents who received and reviewed letter with other than healthy weights had the following impression of the standard letter – easier to read and get a quick overview, succinct and clean, word-heavy with a lot of writing, brief and informative, not straightforward and clouded, too plain and not easy to read, easy layout to follow, liked the table, simply didn't like the letter, felt guilty, shocked, perceived the language as inflammatory, felt it said that they are not good parents, felt it was judgemental, simpler, and less informative.

Parents who did not receive the HW results had a more mixed view regarding the impression of the standard letter than parents who received the healthy weight letter, but they seemed to have appreciated the design and that the letter was not as word heavy. When it came to simple impressions from the letters (see the same code from the previous theme), the following excerpts help to illustrate the key findings and overall pattern within the theme.

For example, the following parent who received a healthy weight result enjoyed the design, table, and bolding in the letter – at least that was their first impression:

> *So, I'd say this is more informative. So still neutral, still a standard letter that's obviously sent out to a lot of people and has to cover a wide range of things but, yeah, a little bit more informative. I like the results box better. And I like that some stuff is in bold. (Parent 04, HW)*

This was also confirmed by another parent who received the same weight category:

> *This one is more pleasing to read, I prefer to read this one. (Parent 06, HW)*

> *Also, parents who received different weight results than healthy weight felt that the letter is fairly easy to read on the first impression despite the fact they did not like the actual content, tone, and other elements. As illustrated below.*

> *Yes, at first look it's easy to read. You can see height and weight. Interviewer: Okay, anything else? Respondent: I don't like the letter. (Parent 12, OW)*

However, some parents felt the letter did not display the results as clearly neither was it easy to read. These parents described to have mixed impressions of the letter or seemed to be confused; see below.

> *In one or two words is that it's not quite straight forward. This letter could be displayed a bit easily read. (Parent 14, OW)*

Parents generally thought that standard letters had an easy and accessible design, although some felt the letter was rather mundane. The main feature which seemed to have driven these impressions was that the standard letter was relatively word light. However, lot of parent impressions were also around the words I have discussed in previous codes – i.e., overweight, type 2 diabetes, or other medical conditions that felt discouraging to parents with overweight and very overweight results.

5.6.2.5 Potential to motivate

The code contains segments where parents discuss how encouraging or discouraging the standard letter appears to be.

Analytical summary: Parents across different weights have described the motivational element of the standard letter as – supportive but unreadable (HW), neither encouraging nor discouraging (just informing about HW), potentially discouraging and scary but the parent did feel they are okay (OW), neither encouraging nor discouraging (VOW), encouraging because the results are positive and it provides information about lifestyle (HW), encouraging because it felt that it is a bit softer (OW), encouraging as it does not compare children (HW), discouraging because the information stated that child is OW, discouraging because it is too plain (OW), discouraging because it made parent feel bad about themselves (VOW), discouraging and shocking because of the terminology (OW).

As with the experimental letter, the standard letter had the potential to be perceived as discouraging or encouraging. This resulted in the following theme that explored the letter's potential to motivate parents to act. The reactions did not seem to be determined by the result of the letter itself (as opposed to previous codes). The diverse reactions are captured in the following excerpts as well as my interpretation of these findings.

Some parents felt the letters are encouraging because they focus on lifestyle, are treated confidentially, and suggest that children are healthy for their weight and age. See below:

> *Yeah encouraging because it says, because it's saying to you it can help you make informed choices about your lifestyle and then it's saying, it suggests that they're a healthy weight for their age and height, and then it's giving you advice to go if you do want to look at an idea for support, and it's been treated confidentially. (Parent 03, HW)*

Other parents alluded to the previous sentence comparing the children – this illustrates how a single sentence can make parents feel that the letter is encouraging or discouraging. In this case, the standard letters were encouraging because they did not "compare the children".

> *I think more encouraging than sample A (experimental letter) … Because it doesn't say about the fact that they're comparing against other children. It just says to help your child to make health … you can go online for practical advice. (Parent 07, HW)*

Some parents felt it was neither and did not feel like anyone should be taking any actions.

Probably neither. I don't think it's discouraging in terms of taking action, but I also think it, I don't think it encourages you necessarily to take action. (Parent 17, VOW)

The letter may have discouraged parents when it was medicalising their children and suggesting they may grow up "to be overweight". This simple statement most likely felt as determinism in the eyes of a parent and did not allow a possibility that children's future may change. This "lack of change" is described by the parent below.

I think it's more discouraging because of they way they use the word overweight, and your child is more likely to grow up and be overweight. I think that's quite discouraging because, you know, we all know how weight can fluctuate during changes and as the child grows and different things so I think it, I mean it's obviously there to shock people but I don't think it's the right terminology to use really with a five year old child. (Parent 15, OW)

Thus far, both versions produced different sentiments and worked for different results parents have received. In general, the standard letter seemed to provide a better experience to parents of children who were classed underweight or healthy weight, while the reverse was true for the experimental version. Importantly, the standard letter was more polarising as opposed to the experimental letter. The neutrality of the experimental letter was generally welcomed; however, small adjustments would be needed to make the letter suitable. For example, providing positive acknowledgement when parents received healthy weight results for their child and removing any sentences mentioning that children could be "compared" or "disadvantaged".

The next two themes explored specific changes suggested by parents where it is showed which features could be modified to improve each of the letters. This should further validate the results presented thus far. The themes are presented in the same order, i.e., the experimental letter followed by the standard letter.

5.6.3 Theme 4 – Changing the experimental letter

In the current theme, parents discussed making changes to the experimental letter. This theme covered finer detail and described what parents wish was different in the experimental letter. Each code aimed at the problem that the parent identified in the experimental letter and either wished it were removed or changed. Therefore, the codes below are less general than the codes in previous themes.

5.6.3.1 Do not compare children sentence

The code refers to instances where parents expressed their concern regarding the sentence about comparing children in the experimental letter. The sentence was not exclusive to any weight version of the experimental letter and was present in all of them. The sentence parents referred to was phrased like this – "*If you would like to find out more about how your child's weight compares with other children's weight, you can go to (… URLs)."*

Analytical summary: Parents were conscious about the sentence in the letter and stated that – they would not want to compare their children to other children (or any children). The issue occurred for parents irrespective of the category in the result letter they have received. The left parents with a negative impression and wished the sentence were removed as they believed that no child should be compared to another.

Parents with children in a healthy weight category raised the issue more frequently, for example, see below.

> *So, I would remove the on sample B (experimental) about comparing their weight, because I don't think parents the right kind of knowledge for that I think they'd get hung up on the BMI measurement and I don't think that's helpful... (Parent 02, HW)*

It seemed that the notion behind the idea of comparing children was something salient to parents, an issue that was perceived as sensitive. Another example follows.

> *Yeah, the comparison is totally. No child should be compared to another child, they are all unique. (Parent 07, HW)*

Parents with children who received the overweight result have also expressed their concern about this sentence. The feeling expressed by this particular parent was that the idea to compare children was (perhaps morally) wrong thing to do since all are all different and unique.

> *The other thing is it sort of like, the bit in there about if you'd like to find out more about how your child's weight compares with other children's weight I think that's wrong because again what I said about the first letter, children's build, obviously some children are stockier and not every child, I don't think it's right that you put the bit in there about actually comparing with other children. (Parent 20, OW)*

When the letters were developed, the sentence about comparison was not expected to cause a negative reaction when it was included in the letters. The idea was to allow parents to "compare" their children with the "national average". It was phrased in a way that would be accessible to parents – in other words; the "national average" was presented as "the other children". This was unfortunate phrasing in hindsight, and the concerns raised by the parents provide evidence to avoid such phrasing in the NCMP letters. The sentence occurred in other letters sent to parents from different local authorities, for example, "*When compared to the national growth charts, which show whether a child is growing as expected for their age, sex and height (…)"*. This was preferable, but I assume it could come across as technical and dissociated to some parents.

5.6.3.2 Social difficulties sentence

The code refers to instances where parents expressed their concern regarding the sentence about social difficulties in the experimental letter. The sentence only occurred in OW or VOW letters and was phrased as – "*We offer this support because research shows that children can experience social difficulties because of their weight*". The idea behind the sentence was to express those children can experience stigmatisation, bullying, and victimisation based on their weight, and care should be taken if parents decide to take action or discuss this with their children. In other words, it was an attempt to provide safe boundaries should weight talk between children and parents occur.

Analytical summary: Parents stated that they – disliked the sentence and felt it should be removed (OW).

This sentence was disliked by one parent who has received above the expected/the overweight result in the letter; they also felt the sentence was unnecessary.

We offer this support because research shows that children can experience social difficulties because of their weight. I don't know if we need that in either, I don't like that. (Parent 12, OW)

Although the sentence was criticized by a single parent it, their excerpt provides evidence that the sentence may cause distress to some. Either omitting the sentence or rephrasing it to highlight the strengths of parents and children could lead to a better perception.

5.6.3.3 Perceived as judging

The code refers to instances where parents perceived the experimental letter as judgemental. In other words, the letter was perceived as too critical of their parental role. Parents may have felt the letter was "attacking" their approach to parenting or questioned their practices.

Analytical summary: Parents described the letter – with feeling like it is "judging me" which referred to the overall tone or the impression parents had from the letter.

This code occurred in the case of one parent who has received the version stating that their child is above the expected weight, overweight. The example below illustrates this.

I think this letter seems like a little bit more telling you off. Like this letter is judging me more. (Parent 11, OW)

The parent directly stated the letter was "judging them", which can mean they felt the letter was evaluating them. They also said it was "telling you off," as perhaps the letter felt offensive or attacking them or their parental approach. This did not refer to a specific sentence but an overall perception from the letter. This evidence suggests that despite the best attempts to make the letter welcoming, few parents still perceived the letter as judgmental. This could perhaps be mitigated by including some praise of parents or acknowledging their role as the experts about their child.

5.6.3.4 Perceived as patronising

The code refers to instances where parents perceived the experimental letter as patronising (condescending).

Analytical summary: Parents described the letter – as condescending, for example, the issue was around wording such as "we recommend" (OW). In other cases, this was caused by sentences "telling" parents to avoid certain behaviours/actions (for example, discussing weight with children), or when parents felt that their agency and freedom to decide is somehow being limited/threatened (OW, HW).

For example, one parent felt that the letter was condescending because it stressed that they can "look after" their child better thanks to the letter. The parent felt that "looking after" was what most parents already do.

And that you've been sent these results to allow you to look after your child's health, well most parents are already doing that. I think that's starting to patronise people. (Parent 08, OW)

Other parents felt that the letter should not tell them what to discuss or not to discuss with their child – this was possibly due to a particular sentence used in the letter at their local authority which stated, "*You do not have to discuss these results with «FirstName» if you do not wish to*". The following excerpt illustrates the reactions to of parents to this sentence.

I suppose it's a bit odd saying you do not have to discuss these results with Ian if you do not wish to…That's a bit, well surely it's up to me to decide what I discuss irrespective of what your letter tells me. If I'm thinking about it more. (Parent 03, HW)

The sentence was trying to avoid the topic of weight between parents and their children; however, it probably balanced too close to be questioning a parent's role and that may have felt by the parent as inappropriate.

These accounts show that the experimental letter still needs to implement further changes to ensure parents feel that the authority delivering these results acknowledges that they do the very best for their children. It also highlights that discussing parenting style in the letter may be a sensitive topic and perceived as patronising.

5.6.3.5 Avoid reliance on BMI

The code refers to instances where parents criticised the reliance on BMI in the experimental letter.

Analytical summary: Parents said that – they feel that BMI is not appropriate for children (HW) and thought it should be used for adults only.

This code was recorded for one parent who felt the BMI could not be used for children.

BMI, I believe that BMI only goes once you're an adult rather than as a child. I think that can change completely, you know, from being a child to an adult size. (Parent 07, HW)

Parent in the excerpt shares their own experience or knowledge about the methodology used and questioned the practice of an element of the NCMP. This shows that it might be useful to work further with how the methodology is explained. The letters use BMI z-score and adjust for children's age; however, explaining this in detail would make the letters too technical and inaccessible. At the same time, stating "simply" that the BMI is used may lead to the excerpt above where parents assumed it was the same BMI as for the adult population – which would be wrong.

One approach could be to exclude the BMI from the letters alongside the weight categories. Another could be to only remove the BMI and include a link to further technical details about how the measurements are achieved. However, the issue with links is that parents do not use them much, especially if it is longer than a few letters or some may not find them accessible for various reasons.

5.6.3.6 Avoid using black & white

The code refers to instances where parents prefer the experimental letter printed in colours.

Analytical summary: Parents expressed that the letter was – mundane, plain, unexciting, unmotivating, and does not draw attention when printed in black & white (OW). Having a chance to see the coloured version, they said they were "even" willing to turn the page of the letter and look at the other side (OW).

This was a surprising finding because I assumed that the letters were always printed in colours as the standard. However, the grayscale print was simply more cost-efficient in the perspective of the LGA. As a result, the letters looked plain in greyscale, especially the attachments taken from the Chage4Life campaign; they were turned from exciting to unexciting and boring.

The following excerpt illustrates that the parents would prefer if elements of the experimental letter were highlighted using colours.

> *…the column with the child's name and the weight and the height, and everything like that, that should be highlighted. So, like put it on a coloured background or something that makes you aware, so it's drawing your eye line to that specific information of that, that's the information you've giving. (Parent 14, OW)*

Similarly, a parent who had their experience receiving the grayscale letter said how much more motivating the coloured attachments felt when she saw one. (Note that the parent refers to Change4Life attachments.)

> *I would say looking at it online it looks much more motivating in colour than it does, on the copy I've got it's all in black and white, it's a printed black and white and all of the, how many ways you change is on the back of the sheet and I must admit I don't actually think I ever turned it over and looked at them so when I saw your version in colour online it was a lot more, you know, looked a lot more bright and it looked a lot, I don't think I've ever actually read the back of it until I saw yours. (Parent 18, OW)*

These excerpts delivered a simple message. There was no point in using attachments that were not printed in colours. This should be avoided to reduce costs associated with printing and delivery. The elements of the letter should also be printed in colour to draw attention to crucial parts.

Where colours cannot be included, bolding, italics, and other elements and stylistic features could be used. There is a potential for creativity in these letters, but there is little room to do so when the budget is strict, time is of the essence, and a lot of the tasks to produce the letters require manual labour.

5.6.3.7 Improve the layout of results

The code refers to instances where parents perceived the design or layout of the experimental letter as distracting.

Analytical summary: Parents expressed their wish to change the design or layout of the experimental letter by – moving phone numbers higher in the letter, keeping the structure simple (HW, VOW), using the result box from the standard letter, bold font face (HW, OW), making the result box "cleaner" (OW), minimising the overall amount of text, highlighting or making phone number stand out, and moving the results onto a separate slip so people are "forced" to read it (OW).

Some parents perceived the design and layout of the letters as leaving some room for improvement. For example, one parent who received a healthy weight letter felt that numbers should be moved to the upper section.

> *So I would have the phone number on both letters and quite early on saying if you've got concerns your first action should be to call us and talk through and we can help you and signpost you on what might be helpful. (Parent 02, HW)*

Another parent felt the design was distracting and untidy. They would prefer it to be like in the standard letter. They have specifically referred to the table as their reason to feel that way.

If I was change it, I would go with sample A, stick to that wording, but just change that table that they use and use the table in sample B because it's clearer. (Parent 10, OW)

Another parent told me that the letter was too long, too wordy and suggested that the best approach to deliver the results would be to move them onto a separate slip to "force" people to read the letter and then look at it.

Yeah, it's just a lot of writing, too much. I mean the phone number to call is a bit more obvious. Yeah, I would look at reducing that and I would actually, for both of them, I would remove the height and weight blocks and put them right at the end… Because then people are forced to read the letter without any, that they would read it for the information and then look and go "oh, let me see where my child is on the" if there are any concerns and then you can flip over and read the results. (Parent 08, OW)

The codes above show that for some of the parents, the design became a problem because it distracted them from accessing important elements of the letters. It seemed that modifications that could move the table into a separate sheet, move the numbers into an area where people can easily find them, and focus on a simple and clean layout that does not feel cluttered to parents would improve the letter. However, such modifications, while they appear simple to do, require professional support of a design expert. The design of the letters was taken from the two official versions produced by PHE, but other LGAs are using different designs and layouts. Nevertheless, the evidence above shows that parents pay attention to design and can tell if it feels right.

5.6.3.8 Increase fonts

The code refers to instances where parents expressed that the fonts in the experimental letter are too small.

Analytical summary: Parents described the letter fonts as – too small and suggested them to be increased (OW).

This was produced as a separate code even though only one parent addressed this issue specifically. The following excerpt shows this.

The font on it could be a bit bigger. (Parent 14, OW)

The fonts are an important part of the letter. The reason the parent has commented on this was probably that the experimental version for overweight and very overweight results was slightly wordier and fonts were smaller intending to squeeze the content onto one page. This should be avoided in the future and either the letter should be allowed to go over the one-page limit, or the text size should be reduced.

5.6.3.9 Keep the ball at their court

The code refers to instances where parents felt that the experimental letter is too forceful and suggested rewriting it to appear voluntary.

Analytical summary: Parents described that the wording similar to "we recommend" as too directive, sudden and suggested changing it to wording such as "If you would like to" (OW).

This may relate to ensuring that parents felt that their parental agency was not in any way limited and they had all their freedom to decide whichever way they wish. This was

commented by one parent who received the overweight version of the experimental letter in the following excerpt.

> *…you could have used a different tone, something like "If you would like...your school nurse would be more than happy to discuss any concerns you may have around your child's weight or any issues such as social experience..." something like that, instead of "We recommend...". You know that became suddenly a bit medicalised, and bit directive. (Parent 19, OW)*

This seemed to be a particularly sensitive topic for many parents, especially in the standard version of the NCMP letters where this was more common, and even more so if the results were not of the healthy weight status. Parents felt that directive wording such as "we recommend" pushed them into doing an action that may not necessarily reflect their own decisions. It may also feel like a medicalised form of advice because it assumes that the parent cannot be an expert in the following matter.

The experimental letters aimed to avoid this wording where possible, but it did occur in the UW, OW, and VOW versions in the following phrase: "*We recommend that you get in touch with your school nurse as they will be able to offer you additional support (…)*". The intention was not to deny parental agency, but admittedly this may have been an unwanted effect for some parents. This approach also does not seem to lead to higher uptake or engagement – it seems simply to frustrate parents that they are being "told to do" something. The wording suggested by the parent, i.e., "*If you would like...your school nurse would be more than happy to discuss any concerns you may have around your child's weight or any issues such as social experience...*" is the better choice in this case.

5.6.3.10 Make it less formal

The code refers to instances where parents perceived the experimental letter as too formal.

Analytical summary: Parents described parts of the experimental letter as too formal – "yours sincerely" feels too formal and replacing with "kind regards" would be preferable, or the overall letter is too formal (HW), the letter feels too much like a standard NHS letter, it would be better to make it more, "light-hearted" (HW).

Some parents felt that the way the experimental letter is phrased made it way too formal and perhaps difficult to approach. For example, one parent who has received a healthy weight result told me that:

> *I personally, I don't particularly yours sincerely. I think it's very formal. I prefer like kind regards or something like that, but I suppose because it is that, that's probably just how it's done but that does make it seem a little bit more formal perhaps. (Parent 04, HW)*

This would have been relatively easily amended if "Kind regards" or a similar phrase was used at the end.

Another parent said that the experimental letter felt like a standard NHS letter. This was not necessarily bad, but it did result in them feeling it was not as engaging.

> *…I would, as I said it just feels like a standard NHS letter but this one is a bit more, sorry sample B (the standard letter) is a bit more engaging, a bit more kind of encouraging, I think. Not light-hearted. It has a lighter tone. (Parent 01, HW)*

The reasons this has occurred were related to wording and phrases such as changing "healthy weight" to "at the expected weight". Parents who perceived the letter to be too formal were receiving the healthy weight version of the experimental letter. This was another evidence confirming how the wording of the result impacts parents in the way they feel about the results and the letter. This can be amended by providing more praise in the experimental version of the healthy weight letters. This also leads nicely to the following code.

5.6.3.11 Make it more positive

The code refers to instances where parents perceived the experimental letter as pessimistic.

Analytical summary: Parents described the letter as pessimistic – parent felt the letter is focusing too much on one-time results (rather than over time or change in weight) which did not feel positive (HW), the statement that the results "are at the expected level" should be followed by some praise (HW), the fact that the nurse may contact the parent about the UW result made the parent perceive the latter as negative (they wished it was removed).

Particularly for parents who have received the experimental result letter with healthy weight felt that the letter was a little pessimistic or too standard. The following excerpt captures the essence of this code rather well and the issue that some of the parents had with the aforementioned version of the letter.

> *I mean there could be…there results suggest that Ian's weight is at the expected level for their age, I mean that could be followed up with this is positive, this is a positive, I don't know, some sort of praise if it's good could be inputted there (Parent 01, HW)*

As opposed to the experimental version, the standard letters often followed up with such short praise in the healthy weight or underweight category.

However, there was also a greater issue in the case of the underweight version of the experimental letter. Only one parent in the sample received the underweight result for their child, but it was even more important to give the space to these parents as they seem more often than not left out from the research around the NCMP. The following sentence expressively shows what the parent means when they feel the language is not positive enough in the experimental version.

> *Yeah, I think the language is more positive. It's making suggestions, it's not telling you that a Nurse might phone you up. It's leaving the ball in your court as to whether you contact somebody and it's kind of saying that your child is likely to still be perfectly healthy so it's highlighting the positives rather than the negatives, and it's being quite clear that the information won't be shared with your child or the school and it's more concise as well which kind of makes it easier to read. (Parent 09, UW)*

Crucially, the two words "perfectly healthy" missing from the experimental letter might be what made the parent feel most of the negative sentiment towards the experimental version. The parent was making an important point here: their children can still be perfectly healthy despite being or receiving the "underweight label". This has the potential to extend to the parents who receive the overweight and very overweight results. The rhetorical question that can be asked here is – why their children could not be "perfectly healthy" despite the "overweight" and "very overweight" labels? Besides this observation, the parent states that

the standard letter was “leaving the ball in your court” – yet another poignant sentence. This relates to the “Keep the ball at their court” Code 9 I have discussed previously. It seems important to let parents make an important decision. This ultimately was where I believe the nudging trend, the medicalising got it all wrong.

This code brings evidence that parents need praise irrespective of how the letter is phrased in other paragraphs and irrespective of the result. After all, bringing up a child is at least on some occasions a difficult job for a parent. The letters should not make them feel like it needs to be made even more challenging.

5.6.3.12 Make it more straightforward

The code refers to instances where parents thought that the experimental letter explained the result in too much detail.

Analytical summary: Parents stated that it would be simpler if, rather than asking/encouraging parents to do any changes, they should simply call school nurse or services (HW), the term “healthy weight” was preferred over at “the expected level” because the parent had to look what the expected weight meant (HW).

Another aspect of using “the expected level” instead of “healthy weight” which I have not anticipated to be a problem, was that it felt to some parents who have received the healthy weight result as going around too much. This relates to some of the previous code, but in essence, they preferred to be told their child is “healthy”. The following excerpt illustrates this.

> *The sentence about the expected level, in my opinion, I prefer if the sentence was about healthy weight. I feel this is slightly better from letter A because it gives information straight away, because I what is the expected level? (Parent 05, HW)*

Some parents were rather limited in their feedback, but I believe it relates to a similar issue as to what the parent above allures.

> *Official looking but not very clear. (Parent 06, HW)*

Ultimately, the experimental letter was not very clear to some of the parents who received a healthy weight version. This brings an idea that when these letters bring in the “good news”, then there is little to gain from going around or using extensive descriptions. They simply wished to know if their child was healthy and get to the point. The term at the expected weight may have led some more parents to “google” what that means, as evidence by the comment from one of the parents above. This can be easily mitigated in the case of healthy results. However, I believe that the evidence presented thus far shows that going around being less direct and neutral was beneficial for the overweight and very overweight results and underweight as well as acknowledging the children can still be perfectly healthy wherever possible.

5.6.3.13 Make it personalised

The code refers to instances where parents perceived the experimental letter as lacking individual information regarding their children.

Analytical summary: Parents described that the letter does not feel personalised because of suggestions to avoid discussing the results with children when the children are too small (e.g., 4 – 5) (HW), lack of any further information about children besides weight and height (HW).

This code described what the Achilles' heel of the letters as a medium was. There were only limited options to modify and personalise letters. The parents noticed it, for example, one parent receiving the healthy weight result noted the following.

> *It says you do not need to discuss these results with Ian if you do not wish to do so. Usually these are like for small kids aren't they so I wouldn't really be discussing the weight of a child with a five-year-old so it's a bit pointless. (Parent 06, HW)*

From the evidence gathered further, it was clear that one common reason not to discuss the results or even mention them in any way was that children were too young. Letters accounting for children's age could omit such a sentence, but not many LGAs do such customised feedback.

Another parent who received healthy weight results felt that the letter needed to mention additional context beyond "simply" height and weight of the children.

> *Yeah, I mean obviously there's some individual information of height and weight but there's nothing, you know, we were pleased that we could take your child's weight, or they were willing to let us take their height and weight. You know, it needs to be a bit more personalised, I think. (Parent 07, HW)*

The parent directly suggested making it more personalised. This code will also occur as a suggestion for changes for the standard letters. There are possibly multiple ways to personalise the letter, from abandoning the format itself and going electronic to splitting the letters across gender, age groups, or both (e.g., Reception year – girls).

5.6.3.14 Make it shorter

The code refers to instances where parents perceived the experimental letter as too verbose.

Analytical summary: Parents described the letter as verbose because – a lot of writing/text, text describing the information that could be stated by graphics, logo, or in the header, too many links when it would be easier to simply call school nurse (OW), not being concise enough (OW), too much writing, not being easy to read (OW), too much content (OW). Note that the previous codes largely quoted HW parents, but the length seemed to be more OW – specific issue.

This code does not need a lot of introductions because it is relatively easy to explain what the issue was for some parents with the experimental letter. Notably, while previous codes seemed to be voiced more often by parents with a healthy weight result, this code was voiced more by the parents with the overweight or very overweight result.

For example, one parent who received the overweight result felt the experimental letter was not concise, not to the point.

> *I think just the first letter is just more concise. It's to the point. So, it's suggesting that your child is overweight. They're not actually saying that they are but then there's also, there's the option, there's a first step to call One Life Suffolk to discuss the findings if you feel that there is an issue or there's a point which needs to be discussed. (Parent 20, OW)*

Another parent felt that such a letter would require a lot of time to read and looked "very much more busy".

I think because there's a lot more writing, a lot more words, probably a lot more information but to me I just, when I look at this there I think "right I'm going to need to sit down and take about 10 minutes to read this" whereas like the other letter you've got the little chart on there which is a lot simpler just to look at and read, whereas this one looks a bit, looks very much more busy. (Parent 11, OW)

Finally, as suggested by another parent, the ideal would be if the letter kept the tone, but used fewer words.

I think letter Sample A would be improved if it contained the same tone except for the ones I mentioned I think I liked less that same tone maybe with less words, less content. (Parent 19, OW)

While the issue of word length was straightforward, it was quite difficult to implement in practice. It is difficult to balance a neutral tone, accessibility, provide the information, but keep everything concise. As the evidence above shows, despite the changes made during the letter development process, the letter still felt too long for some parents. Perhaps removing the results to another page or slip could make the letter more cleaner looking and concise, but it would probably be perceived by some LGAs as an additional cost.

5.6.3.15 Provide more focus on lifestyle

The final code refers to instances where parents would prefer more focus on overall lifestyle information provided in the experimental letter.

Analytical summary: Parents described that the experimental letter as – insufficiently focusing on overall "lifestyle" and is in a way "only" mentioning "weight" and "height" (HW).

This was an issue raised by a parent who has received a healthy result and felt the letter was mundane. They would have appreciated if, like the standard letter, the experimental letter would mention lifestyle.

It's more positive thinking rather than just about their height and weight… Mentioning lifestyle rather than the other wording. It's like everything about, you know, lifestyle or how, yeah. (Parent 07, HW)

It is a separate code because I believe the focus on lifestyle is a tool of its own in the letters. I have not included it in the experimental letters directly since it felt like an overused term that did not contain much meaning at the time, but I acknowledge the evidence above and feel the letter would probably benefit from including the "lifestyle" scope. This could have been more linked with the services offered in the LGA or simply with some of the links to make it part of the letter.

5.6.4 Theme 5 – Changing the standard letter

Similarly, to the previous theme, Theme 05 describes what parents wish was different in the standard letter. Each code aims to point at a specific problem that parents identified in the standard letter, and either wished it were removed or changed.

5.6.4.1 Avoid using black & white

The code refers to instances where parents prefer the standard letter printed in colours.

Analytical summary: Parents expressed that the letter was – plain when printed in black & white, and easy to ignore as something that does not require any urgency (OW).

The comments made in the same code relating to the experimental letter also apply to a large extent here. Parents commented that the standard letter would benefit or be nicer if it was printed in colour. For example, one parent who received the result with healthy weight status said that the “colourful page” was something they liked (referring to the C4L).

> *I mean the second page is nice with the colourful graphics. (Parent 08, HW)*

Another parent who commented on the experimental version and received a result with overweight status said that the letter felt plain and did not motivate them to take any actions.

> *It’s plain. As a parent it’s not a letter that you would think wow, I need to make drastic changes. It’s really, yeah, it’s, like say the column, yeah, if the column was say like, stands out, like say you’ve got a bit of colour background to it so then you know that that’s what you’ve got to really … as a parent you focus on those specific figures, you know, maybe if you put a bit of colour on the letters to show this is what you’ve got to really take concern with. (Parent 14, OW)*

5.6.4.2 Improve the explanation of the results

The code refers to instances where parents felt the standard letter provides an insufficient explanation of the results.

Analytical summary: Parents described the following challenges regarding the presentation of results in the standard letter is – without some sort of comparison, it is difficult to know to understand if, for example, 25 kg is a lot for somebody who is five (HW), I think that the sample A (experimental version) is better at explaining the results (OW).

There were occasions when parents felt there is insufficient information to understand and interpret the results in the letter. As discussed elsewhere, it is relatively challenging to provide complete interpretation without sacrificing a lot of space. For some parents, the information was lacking, such as the following parent who received a healthy weight status in the letter.

> *You sort of see the results in the middle in a box but the thing about those results in the middle is that...I don't know how much they would mean to...you know, because there is no, there is no comparison (skipped) to information in that. So, unless you know what 25 kilo means to somebody whose five..., in fact, I can't even remember what my daughter weights, so..., I don't know whether...I mean, it says it is in a healthy range but it doesn't...you know, without having something next to it. That takes up quite a big bit of the letter I suppose. (Parent 02, HW)*

As per the excerpt above, it was interesting to see that some “comparison” was useful; however, it should be carefully phrased and avoid mentioning comparing children to other children as that was perceived negatively in the experimental letter.

Although the letter did not offer a dramatically different in terms of provided information, some parents felt the information provided and the explanation in the standard letter was worse in comparison to the experimental letter (when parents had the chance to make such a comparison). See the following excerpt.

> *I think sample A (experimental) is much better in explaining than sample B … I think sample A there was a lot further information, yeah, it was worded better. It was more encouraging than sample B. (Parent 12, OW)*

Most likely, it was the wording than provided information that made the difference in parents' perception. Still, these two parents felt there was some issue with how the information was provided and interpreted.

This evidence suggests that parents would find it useful if some anchoring was provided, such as "*25 kg is what is expected for a child of this age and gender*", or in form of an infographic. Where no further information can be provided, it would be important to share the results in an accessible format. However, this also may mean to phrase and word the information sensitively and with care as parents may otherwise not feel it is worth their time to read something which is perceived as offensive or not encouraging.

5.6.4.3 Improve the layout of results

The code refers to instances where parents perceived the design or layout of the standard letter as distracting.

Analytical summary: Parents expressed their wish to change the design or layout of the standard letter by – moving phone numbers higher to improve their visibility (HW), moving the weight and height result's box at the end/separate sheet (OW), considering using more "modern" looking result table (like the experimental version; HW), splitting the letter to sections with the key information, scrapping the current layout and completely redesigning it (OW), making it look like some medical documentation from GP so parents take it more seriously (HW).

Another code that applied for the experimental letter in the previous theme was parental perceptions regarding the design or layout of the standard letter. Overall, parents seemed to accept the idea of presenting results in tables, but they preferred a table which was modern or visually appealing. The table from the experimental letter represented this according to the following parent.

> *No from what we've been discussing I think sample B (standard) works really well, just change the table layout to that of sample A and it's really encouraging, sample B, so keep that kind of tone. So, yeah, sample A I would, as I said it just feels like a standard NHS letter but this one is a bit more, sorry sample B is a bit more engaging, a bit more kind of encouraging, I think. Not light-hearted. It has a lighter tone. (Parent 01, HW)*

The standard letter is a regular Microsoft Word table; therefore, it was not surprising that some parents would prefer a slightly more exciting variation.

Other parents felt the information they may use, such as phone numbers, should be higher up in the letter. The following comment was made by a parent who has received a healthy weight status for their child.

> *I would have the phone number on both letters and quite early on saying if you've got concerns your first action should be to call us and talk through and we can help you and signpost you on what might be helpful. (Parent 02, HW)*

However, some parents felt that the layout was not working and would prefer to redesign it completely. This was how a parent who has received the result with the overweight status for their child felt.

> *So because the, the layout of the letter is done in sections so you read the first bit then there's another section, then there's another section, and then it concludes with*

if you want any recommendations or further information these are the websites and everything that you can look on which is good…Right, sample A (standard letter) I would scrap, I don't like that layout at all (Parent 14, OW)

The standard letter did not satisfy them in the way the results were shared; it was supposedly not transitioning smoothly from one section, as evidenced by the excerpt above.

Finally, as with the experimental letter, this parent's comment on moving the results onto a separate slip of paper or at the end of the letter applied here as well. In some way, the idea is to separate the text and the result so parents can focus on one at the time.

Yeah, it's just a lot of writing, too much. I mean the phone number to call is a bit more obvious. Yeah, I would look at reducing that and I would actually, for both of them, I would remove the height and weight blocks and put them right at the end. (Parent 08, OW)

Both standard and experimental letters received several critiques regarding their layouts. These were quite prevalent codes and therefore I believe this provides evidence that the NCMP team at PHE should redesign the layout for both of the letters. Modifications could include moving the results table at the end, modernising the table, ensuring the text is staged and feels like a continuous reading experience, and moving any important information above or highlighting them.

5.6.4.4 Include further visualisations

The code refers to instances where parents felt the standard letter should feature more visualisations or infographics. This code was recorded only for one parent.

Analytical summary: Parents described the lack of visualisations in the standard letter with requests to – provide a visualisation with centiles like those from the "red book" (OW).

As per previous codes, the letters were perceived as relatively plain; furthermore, the standard letter had another code recorded – improving the explanation of the result (Code 2). The following code shows that some parents may welcome if further visualisations are provided. The following excerpt from a parent who received the letter with overweight status for their child illustrates this.

Probably I'd be quite interested more to see how it actually gauges against other obviously, when they're born and you get given their little record book you have the different centile lines which gives you, obviously which they dot their weight as they sort of progress through the first year or so. (Parent 20, OW)

The parent referred to charts from a red book, formally known as a personal child health record (PCHR). The charts are available at the end of the book and are redesigned the WHO growth standards charts for boys and girls (World Health Organization, 2020; Wright et al., 2010).

This excerpt provides evidence for using visuals that are already familiar to most parents. The WHO child growth standards are complex visuals, but something similar and more accessible (perhaps with infographics) could be used. Certainly, some LGAs use such adapted charts as per the evidence shown in Study 1.

5.6.4.5 Keep the ball at their court

The code refers to instances where parents felt that the standard letter is too forceful.

Analytical summary: Parents expressed their need to – rather be able to do it (the lifestyle changes) themselves than having to talk to somebody (HW), other parents also wanted to make any changes on their own and recommended that it is preferable if the letter does not try to force any changes, or contact, instead it should make it appear that the help is available if a parent wished to use it (OW).

This was another code that has applied to the experimental letter, and what was discussed in Code 9 of Theme 4 applies to a great extent here. However, there was one more reference on this code for the standard letter.

The topic of this code revolves around ensuring that parental agency is fully respected – as the standard letter was more direct, it could be perceived as possibly limiting parental agency to a greater extent as opposed to the experimental letter.

The following excerpt illustrates how a parent who has received the letter with overweight status for their child felt about some of the wording.

> *I don't like the fact that where it says as a first step please contact One Life Suffolk because it feels like it's telling you that you should do that as opposed to suggesting you might want to because I think some people could make the changes on their own but some people will take that as being told they have to do that, do you know what I mean? So, I think that's a little bit too direct. I think it should be given the option that they can contact One Life Suffolk if they want to rather than say in the first, as a first step do that. I think it should be more as a first step help is available should you wish to contact them. (Parent 18, OW)*

The code shows that the wording "as a first step please contact…" is perceived as urging the parent to do something, but in this case, it is not respecting their agency. They would have preferred probably what another parent already suggested, which was to rephrase it as a suggestion. For example, "If you would like to receive further support, OneLife Suffolk would be very happy to discuss it with you…" as a phrasing that avoids being too directive and "telling you that you should do that". The letters need to leave the ball in parent's court, or as another parent said, "*(…) leaving the ball in your court as to whether you contact somebody and it's kind of saying that your child is likely to still be perfectly healthy so it's highlighting the positives rather than the negatives…"* (Parent 09, UW).

5.6.4.6 Make it more personalised

The code refers to instances where parents perceived the standard letter as lacking individual information regarding their children.

Analytical summary: Parents described that the letter does not feel personalised because – free support in the case of "healthy weight" letter might not be useful (HW), they would ignore suggestions to reach out if the letter stated "average"/"healthy" weight (HW), everybody's children shape is different, they are all different and the letter should offer further background information about the children and take it into an account (OW), there is not enough context, it needs to be more than just "weight" and "height" (HW).

As with Code 13 from the previous theme, the standard letter has also suffered from the limitation of the medium that does not allow for significant individualisation when produced en masse. This leads to an awkward situation to some extent where parents feel like the letter neglects important details about their children. For example, below is a parent's reaction who received healthy weight status for their child.

I suppose the bit that jumped out at me was when it said, thank you for reading the letter, we hope this information was useful to you, please call and take advantage of the free support we offer. What went through my head was well if they're a healthy weight and height and you're giving me options to look online and to carry on doing what we're doing do I really need to phone as well. (Parent 03, HW)

In summary, they were a little bit surprised when the letter encouraged a contact, but everything was fine. This sentence could be removed from the healthy weight version; however, some support should be provided if parents wish to discuss the letters irrespective of the results.

Another parent's comment (received the overweight letter) shows what is not easily resolved using the letter format unless the letters are sent on a nurse to an individual parent basis.

So, she is an active child and she eats, we feed our children very well in this house, it's just the way, her make up is like that and it's only because of the figures that you've listed her down at. You're the ones who are saying because she's not specifically across the board like what you put down as a normal weight for her age because she's not that she's technically classified as overweight, but all children are different. Everybody's body shape is different, they're all different. It's not to say that everybody is going to be the same. (Parent 14, OW)

This parent would prefer if the letter acknowledged the personality and individuality of their child by showing that it is not simply a generic result applied to everyone (i.e., her child). If the letter was tailored to their child, perhaps the parent would be open to the letter's result and more likely to feel that this was not an "ad hoc generic standard".

There were other issues (also as discussed in *Make it more personalised* code from the previous theme) such as related illnesses of the child, their disability, or activity history, which cannot be easily inserted into the letter.

5.6.4.7 Make it more readable

The code refers to instances where parents perceived the standard letter as difficult to read.

Analytical summary: Parents described the letter as unreadable because they believed that – not every parent will understand the letter, it was unreadable (HW), the results and the overall latter could be displayed in a better way, was not easy to read, felt the whole letter needed to be re-written (in comparison to the experimental version) (OW).

The code discussed the issue of the readability of the standard letter. Some parents felt the letter was not clear in some wording or sentences. For example, one parent who has received a healthy weight result letter commented as follows.

…I forgot what it's called, there's a thing that you can do for like unreadability, it talks about like different words and length of them I think and I think something like "informed choices about lifestyle", I know what that means but I am not sure whether everybody...like it is quite, ambiguous. (Parent 02, HW)

Possibly phrases such as "informed choices about lifestyle" feel more like public health idioms than something that would be meaningful to the parent.

The other parent who has received an overweight result for their child felt that readability was also a matter of "tone" of the letter. They have stated the following.

How does it make me feel? Really not interested. Yeah. The tone of the letter is not readable so that you actually really look at it and think at it and think oh God I'm interested in what this has got to say, actually it's quite unreadable, you don't really want to pay attention to it. (Parent 14, OW)

The idea that the letter's tone can be readable/unreadable was interesting, it would be certainly difficult to measure with any standard readability metrics. The parent referred to the way this letter was informing about the results and preferred when the information was staged (as they've stated for the experimental version) and if the wording did not use (as per their comment) "*right, your child is obese or overweight*".

This evidence shows there are probably several things to consider before claiming that the letters are readable. Beyond standard readability proficiency metrics, it is also a matter of a tone, design, and paralinguistic features which cannot be easily measured in any standardised way. For any LGA that is aiming to develop "readable" letters, it is necessary to gather feedback on this topic directly from parents.

5.6.4.8 Make it more supportive

The code refers to instances where parents perceived the standard letter as not providing the support they needed.

Analytical summary: Parents though that the standard letter does not appears supportive / or could be made more supportive if – it should be made more inviting, inclusive, and encouraging, and built around the tone such as the one in the sentence "We would be very happy to help you (...)" (HW), it should provide parents with solutions they can utilise (OW), it should not use the term "overweight", provide more information, graphs, charts, and go around a little, be nicer, and gentler (OW), the letter does need to give an immediate support rather than start to list all the terrible diseases, it's horrible thing to read, it should state how can they help you rather than mention heart disease (OW), (the experimental) previous letter made me feel like someone was trying to help me rather than saying my child is "very overweight" (VOW), the letter feels judgemental, not very supportive, not friendly as the other letter (experimental) (VOW), it does not give as much advice and options as the other (experimental) letter (OW).

This code was particularly prevalent among parents who received the standard letter and had their children measured at overweight or very overweight status. It was also one of the more referenced codes (featured with 7 parents). However, parents who received a healthy weight status in the letter also commented on the standard letter, for example, the following.

They're kind of the same but I think I prefer the second one (experimental) because it's just more, I do think it is a bit more inclusive and encouraging. The other one was just … I suppose the other one … I'm just comparing, because the bit go online for practical advice blah blah looking back to compare them both … yeah, because the other one giving you the link to the, go to NHS Change for Life dah the other one doesn't really do that. (Parent 03, HW)

The words such as encouraging and inclusive were something that parents appreciated in the experimental letter but lacked in the standard letter. Further comments by a parent who received the overweight or very overweight status provide further evidence on the perceived lack of support in the standard letters.

(The experimental letter) It's better because (…) it lists about the programme, so it sorts of makes you want to read thinking okay my child is above the expected level for their age but then it's giving you solutions. It makes you want to read and think okay well there's support out there. You can get some help. It lists who's available for the help and I like that. (Parent 14, OW)

The standard letter did not provide different information than the experimental letter but the way it was provided, framed, and worded differed. This provides evidence into how these letters may open or close parents to imagining a potential collaboration with services or healthcare providers. The following example provided by a parent who has received the letter indicating their child was very overweight shows the power of the frame.

Well I still feel guilty and ashamed that I've let my child become overweight but (standard sample) made me feel very anxious about his health very quickly whereas (experimental sample) one I feel is more like actually we can help you with this, don't panic. Much more supportive… I think it's because it's more supportive. It gives you tangible things that you could actually do to make a difference. It's also less scary so you don't read it and feel instantly scared and anxious about it. Yeah, so I think generally it's better because of that. (Parent 17, VOW)

The important words – a feeling of guilt, shame, anxiety, and panic from the letter are some of the reactions parents may experience. The evidence above shows that the standard letter facilitates these experiences for parents who received the OW and VOW letters. It is important to frame the message in a supportive manner, provide (as the parent says) "tangible" things to make the difference and reassure parents they do not have to be afraid of. Not all parents will experience this – they may be very conscious about their child's weight, ignore the letter, or reframe it themselves. However, the letters should also aim to build trust between parents and potential service; they should not damage the relationship right from the beginning by using language that makes parents panic.

5.6.4.9 Make it shorter

The code refers to instances where parents perceived the standard letter as too verbose.

Analytical summary: Parents described the standard letter as – too long, word-heavy (OW).

This code was not featured or referenced often with the standard letter (one parent). It was more "of an issue" with the experimental letter. However, one parent commented that the standard letter showed a lot of writing and was word heavy in their opinion. See below.

It's very word-heavy, there's lots of writing, but even though there's a phone number that I can call I don't feel like, unless I've read this letter in detail I don't think I would bother to call that number. (Parent 08, OW)

The discussion provided in *Make it shorter* code of the previous theme applies here as well. The letters should aim to be more concise and shorter, albeit it is challenging to achieve that and provide all important information in a language while aiming for carefully wording the results. In other words, it is easier to write a direct medicalised letter than an indirect one which goes around and avoids any medicalisation (while still sharing the results).

5.6.4.10 Make it softer

The code refers to instances where parents perceived the standard letter as too harsh.

Analytical summary: Parents described the standard letter's tone as – harsh, insensitive (OW), not unkind, but a parent would like to see that in the overweight letter (HW), a parent would rather have to read more than end up being offended (OW), a parent did not like the word "overweight" and preferred the wording in the experimental letter (OW), the letter was abrupt, rude, blunt, harsh, a parent did not like it (OW), had an initial reaction of "horror" when a parent had to read a list of all the diseases and stated that their child is "very overweight" (VOW), felt that stating the child is above the expected weight is a kinder way to put it (OW).

Make it softer code was where the full impact of the standard letter's wording stands out as opposed to the experimental letter. This code was largely relevant to parents who had the results for their children with overweight and very overweight statuses.

Parents were correct to assume that the content was similar between different letter versions and stated that the wording was where the difference occurred. For example, a parent who received the overweight status for their child remarked that the wording was more sensitive/not as harsh for the experimental letter than the standard letter; see below.

> *If you would like to talk about, right, so then I like that because it says it's not specifically stating the same as what was in the previous letter and it's just wording, it's just more sensitive. In this letter, sample B (experimental), it's more sensitive. The wording in this letter is not so harsh as the first one. (Parent 14, OW)*

Another parent pointed out that in their opinion, the key element missing from the standard letter that was present in the experimental letter was the statement that the weight was "above the expected level". They felt that the letter was not as nice when it used the overweight label.

> *I like the fact that they've said it's above the expected level for their age and I like the fact that it says if you want to talk about these results then they'd be happy to answer questions, that's quite nice. They've not used the word overweight as they did in A so that's nice that they haven't used that. (Parent 11, OW)*

Finally, the following excerpt shows that the standard letter can be felt as rather unsettling and deliver an unpleasant experience to some of the parents. See below the excerpt from a parent who received a very overweight status for their child.

> *Because when you open the initial letter which is the one that I got your first reaction is of horror, first of all, that someone is saying that your child is very overweight and giving you a list of illnesses that they can get. We all know what you can get when you're overweight but I didn't find it helpful whereas the new one, that one you've just sent me appears to be more encouraging and we can help you if you want to talk about it. You don't feel the blame as much. (Parent 13, VOW)*

The excerpt from the parent states strong emotional reactions – feelings of "horror" from overlooking the list of illnesses that their child may one day suffer from. Importantly, a parent was not unaware of these conditions, as they stated, "*We all know what you can get…*", the point is that this was not a "helpful" way to put it.

The evidence presented here shows that the letters utilising the "standard" PHE format need to change the wording they use to deliver the results. The messaging is close to the method known as "fear appeal", which has been criticised previously as not lacking sufficient evidence, and alternative methods should be considered (Ruiter et al., 2014). The method

to apply in the case of letters would be to avoid having parents experience the feeling of “fear”, rather provide what they seem to seek – support, kindness, encouragement, and acknowledgement.

The next three codes (11, 12, and 13) were somewhat relevant to the perceived “harshness” of the standard letter; however, parents will discuss different aspects of it. From the next three codes, *Perceived as patronising* code was also observed in the experimental version.

5.6.4.11 Perceived as assuming

The code refers to instances where parents perceived the standard letter as making unwarranted assumptions about their children.

Analytical summary: Parents described the letter as assumptive and stated that – a parent wouldn't be reading it helpful because it said their child is "overweight" when he is not (OW), it is predicting my daughter will be “overweight”, but that's is not the truth, it is a prediction (OW), saying if your child is “overweight”, they will grow “overweight” is an assumption (OW), the part where it says "more healthily" (refers to: “You and your child can make simple changes to be more active and eat more healthily.”) should be removed because the letter does not know anything about our lifestyle, it is a lot of assumptions (OW).

As I explained in the previous code, this was related code. The code was once again more relevant to parents who received the result that their children were in the overweight or very overweight status. The problems identified in this code by parents related to the certain assumptions the standard letter was making either about the future or their children's current health (in a general sense).

For example, the following excerpt illustrates how a parent questioned the likelihood or probability of a child “becoming” overweight as an adult. They stated clearly that it was simply an assumption in their opinion, not a fact.

> *I don’t like it says if your child is overweight now, they are more likely to grow up overweight and that’s not necessarily true…That’s more of an assumption and somebody shouldn’t say that to you. (Parent 10, OW)*

The letter alludes to the idea of associating these conditions. These associations do have evidence-based background, but it comes down providing it in a non-offensive wording.

Another parent questioned the same aspect of the letter. However, they also added up that the letters lacked any context (see Code 6) or any notion of who the child was aside from what has been measured at the school. This sets off a wrong assumption of the child’s lifestyle, and the parent then felt justified to state that while they lived a healthy lifestyle, the child has a chromosome disorder; therefore, the weight gain was possible irrespective of the lifestyle.

> *Yea, I think I would remove on letter (Sample) B this likelihood that they would be overweight as adults and I would remove "more healthily", so where it says "You and your child can make simple changes to be more active and eat more healthily", really, they don't know anything about our lifestyle so what we do or don't do and as I said, for example, my oldest child has a chromosome disorder. That is genetical condition it creates certain patterns of eating and weight gain, so I doubt people writing this letter would know that. I consider my family to eat very healthily and have*

a healthy lifestyle, you know it's a lot of assumption in that sentence. That sentence could be rewritten or removed. (Parent 19, OW)

As evidenced by the previous excerpt, the parent felt that the sentence "You and your child…" assumed the lifestyle was not healthy.

Alternative wording could avoid such assumptions and prevent negative reactions. For example, wording such as "*The results suggest that your child may benefit from one of our free services providing lifestyle advice. If you feel that we could help you, please contact our services where our professionals are happy to discuss this with you further.*" This sentence states that the help may be appropriate but does not suggest parents need to call or make simple changes. An alternative approach could be to "assume" that parents do their best, but a LGA is always there for them if they wish to get more information. The ideal message would be personalised and would not suggest behaviour changes to parents who already do them.

5.6.4.12 Perceived as medicalising

The code refers to instances where parents perceived the standard letter as medicalising their children.

Analytical summary: Parents described the standard letter as medicalising – change sex to gender (OW), it lists all the horrible diseases which is horrible to read (OW), it talks about diabetes and illnesses (OW), it focuses too much on the "overweight" side of it (OW). This was particularly prevalent among parents with the OW/VOW result letter.

Parents referenced in this code commented on similar aspects discussed previously but saw the letter wording as medicalising. This was perceived again mostly by parents with overweight and very overweight results. However, some parents felt that additional changes could be made as well beyond the context of weight and weight. For example, a parent commented that the word sex should be gender.

So already without having read this letter in detail I know what it's about. The word sex needs to be changed to gender. (Parent 08, OW)

The letters I have seen do not use gender. Alternatively, they could refer to the child in the letter as a boy/girl based on the NHS details instead of the generic term "sex" to provide a neutral alternative.

In the opinion of parents who received the overweight or very overweight results, the issue perpetrating the standard letters was the "scary" list of medical conditions that were referenced and "threatened" to occur to their children of these parents. The following excerpt shows that the parent felt it could be said under a generic umbrella term such as "health conditions" rather than naming each.

Yeah, so where it says being very overweight can lead to health problems for your child such as high blood pressure, early signs of Type II diabetes and low self-confidence I think that is something, I think they could have put something like there are health concerns and it would be good if we could discuss it with you, and can we ring you or can you ring us to talk about it rather than just listing a load of possible health conditions. (Parent 17, VOW)

The following parent received a very overweight result and felt that the term “very overweight” was worse than “at expected weight”. The term was directly from various medical standards; therefore, it is another instance of medicalisation.

> *Yes, I think it reads much nicer. Over the expected weight is much better than very overweight. (Parent 13, VOW)*

Medicalising were all the HW, UW, OW, and VOW “weight” terms, but parents with “healthy” weight children usually liked the term. Some preferred it to the “at the expected level” and felt it was more positive. The appropriate approach would probably be to not use these terms altogether and rather praise parents' hard work in a different way than by celebrating that weight of their child is “healthy”. This would be a compromise because to parents of children who live with any other than the healthy weight category, the wording that associates health and weight most likely appears medicalising and threatening. At least, this is what is shown across the evidence presented in the themes.

5.6.4.13 Perceived as patronising

The final code refers to instances where parents perceived the standard letter as patronising.

Analytical summary: Parents described the standard letter as patronising – it feels like I am being talked down, it is patronising (OW).

This code also got referenced in the experimental version of the letter. The aspect of feeling of being patronised was possibly a cumulative result of all negative experiences referenced thus far. It seemed that parent slowly got weary and annoyed as they read through the letter, which made them feel ashamed, guilty, and told them what they should do.

In the experimental letter, the patronising sentence used words such as “we recommend” or suggested parents now have the information to look after the child’s weight. In the standard letter, the perception that the letter was patronising resulted from “being talked down to”, which was caused by the direct approach taken by the standard letter. A parent who received the overweight status for their child provided the following comment for the code.

> *I think it's worse. I think it's worse because it is more directive, it sounds a bit more patronising than sample A (experimental). Sample A was longer, but it didn't feel as if I was being talked down or talked to. Whereas Sample B (standard), the one I have just read, it's like trying to taught a lesson or lectured. (Parent 19, OW)*

The “lesson” here is probably not to give lessons or lectures to parents. As was already referenced by one of the parents in the previous theme for the experimental letters – parents deserve the acknowledgement that they are the expert of their child. Giving parents lectures does not provide this acknowledgement and causes the reaction described in the segment above.

5.7 Study Conclusions

The findings presented above are meant to be comprehensive and detailed. In the following sections, I will emphasise the most important results from the codes and themes. The following section will provide the summary – condensation of all the results. I will describe the key conclusions from all individual codes for Themes 01, 02, 03, 06, and 07. For Themes 04 and 05, I will provide an extract from the most important codes to bring forward the most

relevant suggestions to change the standard and experimental letters. The findings and reporting were also further assessed using the COREQ checklist in Appendix 3.11.

5.7.1 Key findings

In Theme 01, I have discussed several parents' reactions because of receiving the NCMP result letter. This theme is available in Appendix 3.10.1.

Theme 02 focused on the experience with the experimental letter specifically and covered themes regarding the overall description, feelings of parents, reactions, impressions, and motivational aspects of the letter I have developed.

- Code 2.1. explored how parents felt about the letter tone. Parents receiving the healthy weight status version expressed that they feel mostly neutral or matter of fact about the experimental version of the letter. Some were more excited as they described the letter as upbeat, but one also told me the letter made them feel anxious. Parents with the other weight versions indicated the letter was trying to be supportive and encouraging and have generally felt neutral or positive about the letter. However, one or two parents indicated the letter felt judging.
- Code 2.2. was describing where the parents felt negative sentiment in the experimental letter. Parents receiving a healthy weight status version seemed to have been more dissatisfied. They felt the letter was too formal and were particularly concerned about a sentence mentioning the comparison of children to understand the weight result. Parents with the other weight versions also mentioned the sentence regarding the comparison of children but felt similarly about the sentence mentioning that children can experience social difficulties due to their weight.
- Code 2.3. described the positive sentiment. Parents receiving the healthy weight status version appreciated that the letter felt inviting, encouraging, and supportive. However, the biggest difference made the letter for parents with the other weight versions who felt the letter is supportive, kinder, more sensitive, and less scary. Parents mostly appreciated that the letter does not focus on overweight or very overweight labels.
- Code 2.4. was describing the initial impressions of the experimental letter. Parents across all weight categories have felt the letter was too formal and felt as regular NHS or GP letter. They also felt it was detailed and readable but perhaps too wordy at first glance.
- Code 2.5. described how encouraging the letter felt to parents. Parents receiving a healthy weight status version did find the letter neutral. One reason was that at expected weight did not feel as positive; the other is that the result itself should not incite any action. Parents with the other weight versions felt more encouraged by the letter for its attempts to avoid medicalising terms, but the letter did not feel very personal. Several parents voiced that the letter was discouraging because of the sentence that stated the comparison of children.

Theme 03 explored the same codes as the previous theme but for the standard letter.

- Code 3.1. Parents receiving the healthy weight status version felt positive about the letter tone, as opposed to neutral with the experimental letter. They perceived the tone as lighter, engaging, and factual. Parents with the other weight versions thought the tone was professional; however, they also felt the letter was rude, infuriating, medicalising, harsh, and abrupt. The exception was a parent with the underweight

result who felt it was nice that the letter acknowledges that children with this result can be perfectly healthy. The letter had a different impact on parents based on the results.

- Code 3.2. Parents receiving the healthy weight status version did not have any negative sentiment towards the letter except that they did not like the idea of calling somewhere. Parents with the other weight (except the one parent with the underweight result) versions felt strikingly different as they have said the letter is assumptive (assumes children “will be” overweight adults or have medical conditions), inflammatory, discouraging, medicalising (lists illnesses), and makes them feel guilty while reading. They also did not like the overweight or very overweight terms as opposed to “above the expected level”. The standard letter left parents who received the information that their child is above the healthy weight feeling range of negative emotions. A few modifications in the language could prevent this.
- Code 3.3. Parents receiving the healthy weight status version felt the letter has a laid-back tone, is professional, informative, and factual. They also liked the letter referred to the child’s weight as “healthy” and appreciated the confidentiality statements. Parents with the other overweight and very overweight versions liked that the letter thanked for reading and mentioned confidentiality. Furthermore, parents with underweight letters liked when the result acknowledged the possibility that the child is healthy “despite” the status.
- Code 3.4. Parents receiving the healthy weight status version felt the letter, and its layout was clear, well designed, and relatively pleasant to read. Parents with the other weight versions had no clear consent on the letter, some thought the letter was inflammatory, difficult to navigate and clouded; the others thought it was succinct and clean. The letter resulted in more mixed impressions among parents who did not receive a healthy weight result.
- Code 3.5. Parents receiving the healthy weight status version and the parent with the underweight result felt the letter was encouraging, positive, or neutral about its motivational aspect. Parents with the other weight versions felt mostly discouraged from reading the letter. They reacted in such a way mostly because they thought it was shocking, inflammatory, and the terminology felt medicalising.

Themes 04 and 05 provided suggestions to change the experimental letter and standard letter, respectively. However, describing each code as a summary would result in redundant text, and I encourage readers to go to the relevant sections above. Instead, this section summarises the most important features that need to change in the experimental letter (Theme 04) and the standard letter (Theme 05).

Theme 04 included codes where parents discussed key changes to the experimental letter with me.

- Parents mentioned several sentences (Codes 4.1 and 4.2) that require modifications as they seemed to negatively affect them. First, they did not appreciate the sentence about the comparison of children and suggested removing or rewriting it. Effectively, this sentence can be simply replaced with the link to the BMI calculator, and similar sentences should probably be avoided altogether. They were similarly sensitive to the sentence that openly discussed that children might have social difficulties due to their weight. This sentence should be worded more carefully, perhaps as part of

a phone conversation and then included as a neutral sentence in the letter that simply invites parents to call appropriate professionals – if they feel they would benefit from this.

- There were occasions where the letter felt judging, patronising, and forcing parents to do something (Codes 4.3, 4.4, and 4.9). This is caused by phrases that take the direct approach, such as "we recommend you do…". Similarly, sentences suggesting that parents use the letter to "take care of their child" feel patronising – most parents already do this. Where direct or suggestive approach feels worthwhile, it makes sense to use it in a phrase like this: "***If you would like*** *(…) would be more than* ***happy to discuss*** *any concerns you may have around your child's weight or any issues such as (…)*". The bold parts are especially important linguistic features that make parents feel that the letter is more supportive and inviting.
- There were also several suggestions for design and layout changes (4.6, 4.7, 4.8, 4.14). Particularly important would be to avoid printing the letters in grayscale if any attachments in colours were included. Ideally, the letters would use bolding, highlights, and colours as recommended by an expert on design. The attachments are ideally on a separate sheet, and it might be worth exploring the different presentations of results. The design should not be distracting. Parents also preferred if the letter kept the tone but was shorter and the fonts were larger.
- Some parents also perceived the experimental letter as not sufficiently positive and too formal (4.11, 4.10). This could be resolved by acknowledging that even children who did not receive the result "at the expected level" might be perfectly healthy. Parents should then be acknowledged as having the best expertise to decide what to do next. In addition to stating that the child's result was "at the expected level," parents should be praised that this is great news. Where possible, it is good to acknowledge the hard work associated with taking care of children. The aim is to remain supportive but also add more positivity.
- Finally, the letters should continue building towards increased personalisation. This is difficult to implement whilst relaying on the conventional formats and mediums – e-letters would allow further customisation. The printed letters can be attempted to appear personal by using some of the following modifications such as providing any further background about a child – adding something more than just their name, weight, height, age, and gender, implementing information from other services and making the letters more comprehensive, suggesting further exercise tips, providing additional attachments, sending letters based on age/gender (the more versions will need to be printed and more manual work will be required).

Theme 05 included codes where parents discussed key changes to the standard letter with me.

- Several codes identified for the standard letter showed that it is not experienced favourably by parents who received the overweight and very overweight result status for their children. Parents suggested some changes regarding the letter's wording (Codes 5.7, 5.10, 5.11, 5.12, 5.13). One of the "less urgent" was to improve the readability of the letter further, for example – "*informed choices about lifestyle*" was perceived as ambiguous. More urgent was that the majority of the wording concerned the labels "overweight" and "very overweight", which parents identified as inflammatory or harsh (among other adjectives) across several codes. The letter then continues with listing illnesses that may be associated with these statuses,

which parents perceived as medicalising, assumptive, and patronising. Parents on multiple occasions also stressed out that they wished the letter would not be as unkind, as one parent has put it – they have experienced the feeling of "horror" when they have read it. As a result, the letter makes parents feel guilty and ashamed: "*I still feel guilty and ashamed (…)"* (Parent 17, VOW), which in turn made the same parent feel "anxious". Therefore, the result letters bring mostly negative reactions to these parents; the experimental letter showed that the same could be delivered more "gently", and thus I argue that causing "anxiety" to parents is avoidable and unnecessary.

- Another issue relating mostly to parents with overweight or very overweight status for their children was the perceived "directness" of the letter (Codes 5.5., 5.8.). Perhaps in the tradition of interventionist narratives in medicine, the letters phrases certain passages, for example: *"(…) as a first step please contact One Life Suffolk"* which makes parents feel "forced to act". This ignores parents' needs for support, and multiple parents have voiced that they wished this to be a suggestion rather than a directive. A similar effect had the phrase *"we recommend…"* in the experimental letter. This causes further distress in parents who are in a situation where directives are thrown at them instead of supportive words. The letters should respect parental agency openly – the healthcare authorities will need to rely on the decisions taken by parents, not the other way around, and parents should remain the most informed person at hand who can decide what to do next. The letter should provide support and resources and suggest contacting professionals where appropriate.
- Finally, as with the experimental letter number of design and layout changes were suggested to the standard letter (5.1, 5.2, 5.3, 5.4, and 5.9). A relatively basic thing is printing the letters in colour and including attachments on a separate slip of paper – most of the design changes suggested for the experimental letter apply to the standard letter. Parents would welcome if the results were explained more clearly, and where appropriate further visualisations were included. One parent even suggested avoiding mentioning in words anything that can be visualised, for example, by a logo. Some parents also perceived the letter as a little bit longer, even though it was shorter than the experimental letter.

Theme 06 discussed several recommendations parents have suggested to improve the NCMP further. This theme is available in Appendix 3.10.2.

The final Theme 07 discussed under what circumstances parents share or do not share the results of the NCMP with their children. This theme is available in Appendix and 3.10.3.

6 Discussion

6.1 Introduction

The final chapter of this thesis is the discussion. The discussion aims to integrate and synthesise the findings presented in previous chapters. Additionally, the findings will be compared to the available research evidence and embedded into practical policy actions that can be taken.

The discussion was organised according to the structure proposed by Docherty & Smith (1999) but extended it further with suggestions by Creswell & Plano Clark (2018) and Teddlie & Tashakkori (2009) to account for the mixed-method aspect of the research.

These authors suggest focusing on articulating and interpreting findings in context of both strengths and limitations, and in relation to studies by other researchers, future research should be discussed as well (Docherty & Smith, 1999; Perneger & Hudelson, 2004). However, I will also revisit my research questions, draw inferences, and extrapolate my conclusions into a wider context by comparing and contrasting each answer based on the others (Teddlie & Tashakkori, 2009).

The discussion chapter first covered the research questions asked in the project – Section 6.1.1. This was followed with, Section 6.2 which provided the how-to of integration of the principal findings. Then, with the section that could be considered the heart of the discussion chapter is introduced; the principal findings from each project – Section 6.3. This section was structured with headings representing the research questions I asked in this project and subheadings representing a given strand of analysis related to that question (e.g., 6.3.1 – Descriptive analysis of the NCMP delivery). Once all questions are answered, Section 6.4 will discuss the limitations of the findings, and Section 6.5 will address the implications and practical applications for the stakeholders. The final section concerned the suggestions for future research (Section 6.6).

6.1.1 Revisiting the Research Questions

Four distinctive questions were asked across three studies. The initial study answered, “How is the NCMP delivered across Local Government Authorities in England?” and “What variations among the NCMP result letters produced by Local Government Authorities in England exist?” I used a survey to answer the first question and genre analysis and quantitative text analysis to answer the second question.

The second study answered, “What are the opinions of parents or carers about the NCMP result letters?” and “How can the current NCMP result letters be further improved?” I carried out a quasi-experimental study across three sites that covered both questions.

The third study carried out the questions from the second study but utilised qualitative methodology using a semi-structured interview to answer both questions stated above.

6.2 Integrating the Findings and Overview of the Project

The unique challenge of mixed-method design is what is known as data integration, data synthesis, meta-inference, or third effort (Creswell & Plano Clark, 2018; Guetterman et al., 2015; O’Cathain et al., 2010; Pluye & Hong, 2014; Teddlie & Tashakkori, 2009). These terms all refer to the attempt of a researcher who conducted or conducts mixed-method practice to put all the findings together into a larger picture. Unfortunately, there is no one-

size-fits-all scenario, and I had to consider different angles of establishing and presenting this picture. The idea is not only to integrate the findings for me but also to present them coherently to a reader (Guetterman et al., 2015).

The discussion presents a wider picture and sketches the problem, how the studies addressed the problem, and what the findings were. The findings are presented in a sequence and as a top-down process.

Two strategies were utilised to integrate the findings across Section 6.2. (the current section) and Section 6.3 (The principal findings of each study). The first did what Moran-Ellis et al. (2006) call following a thread – "*we picked an analytic question or theme in one dataset and followed it across the others (the thread)*" (Moran-Ellis et al., 2006, p. 54). This approach was used in this section and provided an overview of how the entire research project evolved. The second approach followed the principal findings from Study 1 to Study 3 in the logic of sequential mixed-method design (Teddlie & Tashakkori, 2009). The second approach was used across the third section ("The principal findings of each study") of this chapter and linked the findings from each study to provide a concrete evidence base.

The following paragraphs provide a succinct overview of this thesis with the aim ***"to conduct a national, collaborative analysis of the NCMP process with parents, carers, and other stakeholders".*** Specifically, the focus was on stakeholders' opinions regarding the result letters produced by the LGAs. The exploration of these opinions was the thread connecting all of the studies.

Study 1 allowed me to get familiar with the operation of the NCMP on the one hand, and on the other, it inspired further research questions that raised as part of the in-depth involvement in the context of the NCMP. The results derived from the first study focused on the perspective of LGA and showed that the NCMP varies across different LGAs. These variations were fuelled by local needs and resources available to LGAs. What proved to be important for the project were the letters produced by the LGAs.

Most LGAs changed the letter, but the rationale for the changes was not obvious from the survey. Only when each of the letters was analysed individually as part of the genre analysis, the pattern of what became a prototypical letter with standardised moves was discovered. This was an important finding that showed what should be the further focus. The prototypical letter showed that the letter's goal was to deliver the results to parents, but at the same time, the letters tried to encourage behavioural changes. These two goals were sometimes in conflict as in one section, the letter tried to be supportive, while in another the letter was urging for action by highlighting the negative consequences of non-healthy weight conditions in children. This was perhaps because the letters aim to combine an extraordinarily difficult mix of support at one hand, but on the other hand seem to follow the public health discourse treating obesity as a disease (Vallgårda, 2018).

It became interesting to explore further what parental user experience the letter may produce (especially if it may be contradicting) and whether parents decide to change their behaviour because of the letter. The second study had this aim in mind, and it focused on the collective opinion of the population targeted by the NCMP. In Study 2, I aimed to test different versions of the letter. While the results were limited, the overall indication was that the letter aimed at parents with children outside the healthy weight category had a worse user experience. None of the letters (irrespective of weight category) had induced any behavioural change. Overall, the study provided predominantly methodological

contributions showed challenges of similar research; thus, most of the findings are available in the Appendix. The findings related to the UEQ were the most robust and remained included in the main text.

Study 3 delivered further detail about the reasons why parents of children outside the healthy weight category may be dissatisfied. This level of detail was only possible because the study approached research questions in a qualitative manner (The research questions were identical across Study 2 and 3). Further, the study focused on providing parents with the opportunity to compare standard and experimental letters against each other and suggest what they would change about the letters. The biggest concerns parents had with the letters were the medicalisation of their children, lack of individuality, dull content, and triggering of feelings of shame and blame upon reading the results. The letters still reflect anti-fat attitudes typical among the healthcare community and stress the importance of personal responsibility (Lee & Pausé, 2016; Parsons et al., 2016). The focus on the individual responsibility of parents not to raise adults with obesity ultimately could pressure parents into feelings of guilt and appears as overly criticising them (Gillison et al., 2014)

One challenge could be that in some cases, the letters are attempting to use medical intervention and solutions to what may be a social problem, and as such, are unlikely to work (Hofmann, 2016). The letters could, however, be used to support parents if the medical aspect was removed or adjusted – as requested by parents; and moved from medical conceptions of weight to those that acknowledge the existence of stigma, thus allowing to tackle the fundamental cause behind health inequalities (Hatzenbuehler et al., 2013).

6.3 The Principal Findings of Each Study

The following section will discuss the principal findings from each study (Docherty & Smith, 1999). This is where the results presented in the previous chapters are linked to the research questions asked at the beginning of the project. The principal findings are structured into sections named after the research questions, and within these sections, I discuss how the findings answered the question.

6.3.1 How is the NCMP delivered across LGAs in England?

The literature covering the topic of NCMP management and delivery revolves around three reports produced by Shucksmith et al., 2008; Mooney et al., 2010; and Statham et al., 2011. Specifically, the aim of the first study was shared with the report by Statham et al., 2011 - focused on the delivery of the NCMP.

Since 2013, PCTs were abolished, and LGAs became responsible for delivery of the NCMP (Queen's Printer of Acts of Parliament, 2013). However, no similar reports of the NCMP delivery were conducted after 2011. Therefore, there is a lack of evidence in understanding the NCMP delivery under LGAs. This project presents this missing evidence and links back to the reports produced a decade ago intending to understand the NCMP delivery after the LGAs took over from the PCTs.

6.3.1.1 Descriptive analysis of the NCMP delivery

Typically, LGA commission providers to deliver the NCMP or some of its parts, this was indicated by 86% of LGAs and aligned with the previous reports indicating that up to this date, commissioning providers remains a common practice (Mooney et al., 2010; Statham et al., 2011). The current study also identified that LGA responsibility was in most cases informing schools about the NCMP's results; the providers' responsibility on the contrast

covered most of the key-delivery elements of the NCMP. Where providers and LGA shared their responsibilities was the development of parental letters.

The delivery of the letters (with opt-out information and results about their child) to parents is the most visible part of the NCMP – in practice, this occurs predominantly in an old-fashioned way by a post (very rarely by utilising children' school bag). Previous reports indicate that PCTs were in the majority responsible for delivering the parental letters (in 61%); however, the current findings show that this is now either shared responsibility between the LGA and provider or one of the responsibilities of the commissioned provider (Statham et al., 2011). Past reports also indicate that 74% of surveyed areas offered routine feedback to parents, and 80% of them have changed or locally adapted the letter (Statham et al., 2011). The findings of this study indicate that 86% of LGAs now share the results with parents on a routine basis, but there has been a decrease in LGAs that localise or change the letters down to 65%. This may be due to following the operational guidance issued by PHE more closely (Public Health England, 2019b). Outside changing the letters due to localisation needs, some comments provided by participants of this survey focused on changes aimed to soften the language *"It was agreed to soften the language..."* which was also present in past reports (Mooney et al., 2010; Statham et al., 2011). The aspect of the language will be further discussed in the upcoming sections.

Past reports also indicated a trend of focusing on the categories above average weight – "overweight" and "very overweight" (Mooney et al., 2010; Shucksmith et al., 2008; Statham et al., 2011). For example, 62% of respondents in Statham et al.'s (2011) survey reported that the pro-active feedback should focus on very overweight children. This is concerning, while the findings of this survey suggest that the feedback letters across most LGAs (55 out of 92) are delivered to all parents (or where not, children "in-need" (47%) are prioritised), the pro-active follow-ups and service provisions are skewed towards the upper weight categories. For example, 32 out of 74 for LGAs who provide services indicated to provide these services solely for the upper weight NCMP categories.

The evidence about service provision may be also aligned with the findings from past literature that identified that the element of the NCMP that is deemed as essential by most LGA's representatives is its link to the provision of the weight management interventions; specifically, it was important for 83% (N = 172) of representatives surveyed in 2010 (Figure 3.6. in Statham et al., 2011). This research did not focus on whether this is considered an essential part of the NCMP. However, it provided evidence that 80% LGAs offer services in their area (Tier 1, 2, 3, and Universal) which aligns with the aforementioned finding and suggest that most LGAs aim for high service coverage, albeit as argued in the paragraph above, this is offered primarily for children with overweight and very overweight. This trend might be concerning in case children who are classed in other weight categories are somehow falling through the system.

Finally, some of the practical challenges identified in the past surveys have also been present in this survey, specifically, cost funding and staff capacity to implement were reason indicated by some LGAs (16 out of 82) who do not proactively follow-up with all children or send result letters (5 out of 31) (Mooney et al., 2010; Shucksmith et al., 2008; Statham et al., 2011). This provides important evidence that LGAs will need to be supported financially and likely have to keep staff in full-time positions to manage the NCMP delivery in the future. An additional situation to consider is also a political influence on the NCMP. I have experienced the NCMP as potentially being a political subject (for example, it was not

possible to carry on with the study during the election); these were, for example, local politics of commissioning the provider, but also national elections. As evidenced in other literature, politics can thus play a role in the evidence-based implementation of the NCMP, and future research may have to explore this further (Atkins et al., 2017; Kneale et al., 2019).

6.3.2 What variations among the NCMP result letters produced by LGAs in England exist?

The second research question aimed to answer how the result letters are (feedback informing parents about their child's result) changed across different LGAs. The NCMP guidelines provide specimens for LGAs to use in the opt-out (pre-measurement) and feedback studies, and the localisation of the specimens seems to be allowed if not encouraged by the PHE (Public Health England, 2018b; Public Health England, 2019b). Explicitly, the PHE guidelines state that the result specimens "*(…) are editable so the content can be amended to meet the needs of local areas."* (Public Health England, 2019b, p. 36), but advise that "*(…) any information given to parents should be done positively and sensitively, avoiding stigmatising terms such as 'obese', 'fat' and 'morbidly obese'*" (Public Health England, 2019b, p. 33).

As discussed before, 86% LGAs in this research changed the templates. Past evidence confirms that "*All the PCTs had made some minor changes to the DH template, often aiming to simplify some aspects of it such as cutting sentences from the introductory paragraph or personalising the information.*" (Mooney et al., 2010, p. 35). The examples provided in another report showed that some of these changes were "*(…) including details of relevant local services and highlighting referral processes; using simpler language; "softening" the tone of the letter (…).*" (Statham et al., 2011, p. 27). Still, the evidence regarding the *actual* letters across different LGAs and the use of the specimens remain limited and outdated as most of the research has focused on parental perception of the letters. The current research addressed this gap by providing the evidence from analysis of documents, i.e., result letters provided by 115 LGAs stored in a corpus of 300 letters (HW, UW, OW, VOW, and COMB versions) utilising, specifically, genre analysis and quantitative text analysis.

6.3.2.1 Genre analysis and individual moves identified in the letters

The six major moves identified as part of the genre analysis were 1. Opening phrases; 2. Sharing results; 3. Educating and informing; 4. Appeal to action or change, 5; Ensuring privacy, and 6. Concluding with pleasantries. Previous literature helped to establish some of the moves and their strategies. Specifically, the research by Upton (2002) regarding the direct mail letters used by philanthropic organisations and work by Barron (2012) on genre analysis of public information messages. These sources will be further discussed in the context of principal findings regarding each of the aforementioned moves identified in this corpus.

The opening phrases move (coded 01) identified here were similar to the get attention and introduce the cause moves found in the direct emails by Upton (2002). The purpose of the move was to introduce the context of the letter. The move occurred in all letters and was therefore obligatory. Primarily two strategies were utilised here, the form of rationalisation (Rationalizing the letters and the NCMP, 79%), i.e., disclosing the purpose of the letter by stating how it can help, and referencing previous communication (Reference the measurement and the letters, 91.7%). Notable linguistic features of these strategies were also found in the work of Barron (2012), specifically the attempts to address the audience

through the address indicators such as "*we"* in the case of referencing the past communication (e.g., *We* recently sent you…), and the second person pronominal references such as *"your"* (e.g., Knowing if *your* child) employed in the case of rationalising the letters. The strategy of providing a rationale early on seems to be similar to the move identified in Barron (2012) called "Give audience details of recent/upcoming changes". What was specific to the NCMP was a high level of standardisation across the corpus. In other words, the two strategies mentioned above were featured in the majority of the letters irrespective of whether the letter was sent to parents of children with healthy weight or children with overweight and was presented in a similar fashion across the majority of LGAs.

The following move (02) "Sharing results" occurred in 99% of the corpus and was exclusive to the nature of the NCMP, and as such, was not found in other corpora discussed in the literature. This was not surprising as at face value it seems uncommon to receive a medical result through a letter medium. Past research has shown that the medical discourse can sit closely in that of an oral genre where medical practitioners can use various mitigation strategies to better control the interaction process with the patient and avoid some challenging topics (Barton, 2004). An interesting feature of this move was that it uses both verbal and non-verbal components which was a phenomenon observed in other corpora related to the public health (Barron, 2012). The move delivers the information using heavily standardised tables (in all letters), text statements regarding result (91.7% of letters), sometimes accompanied by infographics aiming to facilitate the result interpretation (13.7%). Although the move was exclusive, it shared some features with move "Give audience details of recent/upcoming changes" reported by Barron (2012). The "Written result statement" was the strategy where the move referred to weight categories to inform parents about their child's weight. This was also a part of the letter which was often deemed problematic by parents in terms of the choice of language (Gainsbury & Dowling, 2018; Gillison et al., 2014; Mooney et al., 2010). This was not a novel finding, but what was problematic was apparent lack of mitigation strategies (only a few letters attempted to do that) in the corpus that would attempt to soften the language around the weight categories (Barron, 2012). This might be an indication that this was a purposeful strategy employed by LGAs when developing the NCMP letters – i.e., to use the fear-appeal, specifically, labels that were known to be perceived by parents as upsetting (Nnyanzi et al., 2016; Peters et al., 2013).

The next two moves (*Educating and informing audience*, and *Appeal to action of change*) presented a shift as they appeared to attempt to create what has been discussed in previous literature as an impression of one-on-one interaction between the reader and sender (Barron, 2012). These moves also often co-occurred in a similar place in the letter.

The move "Educating and informing audience" was also presented in the genre of public health messaging reported by Barron (2012); specifically, it shared some features with the move "*Detail strategies for participation*". The common features were the use of declarative structure (Barron, 2012, p. 128). For example, *"A good diet and physical activity are essential to maintaining a healthy weight and healthy growth"* (HW letter) is a declarative structure from the NCMP corpus. In contrast, the move in the corpus of the NCMP letters is obligatory as opposed to that in corpus used by Barron (2012). This was signified by the fact that the move occurred in 99.7% of letters. The two most common strategies in the move, "Compute the BMI yourself" (86%) and "Context of health" (79.3%), both focus on health aspects related to weight. These often referred parents to information about health

facts through the BMI calculator or directly refer to health facts in the letter. The medicalisation can be contrasted with strategies referencing external factors such as stigma or environment that occurred in only 1.7% and 2.3% of letters, respectively. The "Context of health" strategy was problematic as it overutilized feature referenced in Barron's corpus, that was, "*Threaten with negative consequences*" (Barron, 2012, p. 144). While Barron found this strategy only in one document of the corpus, the context of health and associations with issues such as type 2 diabetes was present in most of the overweight and very overweight letters. The act of mentioning these health problems may be because parents seem to fail to recognise overweight as a health risk and thus LGAs may feel the need to further problematise such weight, e.g., a recent survey by Viner et al. (2020) found that 61.9% of parents with children identified with overweight status and 57.8% of parents with children identified with obesity were able to recognize the common health problems of obesity. However, this also had negative consequences as it potentially upsets some parents and children as evidenced by other researchers (Gainsbury & Dowling, 2018; Nnyanzi et al., 2016).

The *Appeal to the action of change* move further utilised and relied on creating the appearance of interaction between the reader and sender. The move was obligatory having occurred in 98.7% of letters in the corpus and shares similarities with "Solicit further action" and "Incite audience participation" identified in the corpus of Public Health Messages by Barron (2012), and "Solicit response" identified in the direct messages corpus by Upton (2002). Two strategies dominated in this move, namely "Instructions as directives and obligations" (52.3%) and "Instructions as suggestions and possibilities" (93.3%). In practice, these two strategies were mixed in the letters. They were personalising the challenge every LGA has to face when trying to balance the two approaches (interventionist vs supportive). This was mostly prevalent in the letters with category "overweight" or "very overweight". The directness was an intentional act of employing mood deliverables in the letter to clearly and concisely signal the intention (the illocutionary force) of the sender through the use of verbs such as "use", "look", "please", "help", or "discuss" among others (Barron, 2012). The imperatives were more prevalent in the "Instructions as directives and obligations" strategy (such as "***Take** a look…*" or "*Please **do** call us…"*), while the "Instructions as suggestions and possibilities" used more mitigations in the message (for example, by using "***If** you need…*" or "***Try** to…*") (Barron, 2012). Imperatives are more typical for "controlling" language and studies have shown that this is associated with negative outcomes (Miller et al., 2007). This was perhaps balanced with an interesting feature of the NCMP corpus that Barron identified as "*the politeness marker please*" – one of the mitigation strategies in her corpus (Barron, 2012, p. 216). While the marker was not used commonly in public health messaging, it was common in the NCMP corpus. Another common feature was the utilisation of "*Outline the benefits of carrying out the intermediary action*" (Barron, 2012, p. 217). This has occurred in many forms that appealed to the reader to make an action while highlighting the benefits (e.g., "***Visit** www.nhs.uk/change4life for lots of **handy tips for a healthy family**",* UW Letter) as part of a directive/instructions. Finally, with this move, the letters seem to employ an interventionist approach to public health as they try to convince parents to engage with services. However, the "interventionist" approach may not be what was perceived as negative since studies have shown that at the community level such interventions may not follow the nanny state versus libertarian continuum, but more localised alternative conceptualisations (Grunseit et al., 2019).

The last two moves in the letters were the “Ensuring privacy” that occurred in 87.7% of letters and “Conclude with pleasantries” in 74.3% of letters. These moves were also unique as they had no further strategies. This was likely due to a high degree of standardisation across the NCMP corpus. The first of the moves revolved around ensuring that the letters were not shared with children. Perhaps a move implemented given that early scoping reviews confirmed this type of confidentiality was important for some parents to ensure child did not open or read the letter accidentally (Mooney et al., 2010). The second move signalled leave-taking and thanked the reader for reading the letter (but was optional given its lower prevalence). On some occasions, the move made “one last appeal” to suggest parents to take action.

There are a few additional things to be discussed regarding the language of the letter. Firstly, the letters were written in a gender-less voice. The reader’s gender was not known or assumed (occasionally a child’s was), but research suggests that the parent to take actions was most likely to be a mother while fathers were underrepresented (Clarke et al., 2015; Gainsbury & Dowling, 2018). However, when fathers' views are compared with those of mothers, they are often no different (Clarke et al., 2015). This could perhaps be due to the idea that gender identity was acted on and reconstructed dependent on a social context, it was thus *performative* (Butler & Trouble, 1990; Forsberg, 2007). The letters also acted as a probe from the state into intimate matters of parents as the state tries to intervene or govern their child’s weight (Forsberg, 2007; Henderson, 2015). Unlike some other letters, such as those sent between school teachers and parents, the NCMP result letter only appeared to create an interaction (synthetic personalisation), and only appeared to allow parents to negotiate the power. However, the letters were sent by from position of an authority and parents were in asymmetrical power relationship (Barron, 2012; Forsberg, 2007). Finally, the children were in a completely passive role in the letters, they were in a sense the object of control and parents were expected to responsibly be an actor in the background who should make sure their weight was “optimal” (Forsberg, 2007; Keogh, 1996).

6.3.2.2 Quantitative text analysis of the letters

The corpus analysis extended the genre analysis results following the BCU approach (Biber et al., 2007; Upton & Cohen, 2009). The analysis was complementary by nature and the principal findings discussed here focus on variability across the letters, the moves and weight categories used in the feedback.

Lexical diversity (LD) was one way of understanding the variability across written text (Treffers-Daller et al., 2018). For example, the measure was successfully employed to distinguish between a writer’s level of Common European Framework of Reference (CEFR) on a lemmatised and length standardised corpora (Treffers-Daller et al., 2018). Here, LD was used to measure the variability of letters within the corpora which may indicate to what extent the letters followed common template such as the operational guidelines and whether the letters were lexically “simpler” or “complex” (Public Health England, 2019b). The diversity was measured using the TTR (Type-Token Ratio; high scores indicate high diversity) of the 300 letters collected across 116 LGAs. The TTR indicated low letter diversity. However, since literature suggests that TTR is sensitive to text length, I also calculated the Maas’s index that has been suggested as a potential alternative measure of lexical diversity (McCarthy & Jarvis, 2010; Treffers-Daller, 2013). The Maas’s index confirmed the low diversity of the TTR. The low TTR and high Maas’s index implies that the

letters were more repetitive and simpler. Furthermore, relatively small SD and narrow CI likely confirm the proposed observation from the genre analysis that most of the letters are adhering to a common template.

Previous research has suggested that the high lexical diversity of speakers results in the perception of high competence, credibility, and more influential and effective messaging (Bradac et al., 1979; Dillard & Pfau, 2002). Unfortunately, this research provided only indirect evidence given it has been produced in experimental conditions; additionally, the findings are obscured by lower standards of results reporting in older psychological studies. Further research has also found a positive association between lexical diversity and language style of influential online leaders (users who received a high volume of online feedback) in the analysis of message boards activity (Huffaker, 2010). Although high lexical diversity is usually preferable and perceived as beneficial as it indicates strong vocabulary size and ability to use it effectively, this depends on the communicative situation as it is not always desirable to use many different words (Malvern et al., 2004). Reviews also show that the persuasiveness of a message is affected by the linguistic intensity, power, and other factors such as intergroup bias (Blankenship & Craig, 2011). In the case of the NCMP, the lower LD may be the result of the attempt to create messaging that relies on controlling and intensified language, although, evidence suggests that this may sometimes lead to negative associations with the speaker (Clementson et al., 2016; Miller et al., 2007).

The findings on lexical diversity were accompanied by a hierarchical clustering algorithm to show visually how the letters group. Importantly, the algorithm did not converge at a specific number of clusters. The visualisations showed that the letters were mostly grouped by two features, either by their weight category result (e.g., healthy weight was clustered together) or by LGA (e.g., letters from the same LGA were closer than letters from different LGAs). This suggests that two approaches were employed here, one which follows the templates and the other that follows local standards.

Further exploration of moves and their relative frequencies showed that each move used specific words in higher frequencies which may explain the lower lexical diversity. For example, the word “child” occurred in 12% of all features in the Sharing results move, and the word “hope” in 20% of Conclude with pleasantries move. When the features were further weighted by overall frequency (TF-IDF) some interesting elements were highlighted. For example, both moves Appeal to change and Informing and educating the audience relied on “nhs.uk” links to provide further information to parents. Given that this resource was common for most of the letters, further exploration of how parents interact with the links or whether they find it useful is warranted as no such research is available.

These two moves were also interesting because most of the negative sentiment recorded in the corpus has occurred within them, specifically in the “Context of health” strategy, which refers to a child’s weight in the medical paradigm. When the sentiment was analysed across the letters, the most unfavourable sentiment was recorded in “Very Overweight” category, followed by “Overweight”, “Combined”, and “Underweight” result letters. This aligns with the evidence in the literature of parents who find these results upsetting (Gainsbury & Dowling, 2018; Kovacs et al., 2018). This analysis also pointed out that the medicalisation strategy employed in these letters was what may be the problematic element of the letters. This was also reported as the concern of parents who feel the results do not acknowledge broader conceptions of what is childhood weight but focus on narrow definitions of health associated with weight (Syrad et al., 2014).

Parents who received the letters that did not report healthy weight had a different experience with the NCMP initiative. This was further illustrated by the keyness analysis of weight categories which confirmed that aside from the weight terms themselves, the lemmatised terms such as “problem”, “type 2 diabet”,(es) or “chang”(e) were among those making the difference (Benoit, 2020). However, the different language or terms used across the letters with different weight categories was not a topic specifically discussed in the NCMP guidelines (Public Health England, 2019b). Thus, LGAs have no responsibility to ensure that the experience of parents with children outside healthy weight categories is not dramatically different to parents with children in a healthy weight category – the guidelines do not provide much support here and this might be further exacerbated by the fact that the feedback is not a mandatory part of the programme (Public Health England, 2019b).

6.3.3 What are the opinions of parents or carers about the NCMP result letters?

The following section answers the third research question posed in the project. As opposed to the previous two questions, this topic gained substantial attention from a research community, other stakeholders, and media. For example, the BBC published a news story about parental experiences with the so-called “fat letters” showing how these letters caused distress among parents (BBC, 2015). Other researchers criticised the programme from various aspects, notably for its ineffectiveness to result in behaviour change (Lloyd, 2015). More recently, organisations such as the BEAT (The UK's Eating Disorder Charity) reported their concern over the impact of the programme on the wellbeing of children – highlighted by opinions of parents (BEAT, 2020).

The question was answered by bringing the evidence from two strands of research, parental opinions and their experience assessed as part of a survey, and themes identified as part of the semi-structured interviews. These two strands took a different approach to the question, the former attempted to bring objective evaluation using a standardised questionnaire (the UEQ) and intervention, the latter delved deeper into the subjective experiences of parents through semi-structured interviews. Both strands brough the latest evidence regarding parental user experiences resulting from the current form of the NCMP. Whilst the interviews succeeded in recruiting sufficient sample with robust findings, the questionnaire and intervention provided valuable methodological insights and some evidence that parents who received a letter stating their child was not in a healthy weight category had worsened experience with the letter.

6.3.3.1 Parental user experience with the letters

The current study was the first to utilize a standardised questionnaire in the feedback process to measure parents’ user experience regarding the feedback letters – namely the UEQ (Laugwitz et al., 2008). Specifically, this was done as part of Study 2.

The findings showed that the most important explanatory variable (predictor) determining parental user experience was the weight category the NCMP assigned to their child. The predictor had the largest coefficient and was included in all regression models estimating the UEQ factors (Attractiveness, Dependability, Efficiency, Novelty, Perspicuity, and Stimulation). The results across models showed that the experience was less favourable if parents received a letter stating their child was not in a healthy weight category.

The discrepancy between the parental perception of weight versions between healthy and other categories (underweight, and especially overweight and very overweight) is already well documented in the literature.

As part of this study, the UEQ factor that observed the clearest indication of the differences in parental experiences was the Attractiveness. The factor of impression was the lowest for any of underweight, overweight, or very overweight letters in comparison to healthy weight letter. Other promising factors were efficiency and stimulation where similar but lower differences were observed. The attractiveness related to some of the emotional responses described above (such as feeling upset). The efficiency to the fact that parents may prefer when they receive further help through pro-active follow-up because some may perceive the suggested lifestyle changes to be difficult. Finally, the stimulation may relate to the fact that most parents perceive the letters to be dull due to their lack of individualisation. While other factors could be discussed here, these factors provided the strongest indication of different parental experiences and LGAs could benefit from implementing them as part of the routine feedback where parents have opportunity to share their opinion regarding the letters. Based on the results presented here, the letter result seemed to be the strongest explanatory predictor of parental reaction; however, other factors such as parent's education status and child's age (i.e., Reception year or Year 6) should be considered in the future research project. In addition, the study provided significant methodological contributions, which are discussed in the policy briefing Section 6.5.

6.3.3.2 Themes concerning the opinions of parents about the letters

The distinctive experience of parents receiving the NCMP letters was further explored using semi-structured interviews. This was not a novel approach as reactions of parents towards the letter were investigated in previous studies identified in the literature review.

In the current project, seven themes were identified but of those, only Themes 02 Experience with the experimental letter, and 03 Experience with the standard letter were relevant to research question exploring opinions of parents and their experiences discussed in the current section. The results of Themes 02 and 03 were discussed in Study 3 section, while the result for the remaining themes are available in Appendix 3.10. Themes 02 and 03 are discussed and synthesised under the same heading to allow a comparison of experiences across the letter.

Experiences of parents with experimental and standard letters

In the second two themes, the experimental and control (standard) letter were compared to see if the experience was changed with wording. Several codes described the tone, sentiment, impression, and potential to motivate a parent. The findings in the results chapter showed that parents who received OW or VOW letter preferred the experimental version as it used "above" expected weight instead of the word overweight or very overweight, and as such, the parents described the experimental letter as supportive, kinder, more sensitive, and less scary. Parents who received the result that their child had healthy weight (at the expected level) felt neutral about the experimental letter and described it as too formal which has led to the feeling of dissatisfaction about the letter in some cases. The experiences of parents with the standard letter were different in the sense that parents with HW result described the letter as lighter, engaging, and factual but parents with the OW or VOW versions felt the letter was rude, infuriating, medicalising, harsh, and abrupt. The negative reactions also led to the feeling of being discouraged and not supported.

Nnyanzi et al. (2016) identified that linking obesity (very overweight or overweight statuses) to lethal diseases upsets parents and medicalises the context of a child's weight. Importantly, this study showed that removing these links as well as changing the wording of the weight status leads to improved perception of the NCMP letters among parents receiving the OW and VOW versions. However, the letters could go further, as identified in some critique from the other parents with regards to the experimental letter who called for a more positive approach in wording, not merely neutralising the letter. This can be signified with a response from a parent with the UW result who perceived the standard letter as more positive because it acknowledged that children with this result could be perfectly healthy. These seemingly small details may determine a parent's attitude towards the result and possibly their willingness to engage with service providers.

Where parents of all categories agreed unanimously was the critique of using the sentence that mentioned: "*If you would like to find out more about how your child's weight compares with other children's weight*" (Experimental letters). This was interpreted as an attempt to compare children directly, and parents felt that their child's individuality was not respected. This relates to findings from previous research where parents called for higher individualisation of the letters (Gillison et al., 2014).

These findings showed that parents prefer non-medicalising and supportive language, as noted in previous research (Nnyanzi et al., 2016). While other researchers compared the effectiveness of the letters (Sallis et al., 2019), this is the first research that has looked specifically at experiences of parents and the effect of wording within the letter. Parents reacted positively when the letter stated their child had no overweight or very overweight statuses and used the term above the expected level instead. However, at the same time when the term healthy weight status was changed to at the expected level, some parents – especially those receiving healthy weight version, felt the letter was not positive or supportive enough. Parents also wanted to hear broader definitions of health in the letters, this was signified by parents receiving OW or VOW who disliked the list of medical conditions or parent with the UW category who said they liked when the letter said their child could be healthy despite the given UW status. Importantly, small changes may improve the impression of the NCMP and LGAs should be encouraged to explore how to modify the letters to fit their local community needs. Parents also suggested many changes and modifications that could be implemented, and these were explored in the next research question alongside their actions after receiving the letters.

6.3.4 How can the current NCMP result letters be further improved?

The final research question explored how the letters could be further improved. Some studies approached this topic in the past, either specifically with the NCMP letters or similar alternative and they should be briefly re-introduced here. For example, the study by Sallis et al. (2019) used a visual tool (MapMe^{TM}) to help parents with recognising childhood obesity, various social norm statements, and free stamped envelopes to modify the NCMP letters to increase the uptake to services (Jones et al., 2018). Elsewhere, Dawson et al. (2014) used a traffic light system to help parents understand the BMI centiles and motivational interviewing to ease service recruitment. Bailey-Davis et al. (2017) added several additional resources to their screening reports (such as leaflets or guidance and links to enable access to online tool assessing parental practices) to increase the utility of the screening report and motivate parents to seek clinical help. Finally, Prina & Royer (2014) varied the level of information parents received from the measurement across one control

(with no BMI screening feedback) and three different experimental feedbacks (i.e., basic feedback, feedback outlining risks associated with obesity, and feedback informing parents about levels of weight categories in other children) to see the impact of feedback formats on parental knowledge, obesity attitudes and behaviours, and BMI.

The studies mentioned above all attempted to modify the feedback letters to improve the experience of parents; however, none of the approaches aimed to modify the language within the letters and measure the impact of such modification. This was not a novel idea and various calls for such insight have been made in the past. For example, Gainsbury & Dowling (2018, p. 8) have called for future research that would help to understand "*how we may be able to shape the narrative around healthy childhood bodies*" or Nnyanzi et al. (2016, p. 11) suggested that it might be better for "*the feedback letter to adopt a more neutral tone".*

The research question discussed in this section closely related to these studies. Similarly, to the previous research question, two strands of research were combined – qualitative and quantitative. The best place to start discussing this research question was by going to the themes identified by parents regarding further changes of the result letters. This maintains the continuity from the previous question.

6.3.4.1 Themes concerning parental suggestions about improving the letters

Parents provided valuable suggestions regarding how to improve either of the NCMP letters they had a chance to compare; and commented on what they thought worked well in the letters. The themes that captured their suggestions were predominantly Themes 04 (Changing the experimental letter), and 05 (Changing the standard letter). The remaining Themes 06 (Parental recommendation for the NCMP; Appendix 3.10.2) and 07 (Discussing the result with children; Appendix 3.10.3) are provided in the Appendix but not discussed here as they did not directly help to answer the stated research question.

The notable modifications (Theme 04) requested for the experimental letter were to ensure the letter did not mention comparison with other children or that children can experience social difficulties. Further common requests were to make the letter less formal and more personalised, shorter, improve the layout, more positive, and avoid reliance on the BMI. Rarely, some parents also perceived the letter as patronising, judging, requested increasing the fonts, and attachments to be included in colour (not in grey). The overall narrative suggested that the letter performed better for parents who received either overweight or very overweight results but performed as average with parents of children with underweight (with only one parent in this category) and healthy weight statuses.

The notable modifications (Theme 05) requested for the standard letter were to make it less medicalising, patronising, more readable, and more supportive. These were in majority provided by parents who received the OW and VOW results. Further requests were to improve the layout, explanation, add further visualisations, or make the letter softer. Rarely, some parents suggested to make the attachments in colour, or make the letter shorter. The overall narrative suggested the letter performed the best with parents who received healthy weight result for their children and underweight (with only one parent with this category), but much worse for those receiving overweight and very overweight results.

The modifications are presented below in four principal issues highlighting where the current NCMP feedback letters should be improved. The issue is also contextualised in the

literature presented in the previous sections. This approach to result discussion provided final synthesis of the findings across the two themes.

The Issue with a Lack of Individuality and High Standardisation

The narratives of parents suggested that they call for greater personalisation of the letters. Both letters have featured themes where parents noted the letter did not feel very personal, for example as one parent noted about the experimental version: "…*You know, it needs to be a bit more personalised, I think."* (Parent 07, HW). This was also featured as calls for contextualising the child's background, medical history, or individual lifestyle. For example, one parent said this about the standard letter: "…*Everybody's body shape is different, they're all different. It's not to say that everybody is going to be the same."* (Parent 14, OW). These calls are also reflected in the literature. An example can be provided by Fiona Gillison (2014) and her team who collected such responses from parents in their responses to an open-ended question in survey. One parent said: "I feel that a ''standard'' letter was not suitable in all cases – mine included" which according to the author reflected the need for more tailored letters (Gillison et al., 2014, p. 991). In another study by Kovacs et al. (2018) who reviewed online discussions in fora, the authors found that the letters failed to account for individual lifestyle factors of children according to the commenting parents. These findings were reflected also in the current research and NCMP practice. Despite encouragements in the operational guidelines to tailor the letters to suit local needs, parents still perceive the letter as a standard NHS communication (Public Health England, 2019b). In this sense, LGAs could attempt to modify the letter further to create more personalised experience for parents.

The Issue of Feeling Blame and Shame

Most parents who were interviewed in the project and received either overweight or very overweight results showed some negative response towards the feedback. Nnyanzi et al. (2016) identified these negative reactions as part of the initial stage in the sequence of events that these parents followed after receiving the letters. These feelings typically revolved around feelings of being blamed and patronised (Gainsbury & Dowling, 2018; Nnyanzi et al., 2016). However, these letters may also trigger accounts of negative personal experience in parents who themselves lived with obesity and experienced being made to feel ashamed for their weight (Kovacs et al., 2018). Therefore, it seems valid to interpret some of the findings as an attempt to withdraw, or what some researchers described as "denial" of the results that was further fuelled by cognitive dissonance (i.e., feeling that high BMI is unhealthy, yet giving treats to child) or general lack of trust in public health initiatives such as the NCMP (Crossley, 2002; Gillison et al., 2014; Whitehead & Russell, 2004). Indeed, this could suggest that these negative feelings were part of the complex process of accepting the results of the NCMP as described by Nnyanzi et al. (2016), and this process may require time. The problem with these reactions was that they are most likely preventable if the letters improved the tone and language in which they delivered the results. Inducing blame and shame is not helpful for parents and psychologists, and other specialists agree that it is counterproductive, causes other issues such as controlling behaviours, eating disorders, and place unrealistic assumptions on parents as the primary "force" that controls a child's weight (Chadwick & Croker, 2015).

The Issue of Insensitive and Medicalising Language

The language was an important focus of this research, and narratives provided by parents have shown that the letters have room for improvement in this regard. Parents expressed their need for letters that are supportive and positively worded no matter the results. They also wished for less medicalising information such as information about cardiovascular problems and more reflection on lifestyle or child's happiness which was paramount in their perspective. Parents in this research noted that while the letters (i.e., experimental versus standard) were similar, it was the overall tone that set them apart.

For parents of children with overweight and very overweight statuses, the supportive, softer tone and the absence of medicalising language were crucial. This links with the previous research that found that parents or carers used a wider definition of a child's health. The most notable reference to this was made by Syrad et al. (2014) where the authors noted that diet, activity levels, and happiness played more important role than the weight itself for a parent to accept the feedback in the letters. Therefore, highlighting in the letters these elements or at least removing the problematic elements such as medicalisation will likely make a difference for most parents who do not receive healthy weight result for their child. That said, some evidence showed that parents were trying to protect their children' childhood and shield them from the results (Gillison et al., 2017). This means that they did not wish to discuss the letters with their children (Gillison et al., 2017). This was also found as part of the seventh theme, where parents indicated they did not want their children to worry about this. Therefore, some parents may never be willing to do anything with the letters for a similar reason – even if the language was more supportive.

For parents of healthy weight, the letters themselves were usually good news. However, even they felt the need to be encouraged that these results meant something positive and go beyond neutral statements. The practice that is used during discussing the topic of weight with parents and their children in person should also apply to the written communication of letters. As McPherson et al. (2018) noted, parents endorse the use of open-ended questions and a respectful tone when discussing weight. This suggests that more neutral letters are needed for discussing sensitive topics and the findings of this project support this. Nurses in childcare know well that trusting relationship is crucial in the management of childhood obesity; the evidence from Sweden shows that they try their best to not upset, anger, or make parents feel accused (Sjunnestrand et al., 2019). This is because they favour the long-standing relationship across multiple visits, the building of trust, and careful communication as an effective means of helping the families (Sjunnestrand et al., 2019). The letters should aim to build trust with parents. Sharing results is ethical and should be done but in the most sensitive, encouraging, and welcoming way possible.

The Issue of Dull Content and Unappealing Attachments

The last issue was less influential, albeit it was prevalent across the discussion with all of the parents no matter the result they have received about their child. The notable comments often revolved around the high standardisation of the letter or the use of black and white instead of colours in attachments that made the content feel mundane. This could suggest that adding more attachments or colours could improve the letters. However, research suggests that adding further content or using visual cues such as traffic lights had little impact on parents in terms of their motivation, ability to recognise childhood obesity, or whether they attended further support for their children with overweight or very overweight

statuses (Ames et al., 2020). Similarly, visually interesting tools such as MapMe seemed to have little effect on the actual ability of parents to recognise obesity or engage with further weight management services (Jones et al., 2018; Sallis et al., 2019). Despite this, parents seemed to appreciate entertaining content. Perhaps such content may have more importance for building a relationship rather than on outcomes such as service uptake.

6.3.4.2 Parental behaviours after receiving the letters

The final question is closed with brief discussion of findings regarding the behaviour outcomes of the NCMP letter (i.e., outcomes from Study 2). The specific behaviours were whether parents contacted a service provider, general practitioner, school nurse, or whether they have shared the results of the NCMP with their children.

The findings showed that the most important explanatory variable was the weight category. However, the results did not seem to show that the letters lead to a behavioural response in terms of contacting service, GP, or school nurse. The most interesting finding was that parents seemed to be more likely to share the results with children if they were older and their weight category was in a healthy range. This suggests that parents consider whether the children are old enough and the impact of the results before sharing the results.

The probable reason why the findings were null were sampling issues and challenges encountered during the recruitment phase of Study 2. These challenges provided valuable methodological lessons which are discussed later on, however, the findings were less robust. The full detail of Study 2 is available in Appendices 3.4 to 3.8.

6.4 Limitations and Challenges

The following section will discuss the limitations of the project, and methodological contributions from Study 2 that may be relevant for future research.

When considering the choice of the design, the mixed-method was a good fit for this project because it allowed creating a context where views of different stakeholders could co-exist and inform one another. The mixed-method research allowed a degree of flexibility and complexity that typical qualitatively or quantitatively oriented traditions were not able to offer (Teddlie & Tashakkori, 2009). However, the biggest strength of this approach was perhaps also its limitation since one of the dangers of this research was increasing degree of complexity with each additional study.

An overall limitation of this research related to a common problem in sequential type of mixed-method research where one strand or study typically informs another (Creswell & Plano Clark, 2018; Teddlie & Tashakkori, 2009). However, what if one of the strands does not develop fully or as expected? This also occurred in this project when the second study did not meet the required sample size and produced several iterations of underpowered experimental design. This posed a significant threat to the design and integrity of the research. Decision made here utilised the strength of the mixed-method, notably its flexibility, and ensured the final study could address the limitation of the second study. In addition, while the contributions of underpowered study with small sample size are limited in the sense of findings, the current section will argue that such study still has a significant methodological value to inform the future research practice.

The limitations that were unique to this research are discussed concisely in the paragraphs below. Strengths per se are not discussed as these are implied from the methodology

chapter where justifications for the particular design choices were made. The upcoming paragraphs discuss the limitations of each study in this thesis.

Study 1 had several limitations that should be mentioned. The sample of LGAs did not cover all potential variations of the NCMP implementation. From all possible LGAs (152), 92 agreed to participate in the survey. The study provided representative findings given the response rates across the four PHE regions varied from 53 to 69%, however, the non-probability sampling technique was a limitation that should be considered when interpreting the study findings. Additionally, some LGAs may not have been comfortable sharing their data or were experiencing changes which meant they were unable to provide data at the time of the study. Finally, the survey focused on the perspective of LGA representatives; the study did not explore the perspectives of other stakeholders such as schools or providers.

Study 2 was conducted at local authority level across Suffolk CC and Lewisham Borough sites, and at England level across various school sites. The major limitation across all these sites that the reader should bear in mind was the difficulty to recruit sufficient sample size. This ultimately resulted in a shift from the Cluster Randomised Control Design that would allow stronger evidence of causality behind the investigated phenomena to observational design that provided weaker evidence.

Another limitation that was not foreseen was the staff capacity and resources of Suffolk CC to support the original design choice which has led to further changes and delays. These lines are not intended as critique of Suffolk CC. It was simply unfortunate that the LGA was in a challenging process of switching providers during the study implementation that resulted in a limited capacity on their site to support projects that would require additional staff support. The only accessible design that could use their established NCMP delivery routes was one that disseminated a set of letters to all children in Year 6, and another to all children in Reception year. However, this was considerably weaker design in comparison to the Cluster Randomised Control.

Finally, while the recruitment format used several incentives to motivate parents, all of the routes to parents were indirect, and it was not possible to identify whether parents opened the survey, shared it, or send further prompts. This also contributed to the limited sample size.

Study 3 also had its unique challenges that need to be discussed here. The study relied on a specific population of parents from two recruitment sources. The first was a database of families who attended childhood weight management groups provided by OneLife Suffolk (lifestyle service operating in the Suffolk region). The others were participants who provided their contact details as part of Study 2. This method of recruitment did not guarantee a representative sample – most participants were White British and had higher education. The study therefore cannot represent experiences of parents from other ethnic or educational backgrounds. Additionally, this type of recruitment was prone to selection bias since the participants who did not wish to engage with some part of the NCMP, (i.e., did not leave contact details or did not attend services) were less likely to be included in the final study.

These limitations also provide **methodological contributions** that can be beneficial for researchers planning similar future studies. Study 2 is especially valuable in this sense. The text thus far has focused on discussing the limited evidence while being transparent about

the robustness of the results. The upcoming section will shift the focus to further policy contribution of the project and also discuss the value that the project has for future research (i.e., the methodological contributions).

6.5 Policy Briefing

The following section discusses implications of the results for the PHE, LGAs, parents, and other researchers alongside policy briefing for the current practice. Two of the mentioned stakeholders were participants but all of them provided valuable advice during the initial studies of designing the project. From an ethical point of view and given the practical orientation of this project, it is sensible to discuss what implications the results have and how they may impact the operation of the NCMP in the context of those who hold the stake . Several topics are considered below and split into sections discussing the principal implications and basic recommendations. The section concludes the results presented throughout the project to show the practical impact of the research on the current NCMP practice.

6.5.1 Briefing for PHE

Updating the operational guidance

Public Health England was the executive arm's length body of the Department of Health & Social Care and as such is actively contributing to the development of public health strategies (Department of Health & Social Care, 2020). The results of this research provided novel evidence that could help the PHE in its function “to protect and improve the nation's health and wellbeing” (Public Health England, 2020a).

Study 1 showed the overall patterns across different LGAs. Results of this study allow the PHE to directly update their advice regarding the NCMP strategy as it shows operational strategies across different LGAs. For example, the result that four of sampled LGAs still used children school bag to deliver the feedback about weight to parents is something that the PHE advises against and may need to highlight in their guidelines to limit this practice.

Study 1 findings also highlighted that NCMP delivery was varied and that further guidance regarding standards of best practice would help LGAs to find the most suitable localisation from the various options that exist. Unfortunately, the guidelines at the moment do not help LGAs with this kind of localisation, thus it seems that most simply use elements of the NCMP that follow the latest operational guidelines closely.

Furthermore, Study 2 and 3 findings indicated that parents receiving the weight categories outside HW for their children are dissatisfied with the sentiment and medical content of the letter. This is something that the PHE can implement in their guidelines.

Finally, parents seem to discuss results of the letters with their children as supported by findings in Study 3; however, no guidelines currently exist that would support parents directly with this. Thus, the project has important implications for further development of guidelines for LGAs, and this may ultimately increase the impact of the NCMP on other stakeholders, for example, parents.

6.5.2 Briefing for Local Governments

Delivering the voluntary elements of the NCMP

The evidence from this project showed that the majority of surveyed LGAs deliver the feedback letter after parents' children are measured and attempt to follow-up with children outside the healthy weight category. This trend occurred even though the provision of the results was the voluntary element of the NCMP. Only the follow-up with "high risk" category children is specifically recommended by the operational guidelines developed at the PHE and only the delivery of pre-measurement information is legally mandated since parents must be given an option to "opt-out" of the measurement (Public Health England, 2019b; UK Parliament, 2013).

It should be noted that the delivery of the NCMP feedback is an element that was recommended by the British Government (Department of Health & Social Care, 2008) who issued legislative changes which enabled sending the results to parents ever since 2008/2009 (Department of Health & Social Care, 2007; Lake, 2009; Nnyanzi et al., 2016). This governmental recommendation was part of a further push to move the NCMP from monitoring to a screening initiative (Ames et al., 2020; Grimmett et al., 2008; Nnyanzi, 2012). Most of the LGAs sampled in the study followed the notion of the NCMP as a screening initiative and, as part of the feedback, tried to support parents to take an action or provided intervention. Thus, the current norm is to deliver feedback to parents, and this is an established practice. However, it may also lead to overshadowing alternative decisions regarding whether or how to deliver the feedback to parents. For example, some LGAs diverged from the norm and informed parents that they can request feedback (rather than providing letters automatically), or provided further follow-up only to parents of children who were in the extremely low and high BMI centiles. These approaches should be further documented as alternative ways to work with the NCMP results as the LGAs should follow what works best for their area, rather than a norm or all-purpose approach. The suggestions to localise the NCMP is acknowledged by PHE for some parts of the NCMP, for example, the specimen letters; however, the current practice may be too normative for LGAs to experiment with the NCMP further or learn from each other (Public Health England, 2019b).

Methods of delivering feedback to parents

When LGAs decided to deliver the feedback, the most common method was to use a postal service as per Study 1. The method seemed to be well established as it was not changed since the onset of the NCMP, neither did it dramatically evolve (Shucksmith et al., 2008). Should LGAs keep delivering the letters using postal services, or should they establish novel and alternative methods of delivery?

The main argument for changing the delivery method or exploring alternative options was identified in Studies 2 and 3. Specifically, feedback from parents who stated they were not personalised and lacked individuality. The individualisation of the letters is difficult task in case of printed letters sent by post. The authors will soon find themselves producing long texts. With additional attachments, the letters will also increase in cost. These attachments should also be printed on high-quality paper, not in grayscale on A4 papers that give the appearance of mundane attachments. This will likely increase the cost again. Finally, every parent requires slightly different information, and some also require different methods of delivery (i.e., SMS, website, letter, text). This is impossible to accommodate on the appropriate scale if the letters are delivered primarily by post. In consequence, given that

the delivery method is linked with the scale at which the letter can be individualised; changing the delivery method will be a step towards further personalisation of the feedback.

Still, the reason why many LGAs may choose postal services is that they lack other contact information from parents; for example, parents' phone numbers are not up to date. Additionally, some parents may not have access to the internet, and the e-method often lacks a confirmation that the result was delivered. Another issue may also arise when it comes to checking the identity of the person receiving the results. These are all valid points and must be considered on the local level.

Changing the content and language of the feedback

Studies 2 and 3 identified challenges with the content of the letter, in particular with the language (i.e., overall sentiment, choice of wording, and various structural elements such as black and white attachments). Most parents of children in UW, OW, and VOW weight categories felt the letters were not supportive, the content was medicalising, and the sentiment (tone) was harsh and patronising (Study 3). Moreover, the letters were perceived especially low on attractiveness, stimulation, and efficiency components of the UEQ scale (Study 2) among parents who received the letter stating that their child has not been classed in the HW category.

These negative experiences were often fuelled by the results themselves and likely further exacerbated by medicalising language. However, what has been illustrated in Study 2 (letter modification) and Study 3 (interviews) was that the letters' language can be changed. Especially, the observation of Study 3 has shown that parents reacted positively to indirect and non-confrontational language and alternative approaches avoiding medicalisation (i.e., omit the mentions of health risks of obesity), and appreciated if they were given a choice whether to carry on with the advice or not. At the same time, parents preferred to be praised and receive some positive sentiment despite the overall negative result. Even parents who already received the HW version stated the letter felt too formal if it did not state something such as "and this is good news" and felt the letters should be worded with positive sentiment. The results also showed that parents wish the letters would acknowledge wider interpretations of health – beyond the focus of "health equals optimal weight".

These illustrate some of the changes that LGAs could implement in the development of their feedback letters. Crucially, the changes to language are easily done and are low cost. These also go beyond what is currently suggested in the guidelines published by PHE. Importantly, for any such modifications to be impactful, feedback should be asked routinely from parents. The UEQ proved to be a simple tool to implement that can be utilised to measure the user opinion of the letter (Laugwitz et al., 2008). LGAs could implement even a simpler questionnaire that fits their local needs, for example, several questions developed to measure specific outcomes related to healthy-care pathways. Given that parents are stretched for time, anything above ten questions may result in low response rates. This additional feedback needs to have high accessibility features, LGA should ensure any links for feedback are highlighted, bolded, or otherwise visible. Some parents could fill in the feedback in-person at the school where the measurements were gathered. Implementing such feedback can help to improve the letters alongside local long-term goals.

The research evidence suggested that any modification may not lead to substantially increased numbers of parents at lifestyle management services, or increased calls to school nursing teams, or referrals to GP (Ames et al., 2020; Sallis et al., 2019; Viner et al., 2020).

However, any increase between 1 – 2% can be considered a success; hence, this may lead to an important question of why make any changes at all? The argument presented here is that these changes are important because parents may feel threatened by the NCMP feedback and delivering result letters or feedback that allows them to feel supported through the usage of different words may help parents to accept the results and feel more confident about the situation. This is also why continuous feedback (i.e., asking parents what they think about the letters) is essential – it helps to assess whether any changes improved the parental experience.

6.5.3 Briefing for Parents

The measurement and results delivery phase

The unique contribution of parents as both participants and stakeholders in this research may help the stakeholders who deliver the NCMP understand their experiences, expectations, and their preferences regarding many elements of the NCMP explored here. Specifically, the project has implications for the initial phases after the measurement, i.e., delivery of the feedback information to parents, and for further phases after the delivery of the feedback.

The project highlighted that the letters suffer from a lack of personalisation, heightened focus on the medicalisation of weight, and have the potential to trigger unfavourable responses from parents of children classed outside the healthy weight category. Studies 2 and 3 suggest that these parents react favourably when the letter content, sentiment, and terminology is modified to provide more medically neutral, yet positive and supportive feedback. These findings are supported by the recent systematic review that identified parental preferences regarding the format, timing, content, and amount of information in the parental weight feedback (Ames et al., 2020).

Authors of previous studies reported that parents disregard the results, find the letters unhelpful, or throw them away (Falconer, Park, Croker, Skow, Black, Saxena, Kessel, Karlsen, Morris, Viner & Kinra, 2014; Gainsbury & Dowling, 2018; Nnyanzi et al., 2016). The findings presented in this project may help parents find more benefit in the NCMP feedback and show that parental preferences can be respected whilst still maintaining the key purpose of the NCMP. The feedback that matches parental preferences may help parents who receive negative feedback to build a more favourable perception of the NCMP.

The proactive follow-up and service referral phase

The research did not directly increase the likelihood of parents attending services; however, by decreasing the initial negative reactions, parents are likely to further progress to productive strategies of dealing with the letters as described in Nnyanzi, (2016). Specifically, they may be likely to reach the phase of seeking help sooner if the initial phases of shock, upset, and disgust are mitigated by the neutral tone of the letter. This may assist a service provider as they can reach the target population faster and they may be also able to engage in communication with parents who would otherwise disregard any offer for help. This strategy fits well with the government plans to tackle childhood obesity as it could increase the number of service uptakes if the perception of the NCMP was positive (Department of Health & Social Care, 2018). Parents may also react more favourably towards other elements of the NCMP brand if the overall perception is positive.

6.5.4 Briefing for Researchers

Methodological contribution

The studies that make up this thesis have had significant methodological contributions relevant to future research related to the NCMP; however, specifically, Study 2 can be used to illustrate these contributions. This is because the study explored various research design implementations and ultimately settled on a quasi-experimental approach. However, the experience with proposing various designs for Suffolk CC revealed many factors (listed below) that can determine whether a design can be successfully implemented.

The first such factor was the availability of resources at any given LGAs. This would primarily cover the areas of staff capacity, funding, and time. For example, can LGA's staff and school nursing team support the project? If not, can the research team provide such support? (A support could be any manual preparation of letters, their adjustments, or making calls to parents.) Can sufficient funds be allocated for the dissemination of letters? Finally, does the project fit the mandated timelines of the NCMP and timelines required by a LGA? This usually means delivering result letters up to 6 weeks after the measurement and scheduling measurement of all children in a timely manner in throughout the scope of a single academic year. In practice, any NCMP related project usually needs to be planned at the very least a year before the letters are scheduled to be disseminated.

Another factor that impacted the success of the project were elections in England. This is because the NCMP can be in the focus of media and the result letters can become politicised. The impact of this may not be clear to researchers at universities as they are generally apolitical institutions by default; however, LGAs are affected. The practical impact in the case of this project was that the NCMP and any associated planning had to be put on hold during the 2017 general and local elections. This resulted in further delays, and future research carried on the NCMP should take this into account. The third factor were specific requirements of the target population – parents. The experience of this project and some other projects referenced in the literature review showed that parents could be particularly challenging to recruit. Typically, their work and caring responsibilities do not leave them with a lot of time to share by participating in a research project. This introduced selection bias in the project and was probably one of the key reasons why Study 2 recruited a low sample size. Potential mitigations could be exploring and using any routes that offer direct contact with parents. In this research project, the example that worked were direct phone calls to numbers from a database held by lifestyle provider OneLife Suffolk. Other options could be contacting parent groups (social media and forums), contacting parents through schools and headteachers, or closely collaborating with the school nursing team (or commissioned services) to recruit parents. It was shown in this project that these approaches result in a sufficient sample size for qualitative studies.

Another key factor was an effective collaboration with relevant organisations. This can be illustrated particularly well in Study 1. For example, recruitment for the purpose of operational surveys targets a different population than parents. Study 1 called these participants "representatives of LGAs", in practice these were typically members of the school nursing team or those who commissioned the NCMP at a given LGA. The recruitment worked very well in collaboration with PHE, who distributed the survey in newsletters, and through contact, their regional leads had with LGAs. As indicated earlier,

schools and service providers are also important stakeholders, and close collaboration can be what determines the success of the project.

Finally, studies investigating parental behaviour will likely need large sample sizes. This was important for all of the studies in this project. The final factor that needs to be considered is the scalability of the recruitment and accessibility of selected recruitment methods. The current project aimed to include an online survey at the end of the letter that was accessible using the Internet (i.e., parents had to type a shortened link to their devices). This approach proved to be scalable and allowed the links to be included in all of the letters; however, it seemed to be inaccessible to parents. In fact, it would not be an exaggeration to say that parents completely ignored this method. While highlighting or colouring and bolding the text could have slightly increased response rates, another approach was probably needed. The ideal would be a simple text message sent to the parent's phone. This would fit well with a goal of exploring novel delivery methods; however, privacy issues need to be considered and appropriate consent gathered a priori. A similar approach could be done using an email or dedicated website. However, not all parents have access to the Internet, while nearly all do have access to a post. This means that sending a feedback survey alongside the NCMP could be a viable route, but the cost-effectiveness of such an approach has to be carefully considered. These approaches are only viable if there is sufficient time to plan the research project and there is effective collaboration with relevant stakeholders. Finally, one approach that could be promising is to include regular feedback such as the UEQ or bespoke set of questions that could be included to the NCMP using one of the methods above. The aim would then be to collect data over a longer period of time.

6.5.5 Summary and Recommended Policy Actions

The paragraphs above can be further condensed into a summary of specific policy recommendations that could be taken based on the evidence presented in this project. Therefore, the following policy actions are recommended:

- PHE and DHSC should provide sensitive, neutral, or slightly positive templates and avoid medical terms such as cardiovascular disease or cancer. The LGAs need additional examples of the best practice and letter localisation. Clarifications about how results should be delivered are still needed.
- Provision of the letters is voluntary, and LGAs can explore different delivery methods from no delivery to e-delivery or selective delivery. Local needs should determine the best course of action in close collaboration with service providers.
- Parents need and have been calling for letters that are medically neutral, positively worded, and supportive. Parents also need letters that are further tailored to the individuality/needs of their children. This provides a unique opportunity to explore different methods of delivery and result sharing or combining services into a holistic approach.
- Researchers should focus on forming effective collaborations with stakeholders and LGAs. Different designs need to be explored, and feasibility studies are advised until the best fitting research design is identified. When recruiting parents, the most direct and personalised routes (*e.g., via school nurses, headteachers, lifestyle services, or attending events where parents can be met*) are also the most appropriate. Mass recruitment anonymous methods (e.g., *internet links in the letters, posting on forums*) proved ineffective in recruiting sufficient sample sizes.

6.6 Current Climate – COVID-19

The general impact of the pandemic on childhood wellbeing

The final section discusses the recent developments related to the novel coronavirus (COVID-19) outbreak that has been declared a pandemic by the WHO (Cucinotta & Vanelli, 2020). The pandemic had serious implications across the entire healthcare sector and gave incentives to develop telemedicine practices as non-urgent patient cases were low in a triage (Hollander & Carr, 2020; Portnoy et al., 2020). This also introduced implications that need to be considered in the context of the NCMP delivery and wider context of childhood wellbeing.

One of the negative impacts of the pandemic was that the schools had to be temporarily closed, which brought a variety of issues for children and adolescents. The most striking were the widening food insecurity, inequalities in educational outcomes, and impediments to mental health and well-being (Lancker & Parolin, 2020). The complete discussion of all the complexities associated with the pandemic are beyond the scope of this section; however, of particular relevance was that with the school closures (and in context of the previous issues), prevalence of overweight and obesity as well as other nutritional disparities is expected to increase (Rundle et al., 2020). For example, an early longitudinal study indicated that the consumption of food such as potato chip, red meat, and sugary drink during the lockdown increased significantly while the time spent doing sports activities decreased (Pietrobelli et al., 2020). Obesity is a complex multifactorial disease (Butland, Jebb, Kopelman, McPherson, Thomas, Mardell, Parry, & others, 2007), and therefore, further evidence will be required to assess the full impact of the pandemic.

The impact of the pandemic in the context of the NCMP

The implication of these issues for the NCMP is important to discuss. In November 2020, the PHE released additional guidelines addendum alongside the new operational guidelines specifically addressing recommendations for the delivery of the NCMP during the pandemic (Public Health England, 2020b; Public Health England, 2020c). The NCMP was on hold since March 2020 but was due to be restarted from January 2021 (Public Health England, 2020b; Public Health England, 2020d). The addendum argued that the NCMP was essential concerning the pandemic as *(…) it will provide population-level data to help understand how COVID-19 has impacted child weight status, including obesity prevalence and inequalities* (Public Health England, 2020b, p. 3).

In the guidelines, the pre-measurement letter was recommended to be distributed using an email, which has been the case also for the previous guidelines (Public Health England, 2018a; Public Health England, 2019b; Public Health England, 2020c). However, no such suggestion was made for the feedback information (letter). The guidelines recommended using the “bespoke” letter specimens and offered any personalised advice using the proactive follow-up (Public Health England, 2020c).

This project and the past research has highlighted that the parents have various preferences regarding the feedback letters, including the method and timing of delivery (Ames et al., 2020). LGAs could be supported to explore various options when delivering the feedback information, for example, they could follow the telemedicine trend established in other areas of healthcare and modernise the feedback in the NCMP. They may have to do so for other elements of the NCMP, such as services where the guidelines advised to

assess the availability in the meantime (Public Health England, 2020b). The LGAs will likely need some further guidance in the current situation, and while the pandemic may open some opportunities, it could also exacerbate problems, for example, funding issues. This research pointed towards some LGAs (in Study 1) that close services due to operational costs.

The unprecedented situation brings various challenges, and the time of writing this thesis it was early to assess the full implications of the pandemic in the context of the NCMP; however, this section introduced some of the key issues that may be considered.

6.7 Suggestions for Future Research

Future work should explore the impact of the varied practice that results in the modifications to the NCMP result feedback. The feedback element of the NCMP has been criticised as a cause of distress to parents (Gainsbury & Dowling, 2018; Gillison et al., 2014; Nnyanzi et al., 2016). A paucity of research has explored parents' experiences to the varied feedback content, and given the potential impact of this NCMP element, further work is warranted. Research suggests that parents have various preferences regarding the feedback, and these should be considered within the NCMP feedback (e.g., timing, terminology, literacy level, or tone) (Ames et al., 2020). Since LGAs are free to modify the feedback information, there should be a discussion about how to best share the feedback with attention towards the language within the feedback. This is important concerning delivering further evidence regarding the medicalising language within the letters. For example, LGAs and researchers could explore the impact of completely removing any weight labels and medical information from the letters.

Novel delivery methods remain unexplored, and the traditional methods such as letters offer limited adjustability to offer personalised feedback that parents long called for. Future research could compare different delivery methods such as emails, text messages, or internet messaging. These methods also allow further modification of structural elements, fonts, colours, and attachments whilst remaining relatively cost-efficient. Additionally, researchers and LGAs could experiment with the amount of information provided, i.e., from detailed letters to bare-bones letters, which is achievable if the delivery method is modified.

Parents are a challenging sample to recruit as they have multiple responsibilities and their willingness to respond to a study may be subject to selection bias. The practical way to solve this could be implementing routine requests for feedback as part of the NCMP result, opt-out information, or proactive follow-up delivery. For example, utilising questionnaire methods with no more than ten questions, such as the short form of the User Experience Questionnaire or custom-developed survey of similar nature, could allow it (Hinderks et al., 2018). This would allow parents to participate in the operation of the NCMP routinely. Finding a suitable means to engage parents long-term is also important, and schools could play an important role in facilitating this. Researchers should focus on implementing longitudinal feedbacks as described above and work with LGAs to build a database of contacts within schools that could be used to facilitate the implementation of the research. As a result of this activity, research resources would be minimised, and parents would be able to take an active role in developing the NCMP.

There is a lack of research regarding the impact of the NCMP feedback on people of different ethnicity and people with limited command of the English language. The limited research experience from this project showed that it was challenging to discuss the NCMP

with parents who did not speak English. These parents may approach the NCMP differently, and the research community does not know anything about how the NCMP impacts them. Whilst the LGAs promise to provide interpreters as required, further understanding needs to be obtained in how or if non-native English speakers use these services. Therefore, research exploring how the NCMP is viewed, engaged with, and responded to by these parents is needed, allowing it to become more tailored and appropriate for a diverse range of backgrounds.

Further research should also focus on understanding the engagement of parents with children from deprived communities. Since obesity is linked to malnutrition (Popkin et al., 2020) and increasing numbers of families are using food banks (Loopstra et al., 2015), this would be an area requiring substantial focus. Therefore, the NCMP could contribute to better identification and support for children and families in more deprived communities.

Finally, future researchers should hope to collaborate with different stakeholders, prioritising those in their local area as the NCMP operates across different layers of society (i.e., from the government level to the individual level). Mixed-method research or agile research that closely cooperates with local stakeholders will likely fit well with LGA plans to operate the NCMP further and may bring important local evidence that may have a real-world impact.

6.8 Conclusion

This thesis addressed gaps in research evidence, gaps in knowledge that can improve the practice and delivery of the NCMP for parents, children, and wider stakeholders such as local governments. The final section presents the overall contribution of the thesis.

In particular, this thesis and Study 1 provided the much-needed **update of the evidence on the NCMP operation** since the reports by Shucksmith et al. (2008) and Mooney et al. (2010). The study brings **novel evidence about the operation and delivery of the NCMP** from the perspective of the LGAs. PHE and similar stakeholders can directly use this evidence to develop the NCMP, especially the delivery methods of the result letters or services offered across LGAs. The results show that **modern delivery methods using mobile applications, SMS or the Internet are underutilised** and that LGAs still consider the postal services the most reliable. The findings also highlight **funding and staff capacity issues,** combined with heavy reliance on the commissioned organisation to manage significant parts of the NCMP. The evidence presented here also timely answers the calls made by the House of Commons for the urgent need to critically review the NCMP and its delivery (UK Parliament, 2021).

The depth and scope of analyses in Study 1 were unique as the feedback letters were analysed in detail using genre analysis and computerised text analysis. This brings new evidence regarding **the role of language in the NCMP letters and the overall framing of the feedback letters**. The analysis highlights **the lack of innovation in result letters** sampled across the various LGAs. **The letters use direct, medicalised language** that can further fuel parents' worries about their child's weight. Most of the **standard result letters also do not address parents' calls to modify or improve the language**. This was especially urgent in the context of parents who received the letter that their child was categorised with weight outside the healthy range.

The results presented in this thesis, and especially in studies 2 and 3, **fulfilled the need for evidence of altering and improving the NCMP result letters beyond nudging and**

measured user experience. The standard NCMP result letters were re-developed and assed on their quality to provide support to all parents. **The majority of interviewed parents reported they preferred the new version over the standard.** In particular, **parents of children classed outside the healthy weight range described their preference of the enhanced letter** over the standard version. In addition, the results support that the standard letters deliver an adverse user experience to parents with children identified with overweight and very overweight. Therefore, the improvements made in the enhanced version of the letter are even more important and meaningful for potential implementation at the LGA's level.

The evidence presented in Study 1 showed that the letters are **direct and conservative**. In the majority, they seem to **follow the template** issued by the Government and PHE in particular. The **medicalising and fear appealing** language identified across the letters also show that the **weight stigma** is perpetuated in the letters. This was further confirmed with **negative user experiences of parents of children with overweight and very overweight statuses** in Study 2 and Study 3. Such evidence presents a call to all engaged stakeholders to help to eradicate the weight stigma from the letters should the NCMP continue. It also shows that the weight stigma in the NCMP result letters is pervasive as it links overweight statuses with severe medical conditions and predictions of diseases in adulthood of weighted children. In addition, this link translates into a narrative that threatens some parents of children with overweight and very overweight statuses.

Finally, the project provides a unique contribution for various stakeholders involved in the NCMP. These were summarised in Section 6.5 and provide the opportunity for various policy changes and could help the future research planning.

7 References

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