YOUNG CHILDREN'S UNDERSTANDING OF WEIGHT CHANGE

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The candidate confirms that the work submitted is his/her own and that appropriate credit has been given where reference has been made to the work of others

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ABSTRACT

The prevalence rates of childhood obesity are at an all-time high. Alongside this worldwide problem is the important issue of weight-related stereotypes. As well as growing up with these, children are also experiencing societal pressure to be 'thin', which is influencing many children's desire to change their body shape and size. At a time when children are measured and weighed in schools and healthy living initiatives are common, this study aimed to engage young children in conversations about weight change. Specifically, children's understanding of how weight loss and weight gain are achieved, and the potential motivations for and consequences of weight change, were explored. In addition, the study examined whether understanding differed between boys and girls.

One hundred, four to six year-old school children (62 boys, 38 girls, mean age five years and two months) were individually interviewed. Each child was read a story in which the main character was either overweight or of average weight. Subsequently, this character was shown as either having lost or gained weight. Children were then asked a series of semi-structured questions. The interviews were transcribed and analysed using thematic analysis. Frequency counts of the children's responses which helped generate each theme, yielded quantitative data.

The results revealed that young children have an understanding of how food intake and exercise can influence weight change. Reasons given for why the fictional character may want to change weight included positive and negative motivations, such as, to increase or decrease negative reactions from others, to improve or worsen appearance, and to increase or decrease physical activities. The children offered positive and negative consequences to gaining/losing weight. The themes generated included; *severe consequences*, *appearance*, *physical activity*, *increase/decrease in negative reactions from others* and *increase in health.* The responses commonly focused on the avoidance of becoming/being overweight. Overall, few differences in understanding were observed between boys and girls.

The findings indicate that children as young as four years-old have a clear understanding of the pressures faced by individuals to have a certain body shape, and the negative consequences which occur if they don't. Therefore, health education surrounding these topics needs to occur at a very young age.

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CHAPTER 1: LITERATURE REVIEW

Introduction

All over the world countries are documenting high prevalence rates of obesity in both child and adult populations, rates which are continuing to rise (World Health Organisation, 2000; World Health Organisation, 2011). In 2006 the UK's Department of Health and Department of Education implemented The National Child Measurement Programme (NCMP) in order to assess and monitor children's obesity levels. In 2011/12 the NCMP reported that 23% and 34% of 4 year-olds and 10 year-olds, respectively were overweight or obese (The Health and Social Care Information Centre, DoH, 2012). In recent years, this major societal problem has stimulated a surge in research designed to help us better understand the causes and consequences of childhood obesity, thus also allowing for interventions to be designed. Within the UK initiatives such as 'Change 4 Life' have been implemented in an attempt to help individuals eat and live more healthily. Many of these initiatives have been aimed at schools in order to tackle rising numbers of overweight children and educate them for the future. However, although these strategies may be helpful for some children, this may not be the case for all. Concerns have been raised that weight screening and health promotion initiatives in schools may in fact be increasing children's body weight anxieties by further highlighting those who are overweight (Ikeda, Crawford & Woodward-Lopez, 2006; Blood & Grogan, 2011). In addition, this is said to be impacting on weight stereotypes and stigmatisation, and reinforcing Western society's conceptualisation of the 'ideal' body and therefore children's desire to be slim (Ikeda et al., 2006).

Increasing evidence suggests that some children, even as young as three years-old (Tremblay, Lovsin, Zecevic & Lariviere, 2011), are worrying about their body image and weight, have an awareness of weight stereotypes and are using unhealthy dieting strategies from young ages (Rees, Oliver, Woodman & Thomas, 2011). Ricciardelli and McCabe's (2001) review has suggested that these early thoughts and behaviours are putting some children and adolescents at risk of developing eating disorders such as Anorexia Nervosa. Despite these important issues, little is known about young children's understanding of body weight and individuals' ability to change it (both increases and decreases in weight), whether

they know how change occurs, the motivations for change, its potential consequences, and whether understanding differs between boys and girls. This is despite all children in Reception classes in England being weighed as part of the NCMP, their weight status reported back to parents, and several school interventions for obesity being developed and evaluated. Furthermore, exploring the knowledge of children at this young age (8-years and below) has been highlighted as important as this is the stage when their own ideas and attitudes about the world begin to emerge and develop (Lanigan, 2011). It has also been suggested that this is a critical time for adults to influence children's development of ideas and beliefs, as well as their behaviour (Lanigan, 2011).

This study aimed to engage young children, aged between four and six years, in discussions about weight change in order to explore their ideas and understanding. Of particular interest were children's knowledge of weight change strategies, for both increasing and decreasing weight, the motivations for and consequences of weight change, and whether understanding differs between boys and girls.

A comprehensive literature search was performed and updated throughout the research process focusing on literature from the last 50 years. Due to this being a narrative, not a systematic review, the extensive details and results of the literature reviews have not been provided within this report. However, using MEDLINE to search the databases Embase, PsycInfo and Ovid Medline, the following terms were used (alone and combined) during the searches: "children", "young children", "preschool", "preadolescents", "perceptions", "understanding", "awareness", "knowledge", "weight loss", "underweight", "weight gain", "overweight", "obesity", "strategies", "controlling weight", "dieting", "exercise", "healthy", "unhealthy", "eating", "weight change", "nutrition", "body size", "body shape", "increase weight", "decrease weight", "fat", "thin", "weight stigmatisation", "stereotypes", "body image", "dissatisfaction", "prevalence", "concerns".

Throughout this paper different terminology is used to describe body weight, with the terms overweight and obese used interchangeably to refer to excessive weight. However, the children's own words and more colloquial terms such as 'fat' are also used. When discussing previous research, the classifications of weight provided by the authors have been used. Typically, they have calculated body mass index (BMI) scores whereby an individual's height and weight is measured to determine, and comment on, different body weights.

This review will begin by giving a brief overview of the possible causes of obesity and ways in which individuals lose weight. It will then go on to describe weight-related stereotypes present in society today and the links with body image and weight dissatisfaction. Gender differences in relation to these topics will be explored. The potential impact of weight measurement programmes and other government weight-loss strategies on children's beliefs will also be examined. The review will then go on to describe what is currently known about different age children's understanding of weight change, before specifically detailing literature which has explored young children's knowledge. Conducting qualitative research with young children will be examined before the methodological limitations of previous research are highlighted. Finally, the rationale and aims for the present research are outlined.

Causes of Weight Change

Before examining what children believe causes weight change, it is important to understand what the actual known contributors are, and what the general population perceive the contributors to be. The World Health Organisation (WHO) has recently described childhood obesity as "one of the most serious public health challenges of the 21st century" (WHO, 2013), with over 40 million children under the age of five described as overweight in 2011 (WHO, 2013). Put simply, obesity occurs when over a prolonged period of time, an individual's energy intake, via the consumption of food and drink, is greater than the amount of energy their body releases, for example via physical exercise (The National Obesity Observatory, (NOO) 2013). However, it is also understood that the process of developing obesity is multifaceted, including both behavioural and societal factors (NOO, 2013). In 2007, The Foresight Report presented an obesity system map which illustrates that there are seven main factors involved, including an individual's biological background (e.g. genetics and ill-health), physical activity levels, societal influences, food environment (e.g. availability of fruit and vegetables), and food consumption. Despite these important, complex issues, research indicates that the widespread, popular assumption is that individuals have complete personal control over their weight (Puhl & Brownell, 2001), and therefore their ability to alter it if they wish, for example, by simply eating less and exercising more. It is suggested that these internal attributions have a negative contribution on stereotypes, whereby obesity is

associated with laziness and a lack of self-discipline and willpower (Puhl & Brownell, 2001).

Although the general population may perceive weight gain to be a result of an individual's own behaviours, adults who are overweight appear to have a greater awareness of the variety of potential causes. Smith and Holm (2011) interviewed 20 men and women, and reported that women predominantly believe that their weight gain occurred due to transitions in their biological lifecycle, for example puberty, pregnancy and the menopause. Furthermore, while they acknowledged the influence food had had, they felt that significant negative life events had led to their unhealthy eating habits. Medication side-effects were also considered a cause of weight gain. Men also felt that transitioning through the lifecycle had contributed to their weight gain, whereby events such as starting a family were seen as obstacles to physical activity. Therefore, while food and exercise were considered as contributors to weight gain, the consensus was that there are many complex factors which may lead to an individual's change in behaviour.

In relation to causes of weight loss, behavioural adjustments to food consumption and/or exercise levels, which are considered healthy weight change strategies, are commonly reported among adults and adolescents (e.g. Horm & Anderson, 1993; Serdula, Collins, Williamson, et al., 1993). However, Neumark-Sztainer, Story, Hannan, Perry and Irving (2002) also found that a high percentage of teenagers (57% of girls and 33% of boys (N = 2357 and 2377, respectively)) engage in unhealthy food related weight loss behaviours. These included skipping meals and fasting, taking diet pills, vomiting, and using laxatives.

Other unintentional causes of weight loss include illnesses such as cancer, overactive thyroid gland, and heart disease; however, it is unclear how much knowledge the general population has in regard to these causes.

Weight Stereotypes

Before examining research which has concentrated on children's knowledge of weight change, it is important to understand why this topic is of importance. It is well documented that becoming overweight can lead to extensive serious health risks, however the consequences extend further, with individuals frequently

experiencing a range of social and psychological difficulties (Puhl & Latner, 2007). For instance, overweight children often report being subjected to victimisation and bullying from others, with prevalence rates ranging from 36% in large scale prospective studies (Griffiths, Wolke, Page & Horwood, 2006), to 78% in questionnaire studies (Hayden-Wade et al., 2005). Qualitative research with 50 overweight adolescents found that 96% reported experiencing weight-related negative reactions from others, including teasing and social rejection (Neumark-Sztainer, Story, & Faibisch, 1998). The perpetrators of these behaviours are commonly reported to be peers; however teachers and parents are also reported to behave negatively towards their pupils and children, respectively, as a result of their beliefs (Puhl & Latner, 2007). The psychological impact of these behaviours has been widely examined, with low self-esteem, body dissatisfaction, and depression consistently reported (Puhl & Latner, 2007). Furthermore, overweight children who are teased have consistently been found to engage in higher degrees of unhealthy eating behaviours such as binge-eating, and weight-loss strategies compared to overweight individuals who are not teased (Puhl & Heuer, 2010; Neumark-Sztainer, et al., 2002). In addition, they are less likely to engage in physical activity (Puhl & Heuer, 2010), all of which are likely to be contributing to the increasing rates of obesity.

It is suggested the stereotypes and negative stigma held against individuals who are overweight have a large part to play in these behaviours (Janssen, Craig, Boyce & Pickett, 2004). Puhl and Latner (2007) and Crocker, Major and Steele (1998) highlight that "a stigmatized child possesses an attribute or characteristic that is linked to a devalued social identity" which results in stereotypes, prejudice, and discrimination (Link & Phelan, 2001), along with reduced expectations and opinions. Research consistently reports that throughout their lives obese individuals face a multitude of negative attitudes from others in almost all areas, including; employment, health-care, education settings, and interpersonal relationships (Puhl & Heuer, 2009).

Research indicates that these perceptions begin to develop at a very young age. For instance, Cramer and Steinwert (1998) reported that stereotypes towards overweight individuals are held by children as young as 3 years-old. By reading the participants a series of short stories, they found that children were more likely to

associate “mean” behaviour (e.g. kicking over a sand castle) with a child who was overweight than an average-weight child.

Musher-Eizenman, Holub, Miller, Goldstein, and Edwards-Leeper, (2004) expanded on this research by assessing a wider range of personality adjectives. Three body figure drawings, scaling an obese, average and thin child, were used to assess four to six year-old children’s ratings of each figure in terms of *nice/mean*, *smart/stupid* and *has friends/has no friends*. The results were congruent with the findings of Cramer and Steinwert (1998). In addition, Musher-Eizenman et al. (2004) used the same figures to ask the children to choose a preferred best friend and a playmate. They found that the overweight figure was picked 7% and 16% of the time, respectively. Whereas the children chose the thin figure 55% of the time and the average figure 38% of the time, as a preferred best friend, and 45% chose the average figure and 39% the thin figure, as a playmate. This weight stigmatisation has been found to extend further, with two to five year-old children assigning a range of negative characteristics, such as *lazy, unfriendly* and *ugly*, to overweight individuals (Turnbull, Heaslip & McLeod, 2000). In addition, studies which have used qualitative methods (e.g. Birbeck & Drummond, 2006) provide further evidence that these stereotypes exist at a young age. For example one child commented; “*they would not be able to come* (to the child’s party) *because I do not like fat people*”, “*they* (largest image of a child) *look nasty*”.

These negative stereotypes, and subsequent discriminatory behaviours, have led to, and/or emphasised the perception that obesity is undesirable and should be avoided, whereas the opposite is true for ‘thinness’ (Puhl & Heuer, 2010). Consequently, the social construct that “thin is good, fat is bad” (Cramer & Steinwert, 1998; Rees, Oliver, Woodman & Thomas, 2011), is a narrative which is strong in Western culture today. Unfortunately, children are growing up with an increased pressure to look good and be thin in order to feel accepted, causing them to compare their shape and weight with others, feel anxious about the way they look (Rees et al., 2011), and resulting in a high proportion feeling dissatisfied with their bodies (Ricciardelli & McCabe, 2001).

Weight Dissatisfaction

Although the current study is not directly exploring young children's perceptions of their weight, it is important to understand how children's feelings of dissatisfaction with their physical appearance can contribute to the topic of children's awareness of weight change. In a review of the literature, Tremblay and Limbos (2009) reported that there is increasing evidence to suggest that some Primary- School aged children are dissatisfied with their weight. For instance, Davison, Markey and Birch (2000), revealed prevalence rates of approximately 21% of five year-olds of girls and up to 37% of nine year-old girls feeling unhappy about their weight. As children become older this figure increases further (Ricciardelli & McCabe, 2001). Clark and Tiggemann (2006) found that 49% of 9 – 12 year old girls desired to weigh less. More recently, Tremblay, Lovsin, Zecevic and Lariviere (2011) found that this dissatisfaction may extend to even younger ages. Children aged between three and five years-old (N = 144) were shown three pictures depicting an overweight, an average and an underweight child, and asked them to pick which figure drawing looked the same as them and which one they would like to look like. By taking the difference between the two choices, they found that 64% of average weight children wanted to be thinner than they were. Furthermore, with regard to children (of a variety of ages) who are overweight, literature reviews consistently find that body dissatisfaction is higher than among average-weight peers (Ricciardelli & McCabe, 2001; Wardle & Cooke, 2005; Puhl & Latner, 2007).

Some caution must be noted regarding methods typical of these studies; silhouette pictures and forced-choice decisions (e.g. '*which picture would you like to look like?*' Tremblay et al., 2011) are often the methodology of choice. Although these methods have been shown to be reliable with older children (Ricciardelli & McCabe, 2001), below the age of five, children's ability to evaluate their own body, be aware of an ideal, and make a comparison between the two is questionable (Smolak, 2004). Musher-Eizenman, Holub et al. (2003) found no correlation between preschool children's BMI and their own perceived body size rating, something that would be expected in older children. Furthermore, these methods do not allow participants to respond fully, compared with when open-ended questions are used, thus preventing children from providing justifications for their choices.

Despite this, the potential consequences are important to understand and many researchers have studied this, suggesting that weight dissatisfaction can lead to low mood (Hutchinson, Rapee & Taylor, 2010), and disordered eating behaviours (Stice & Shaw, 2002; Hutchinson, Rapee & Taylor, 2010). McCabe and Ricciardelli (2005) attempted to assess whether higher BMI scores were related to negative body images and dieting by assessing 394 males and females between the ages of eight and 12 years, over a 16 month period. They report that higher BMI scores predicted increased body image concerns, with girls focusing on their weight and boys on their muscle size. Furthermore, over the 16 months, strategies to lose weight were predicted by higher BMI levels in both boys and girls, suggesting that both genders are aware of body ideals and begin to adopt body changing strategies at a young age.

Davison, Markey and Birch (2003) conducted the first longitudinal study of girls' (ages five to nine) body dissatisfaction, weight concerns and dieting behaviours. Over a four year period, 182 participants were assessed using a range of quantitative questionnaires and BMI measurements. The authors found that weight concerns, dietary restraint and maladaptive eating attitudes at ages five to seven, predicted dieting behaviour at age nine, thus suggesting a link between weight concerns at a young age and eating attitudes and behaviours later on. However, the implications of these results are dependent on the current actual weight of the child. For instance, if the child is overweight it may be important for them to be engaging in healthy weight loss strategies at a young age, as long as they are appropriately supported. However, if the child is a healthy weight but feels concerned about their body shape and size, and is attempting to lose weight, this is worrying and needs to be understood and managed. In relation to this, Davison et al. (2003) report that high ratings of weight concerns and body dissatisfaction between the ages of five and seven years, were associated with increased dieting at age nine, independent of the children's BMI scores. This suggests that many children may be engaging in unnecessary and unhealthy weight loss strategies. Taken together these results suggest that children are growing up feeling unhappy with their bodies, and often have a desire to alter their shape and/or weight.

Gender Differences

Research surrounding these issues is extensive for female adolescents and adults (McCabe & Ricciardelli, 2004), with a surge in studies now examining younger girls. In comparison, until fairly recently, boys' perceptions of their bodies had received little attention. However, it is now recognised that males also experience body dissatisfaction which has been associated with a range of psychological difficulties and unhealthy behaviours (McCabe & Ricciardelli, 2004). Indeed, gender comparisons are often reported, with many conclusions seeming inconsistent. For instance, two systematic reviews of the literature, completed by Ricciardelli and McCabe (2001) and Rees et al. (2011) have suggested that although prevalence rates of weight dissatisfaction among preadolescent boys appears to be high (17% to 35%), girls report greater concerns consistently across the age span. In comparison, a review specifically examining gender differences (McCabe & Ricciardelli, 2004), suggests that there are few differences between levels of body dissatisfaction in males and females among preadolescent and adolescent children.

As well as these potential prevalence differences, existing research appears to suggest that preadolescent girls and boys are affected by weight dissatisfaction in different ways. Rees et al.'s (2011) review suggested that although boys may not worry as much about losing weight as girls, older boys in particular still feel a pressure to have certain body types. For instance, McCabe and Ricciardelli's (2005) longitudinal study of eight to thirteen-year-olds (N = 443), used eight Likert scale questions to assess body dissatisfaction and how often the participants attempted to change their weight and/or muscle size by altering their diet or by increasing their exercising. They found no age differences, but reported that boys focused on increasing their muscle size and losing weight, whereas girls focussed solely on the latter. The finding that there was no gender difference in preadolescents wanting to lose weight is supported by Lawie, Sullivan, Davies and Hill (2007), who assessed eight to 13-year-olds, and Truby and Paxton (2008) who assessed seven to 11-year-olds. This emerging trend may suggest that males are now feeling pressure to increase their muscles while also remaining slim (McCabe & Ricciardelli, 2005); perhaps unsurprising considering the strong negative stereotypes associated with being overweight.

For young children, results suggest similar gender differences in weight concerns among three to five, and six year-olds, to those seen in adolescents, i.e. higher levels of dissatisfaction among girls than in boys (Tremblay et al., 2011; and Lowes & Tiggemann, 2003). However, combining quantitative methods with qualitative questioning, Birbeck and Drummond (2006) reported that levels of dissatisfaction, among five and six year-old girls (N = 22) and boys (N = 25) were ambiguous. Many girls chose their 'ideal' picture as smaller than their perceived actual size. However, the interviews revealed that when asked how they would feel if they were a different size in the future to the picture they had chosen, including images that were larger than their 'ideal', the girls often reported that this would be okay, as long as it was within a range of two images, either side of their own perceived image. The interviews revealed further contradictions between the children's choices and their explanations. For example, one girl chose her ideal body figure as being the smallest, stating "*Because it is skinny*". When asked did she think she was skinny, she responded "*No I think I look like this one* (Image 5)". However, when the interviewer asked whether she felt this was fat, skinny or just right, she responded "*Just right*". For boys, selections of their preferred body size varied considerably, making it difficult to draw any firm conclusions. The authors reported that they tended to choose an 'ideal' image that was larger than their perceived own, providing justifications such as, *"I want to be this one because it is bigger….I would be able to kick higher"*. Therefore, this study indicates that eliciting children's explanations of their choices may reveal that more is occurring than simply desiring a thinner body, particularly for girls.

McCabe and Ricciardelli (2004) highlight that these differences in results found while examining gender differences, may be due to several unknowns/shortcomings of the available research: few studies have assessed preadolescent or younger boys (supported by Rees et al. 2011); a range of terminology is used interchangeably to explore weight dissatisfaction (including, smaller/larger/bigger body, lose/gain weight and thinner/fatter); and, different methodologies, predominantly quantitative, are employed. This evaluation is applicable to all research within this area, for males and females across the ages, and suggests that overall results must be treated with caution, at least until further research is conducted and some consistency is achieved. Nonetheless, although

research comparing younger boys and girls perceptions of their weight is in its infancy, with preliminary results suggesting early gender differences it is important to discover whether these extend to other areas within the topic of weight.

Weight Measurement Programmes

In 2006, the NCMP was implemented in England in the hope that monitoring the rates of childhood obesity would help guide and inform government and local weight-loss and health initiatives. Furthermore, by providing parents with their children's BMI scores, awareness of obesity was thought likely to improve, along with behaviour changes at home. However, with over 90% of children in Reception and Year 6 being measured and weighed (The Health and Social Care Information Centre, DoH, 2012), it is also important to consider the impact this process has on children's weight concerns. Unfortunately, relatively few studies have been conducted to comprehensively assess the effects of measuring children's BMI at school (Westwood et al., 2007; Soto & White, 2010). However, commentaries by a number of researchers (Lake, 2009; Ikeda, Crawford & Woodward-Lopez, 2006; Soto & White, 2010; Blood & Grogan, 2011) have suggested that taking such measurements from overweight/obese children, and then formally "labelling" them as such, could potentially increase stigmatisation and weight-related teasing. It has also been suggested that both measurement initiatives and health promotion programmes increase children's body weight anxieties and have a negative effect on body image and dissatisfaction (Ricciardelli & McCabe, 2001), by further highlighting those who are overweight (Ikeda et al., 2006). In addition, it is suggested that they are increasing the risk of children engaging in disordered eating behaviours (Ikeda et al., 2006; Eating Disorder Coalition, 2010). Gimmett, Croker, Carnell and Wardle (2008) reported that some overweight children found being weighed "distressing" and would not want the process to be repeated. Furthermore, some authors state that presenting parents with their children's BMI scores does not improve their awareness of their children's weight status, and does not have a significant impact on their weight-related health behaviours (Evans & Sonneville, 2009). This suggestion is emphasised by the NCMP reporting a steady rise in obesity prevalence rates in 10 year-olds in the six years since their recordings began (The Health and Social Care Information Centre, DoH, 2012). Overall, it is unclear at present whether the benefits of these programmes of helping identify children who

are overweight, and who therefore may benefit from alterations to their lifestyle, outweigh the potential harmful effects described above.

Preadolescent Understanding of Weight Change

At present, research suggests that there are various factors which may contribute to children's awareness, understanding and personal usage of weight change strategies. For instance, mothers' dieting behaviours (Abramovitz & Birch, 2000), body dissatisfaction as described above, the media (McCabe & Ricciardelli, 2005), and actual (Murtagh, Dixey & Rudolf, 2006) and perceived (Hill, Draper & Stack, 1994) high BMI, have all been highlighted as factors which may increase a child's awareness of weight change strategies. At present, it is unclear whether these influences extend to younger children as the majority of research has been completed with preadolescents and older (Rees et al. 2011).

Currently, research exploring children's understanding of weight change is limited and has predominantly focused on older children's awareness of weight loss strategies. The emerging results suggest that older children are aware of the concept of dieting, and related behaviours. For instance, Kostanski and Gullone (1999) assessed children aged between seven and 10 years (N = 431) on their understanding of dieting using a sentence completion task. Their results showed that 72% of children completed the sentence "dieting means…." with an appropriate response. The responses demonstrated an understanding that dieting can involve a reduction of the amount of unhealthy food eaten such as sweets, eating "better" food such as vegetables, and increasing exercise. These results are supported by research, using a variety of predominantly quantitative approaches (Hill & Pallin, 1997; Edlund, Halvarsson & Sjoden, 1996), that suggests that conceptualisation of dieting behaviours is well established by preadolescence. However, although research indicates that children are aware of what behaviours are involved in dieting, only 15% of Kostanski and Gullone's (1999) participants knew that dieting behaviours were employed in order to lose weight. This suggests discrepancies between knowledge of the behaviours and its consequences.

Increasingly, researchers have incorporated qualitative methodology into their designs in order to elicit children's knowledge and beliefs about dieting from their own perspective, rather than having them make forced judgements. One of the

first studies to use open-ended interviews within this area was by Schur, Sanders and Steiner (2000). These authors assessed 62 children, ages ranging from eight to thirteen years, and equal numbers of males and females. In response to the question *"When people say that they are dieting what are they doing?"* 82% of children described changing food choices such as eating healthier foods such as fruit and vegetables, and refraining from eating foods that *"make you fat"* like chocolate. Furthermore, 60% of children included a range of exercise behaviours as part of a diet, and 45% mentioned individuals eating less food when dieting. Interestingly, this study also assessed whether there was an effect of gender on children's responses and found no statistically significant differences between any of the themes identified. These high percentages (also supported by Kostanski & Gullone, 1999) confirm that preadolescent children have a broad understanding of weight loss strategies which is not confined to calorie restrictions.

Dixey, Sahota, Atwal and Turner (2001a, 2001b) expanded on these results using focus groups with a population of 9 – 11 year-olds (N = 300, five members in each group) to assess knowledge of healthy food, and their ideas about why it is important to maintain a healthy lifestyle, in relation to weight. By asking a series of questions to stimulate conversation, they found the children "spontaneously linked concepts of thinness and fatness with concepts of healthy eating", indicating that children had an understanding of some of the causes of different body weights (e.g. *"too much salad would mean you would get too thin."*). Children were also aware of other contributing factors of being overweight such as genetics *"sometimes it's the way they were born"* and that having a larger body size may mean having increased muscles while remaining healthy *"well-built"*, *"…healthy like rugby players who have a lot of exercise"*. However, the link between exercise and decreasing or increasing weight did not appear to be recognised. An understanding of some of the potential consequences of losing and gaining weight was also found. For example, children were aware that being overweight was linked with illness, often reporting heart disease as a result as well as increased likelihood of early death. By contrast, other participants commented that losing weight would allow an overweight child to make more friends and prevent bullying; a result which is commonly found within the literature (e.g. Nabors et al., 2011, Wills et al., 2006). Dixey et al. also found that children, particularly girls, believed that improving appearance and fitting into

clothes was a possible motivation for losing weight. However, children also had some awareness of the consequences of losing too much weight, and the possibility of developing an eating disorder such as anorexia nervosa: "*don't eat anything and refuse to eat because you think you're fat but you're not*"; "(some people) *might think 'I want to be really thin like a model'. I think they might be quite ill.*"

Dixey et al. (2001a, 2001b) therefore highlight that preadolescents' understanding of weight loss extends further than simply knowledge of diets, to include potential beneficial and harmful consequences. The results also indicate that preadolescents are knowledgeable on the causes and consequences of weight gain, a result which is supported by others (e.g. Fielden, Sillence & Little, 2011) revealing overall that children may not believe simply that "thin is good, fat is bad" (Rees et al., 2011; Dixey et al., 2001b).

Young Children's Understandings of Weight Change

To date, research investigating whether these findings extend to younger children is scarce (Rees et al., 2011) and such studies have tended to focus on dieting awareness. However, exploring the knowledge of this young age (below 8-years) has been highlighted as important as this is when children begin to develop their own beliefs (Lanigan, 2011). It has also been suggested that this is a critical time for adults to influence children's development of ideas and beliefs as well as their behaviour (Lanigan, 2011). Furthermore, with research highlighting that weight stereotypes (Turnbull et al., 2000), high levels of weight dissatisfaction (Rees et al., 2011), and disordered eating behaviours (Hutchinson, Rapee & Taylor, 2010) occur in childhood, it is critical that there is an understanding of when awareness of weight change emerges. By increasing our knowledge of children's understanding, recommendations on how to improve health and weight-loss initiatives can also be made.

One of the first studies to specifically explore young children's understanding of weight change was conducted by Abramovitz and Birch (2000) who utilised a qualitative design to ask four to six year-old girls (N = 197), four open-ended questions. The first question was worded "*What is a diet?"* and in response to this, 45% of responses were appropriate and taken to indicate that the participants had some understanding of dieting as a concept (e.g. "*eating healthy*

food", "*eating less fat*", "*people eat less stuff*."). This response rate increased to 55% when children were asked *"What do people do when they are on a diet?"* revealing knowledge of weight loss strategies, including modified and restrictive eating behaviours, and exercise. With regard to children's understanding of why individuals diet, 35% of responses were appropriate (e.g. "*because they want to lose weight*", "*because she ate too much before*", "*so they're healthy*"). Unfortunately, these figures are misleading as the authors gave the children "credit for every answer given" (Abramovitz & Birch, 2000). Therefore, it is unclear how many participants gave responses; it could be that a small number of children who were able to give a large range of appropriate answers led to these percentages.

Interestingly, while Abramovitz and Birch's (2000) study focused on weight loss they also asked their participants a question related to weight gain; "*What can make people weigh too much?"* Although the authors placed less importance on it, the responses offer a preliminary insight into children's knowledge around becoming overweight. The children's responses revealed that they were aware that eating unhealthy and excessive amounts of food could lead to an increase in body weight as 71% of responses were appropriate. However, participants were less aware that limited exercise could also have an impact on an individual's weight. This form of questioning, without the use of a context, appears to be effective, even with this young age group. Furthermore, the results indicate that slight adjustments to the wording of the questions may have an impact on whether children can respond. For instance, instead of the authors asking the children "*What can make people weigh less?"* they phrased it "*What can make people thin?*" and this produced a low response rate, with 65% of individuals unable to provide an answer. It may be that the children found this form of question confusing, although it might also indicate that the young participants had little understanding of the link between dieting and attaining a thinner body shape.

Although Abramovitz and Birch (2000) showed that by simply asking young children questions related to dieting, interesting responses can be obtained, attempts have been made to develop more novel interview techniques in order to elicit as much information as possible from this young population. Accordingly, Lowes and Tiggemann (2003) interviewed 135, five to eight year-olds using both explicit questioning about dieting, and implicit questioning within a context to assess

conceptual understanding. To begin with, the children were asked *"What is a diet?"* and *"Why do people go on a diet?"* Following this, children were presented with two silhouette figure drawings of a child of the same sex as themselves, firstly as average weight and then as overweight. The participants were told that the child in the picture had *"...become a little bit bigger"* and were asked why they thought this had happened, what the child in the picture should do, and what they would do if the same happened to them. The authors found that 25% of the children were able to define the word 'diet' and explain some functions of a diet, whereas 52% were able to recommend that the fictional character use dieting-type behaviours related to food in order to lose weight. These numbers appear more reliable than those found by Abramovitz and Birch (2000) as a percentage of participants rather than a percentage of responses is reported. This consistent difference in the ability to define and show understanding of the concept of dieting was again seen for all ages; however awareness of both the definition and concept did increase with age. No gender differences in understanding were found.

Although these two studies focused on children's understanding of dieting, consideration of this research is important for the current study. It reveals that young children are able to verbalise their understanding of weight loss strategies, even when simply asked to define a word. However, by having a context within which to base the questions, further knowledge and beliefs can be elicited. Unfortunately, Lowes and Tiggemann's (2003) findings did not reveal the participants' full understanding of the range of weight loss strategies. The questions asked were limited and the scoring of responses was restricted specifically to eating behaviours (and not exercise) in the first task. Also, in the second task participants scored less if they attributed the character's weight gain to a lack of exercise rather than increased food intake. Furthermore, a break-down of the participants' responses to this question was not provided. It is therefore unclear whether the children were aware of exercising behaviours as a means of losing weight. Overall, however, these two studies suggest that children as young as four years-old may have an awareness of dieting as a concept, as well as some beliefs about individuals' motivations for engaging in the behaviour.

In comparison to research examining children's understanding of weight loss, Rees et al.'s (2011) review highlights that the majority of research related to young

children's ideas about weight *gain* has centred on their attitudes towards others who are overweight. Research which specifically explores young children's understanding of the process involved in becoming overweight, and its consequences, is limited. The first study to specifically focus on exploring young children's knowledge of the causes and consequences of being overweight/obese, using a qualitative design has been recently published. Fielden, Sillence and Little (2011) selected six children aged between four and five years, and six children aged 10-11 years, to participate in separate focus groups (separated by age and gender). The authors commented that these age groups were chosen for two main reasons: it is at these ages that children's BMI statistics are recorded at school, and interpretations could be made as to how much understanding children have when they start school, and whether these change later on once they have been influenced by school and their peers. With the aid of replica toy food items (younger children only), the children were first asked to speak about food which they thought would make a healthy lunch and invited to explain why they thought it was healthy. The children were then asked which foods they liked and why, and which foods they normally ate at home and at school. Secondly, the children were shown pictures of physical activities (e.g. running, swimming, playing computer games etc.) and asked to discuss which activities they thought were healthy, which they liked participating in, why the activities were good for them, and which activities they took part in as a family. Incorporated into the focus groups were also questions relating to the benefits of a healthy lifestyle, consequences of not following one and what advice they would give to someone who wanted to be healthier.

Using thematic analysis, the results revealed that both age groups were able to discuss what foods are considered healthy. However, the younger children were somewhat confused about *why* foods belonged in the healthy/unhealthy categories, offering responses such as *"because it's (rice) nice"*. Nevertheless, other responses revealed that children had picked up on some health messages from adults, particularly around growth and strength relating to the consumption of fruits and vegetables; *"...you have to have fruit so you can grow."* Children aged 10+ demonstrated a greater understanding of the concept of a balanced lifestyle with regard to food consumption and physical activity. They were also able to explain both physical and psychosocial consequences of over-eating and limited exercise:

"you would have a miserable life", *"get fat"*, *"might die."* In keeping with their developmental level, the younger children revealed more rigid thinking regarding the consequences of becoming overweight, e.g., *"….have to go to hospital"*, *"have an operation."* The differences in responses between the younger and older children could however, reveal the impact of school education on levels of understanding, rather than simply the children's ages. Despite these differences, children in both age groups appeared to have more knowledge about the consequences of being overweight than the causes of overweight (Fielden et al., 2011). It is possible the younger children may have had further understanding (cf. Lowes & Tiggemann, 2004) which was not accessed, and that by using more concrete questioning, more complete understanding may have been elicited.

The authors also noted responses supportive of the research cited previously, describing the negative attitudes children develop towards obese individuals from a young age. The younger participants often found it difficult to talk about overweight individuals, and responded by giggling when asked various questions (Fielden et al., 2011). Although the use of focus groups enabled the authors to gather a range of responses fairly easily, it is possible that this methodology intensified social conformity, increasing laughter as a response, and preventing the researchers from accessing some of the children's beliefs about obesity, especially those of the younger children. The small sample size also makes generalisability problematic.

In relation to this topic, a study which investigated whether children understand the relationship between nutritional intake, such as food and water, and the conversion of these nutrients into outputs, such as body growth, energy, weight etc. was published by Wellman and Johnson in 1982. The procedure and results relating to body shape are particularly pertinent to the present research. The authors examined 15 six year-olds, 15 nine year-olds and 15 twelve year-olds' (eight girls and seven boys in each age group) understandings of the causes of five different dimensions. These included body shape (*"fat"* and *"skinny"*), healthy/sick, tall/short, strong/weak. In addition, the authors examined participants' knowledge of the consequences of certain diet/inputs, such as: eating twice as many vegetables, twice as much dessert, eating a diet consisting only of sweets, twice as much water, and twice as much of everything. Within this task, children were also asked what the consequence would be of only consuming water, vegetables, or sweets.

Using two pictures of male children depicting the different body shapes (e.g. fat and skinny), the participants were asked *"what do you think made them different?"* Examining the six year-old responses to the body shape difference, 69% provided a food related response, with ten participants specifically reporting that there was a relationship between the *quantity* of food eaten and being fat or skinny. This dropped to one out of fifteen believing that the *quality* of the food produced the difference, and four participants thinking it was due to specific *types* of foods eaten. These results further indicate that young children may have some understanding of the relationship between food and body shape. However, due to the use of the words "fat and skinny" rather than 'overweight' and 'underweight', it is unclear whether this is a true indication of understanding between food and weight as claimed by the authors.

For the second task, relating to consequences of nutritional input, the children were given two drawings of identical male twins and told that one was going to have a different diet than the other for a year. They were asked what they thought would happen to both boys, and whether there would be any changes. Responses to this task revealed that the younger children had not yet developed the understanding that different nutritional inputs did not cause the same consequences. For instance, eight six year-old children believed that drinking double the amount of water would make one twin fatter. The number of responses rose to fourteen for eating double 'everything', and to twelve for eating twice the amount of dessert. Ten participants thought that doubling the intake of vegetables would make the twin fatter. This suggests that the younger children valued all the nutritional inputs as similar, whereas the older participants had a better understanding of different nutritional roles in a diet. However, the six year-olds did have some understanding that becoming *"skinnier"* was not a likely consequence of doubling an individual's food intake as responses for all categories was low. Additionally, there were no age differences in knowledge that drinking only water would cause the twin to become skinnier, or eating only sweets would cause him to become fatter.

Importantly, Wellman and Johnson's (1982) research indicates that young children may have some knowledge of the food – weight (input/output) relationship; however their nutritional understanding is still developing at this age. Unfortunately, it is unclear whether any gender differences in responses were present. Furthermore,

the results should be considered with caution as a small sample size was used and children were not asked open-ended questions therefore limiting the information gathered. The study was conducted 30 years ago and it is unclear whether these same results would be replicated today. However, similar results have been found by Slaughter and Ting (2010), who report that by age five children have some understanding of the relationship between eating and the potential effects on the body. These young participants spoke about food influencing growth and degree of health, gaining weight from eating too much, and understood that death would occur if no food was eaten.

Taken together, these studies suggest that young children have some understanding of the causes of both weight loss and weight gain, with results predominantly focusing on the involvement of food. Unfortunately, the majority of these qualitative studies did not extend their questioning to elicit whether children knew why individuals may or may not want to change their weight, or what they thought the consequences were. Nevertheless, the authors have provided preliminary data relating to the topic of weight change and have revealed that children below the age of six can engage in qualitative research.

Qualitative Research with Young Children

Kirk (2007) reports that increasing emphasis is being placed on the benefits of involving children directly in research in order to gather rich information, which in turn allows us to gain insight into their worlds. For many years it was felt that children could not be engaged in qualitative research due to the constraints of their cognitive development. Children were thought to lack insight, have limited ideas and opinions, and lack the ability to express themselves verbally (Docherty & Sandeloski, 1999). Furthermore, when children gave their perspectives they were deemed unreliable (Kirk, 2007). However, children's thoughts and opinions are increasingly being viewed as unique and important and can be accessed and studied through the careful planning of qualitative research (Kirk, 2007).

Kirk's (2007) review of conducting qualitative research with children highlights helpful techniques and key issues to be aware of. For example, it is important to choose developmentally appropriate interview methods in order to enable the child to be an active participant, while eliciting as much information as

possible. Davis (1998) highlights the importance of conducting interviews within a familiar context (e.g. home or school) or alongside an everyday activity, as well as using familiar tools (such as stories and pictures) to aid the process, in order to help the children communicate, put them at ease and build rapport with the researcher.

Studies in this area have shown that young children (three to six year-olds) can effectively verbalise their thoughts and ideas (Lowes & Tiggemann, 2003; Abramovitz & Birch, 2000; Fielden et al., 2011). In order to assess the age at which children begin to develop ideas about weight change, it seemed appropriate and suitable for the current study to conduct qualitative research with children aged between four and six years-old. By incorporating some of the techniques described above, such as the reading of a picture book within children's familiar class-room environment, and placing the qualitative questions within a context, data illustrating children's understanding of weight changes could be obtained, thus furthering our understanding in a currently unexplored area.

Methodological Limitations and Gaps in the Literature

Research examining children's understanding of weight change has identified that children develop some understanding of the causes of both weight loss and weight gain, from a very young age (Wellman & Johnson, 1982; Abramovitz & Birch, 2000; Lowes & Tiggemann, 2003; Fielden et al., 2011). However, research examining children's understanding of weight loss which is not focused on dieting is scarce, as is the exploration of their understanding of weight gain and whether knowledge differs between girls and boys. Specifically, very few studies have explored how much children know about the motivations and consequences of weight change. Furthermore, all of these topic areas separately, let alone combined, are rarely studied with children below the age of eight years-old. Finally, there are often methodological shortcomings, inconsistencies in results among the different studies, and gaps in the literature, which means that we do not yet have a clear understanding of this topic area.

With regard to methodological limitations, previous studies which have been qualitative in nature have, for example, used different terminology when referring to weight change (e.g. *'fat/skinny'* (Wellman & Johnson, 1982); *'....make people thin'* (Abramovitz & Birch, 2000); *'...bit bigger'* (Lowes & Tiggemann, 2003)). It is

likely that children articulate weight change in different ways, either by reference to changes in body shape, size, weight or a combination of these, and this leads them to focus on one term in particular, producing responses which are restricted for some individuals. This, along with the lack of open, non-directive discussions with the children, particularly when exploring weight loss, also limits the generalisability of the results. This limited generalisability also applies to results generated from research examining children's knowledge of weight increase as sample sizes were often small (Fielden et al., 2011; Wellman & Johnson, 1982).

With regard to the exploration of gender differences in understanding of weight change, results are limited, with very few studies comparing boys' and girls' responses (Lowes & Tiggemann, 2003; Fielden et al., 2011). Of those mentioned, only one study reported gender differences in responses, however this was specifically with regard to understanding the causes of obesity, and among children aged 10-11 years-old, and not the younger participants (Fielden et al., 2011).

Aims

The present study aimed to address these gaps in the literature by using a qualitative approach, while paying heed to some of the methodological issues which have limited other research, to explore young children's understanding of weight change. Importantly, both weight gain and weight loss were assessed, investigating whether children have an understanding of motivations for weight change, how these changes are achieved, and the possible consequences. Gender differences in awareness were also investigated, specifically whether young boys and girls differ in their understanding of weight change.

Young children (aged four to six years-old) were presented with a fictional character whose appearance had changed, and were asked open-ended questions in order to explore how children perceived this change, and how much understanding they had of the change. The primary research questions were:

- What do children think causes weight loss and weight gain?
- What reasons do children give for *why* individuals want to lose/gain weight?
- What do children think the consequences are of weight loss and weight gain?
- Do responses differ between girls and boys?

CHAPTER 2: METHOD

Design

Each child responded to a series of open-ended questions about weight change in relation to the target fictional character of their own sex. Children were allocated to one of two groups; Weight Loss or Weight Gain (target fictional character's weight). Therefore, while all boys were presented with a male target character, and all girls a female target character, half of the boys and half of the girls were in the weight loss or weight gain group, respectively.

Participants

Participants were recruited from two schools within the West Yorkshire area, in the North of England. All parents/guardians of children in Reception and Year One classes (in both schools) were approached via letter, for their consent to their child's participation in the study. Consent was obtained for 104 out of a possible 220 children. On the various days of interviewing, five children were absent from school due to illness and one child had moved schools. Therefore 100 children were included in the data analysis (98 recruited through the schools, plus the responses from the 2 pilots). The participants' ages ranged from 4 years 0 months to 6 years 9 months (mean 5.2 years, SD = 0.82), and included 62 males and 38 females. Details of the pupils' ethnic backgrounds were obtained directly from the school's demographic records, detailing the school's overall population and each separate year group. The ethnic backgrounds of the all pupils in Reception and Year 1 classes (at both participating schools) were diverse and the schools' most prevalent categorisations included; White British, Other Pakistani, Indian, White Eastern European, Bangladeshi, Black-African and other mixed ethnicities. Although the participants' ethnic backgrounds were not obtained they were likely to be representative of the overall school population.

Ethical approval was granted by the Leeds Institute of Health Sciences and Leeds Institute of Genetics, Health and Therapeutics and Leeds Institute of Molecular Medicine (LIHS/LIGHT/LIMM) joint committee on the 21 February 2012 (Appendix 1).

Materials

Each participant was introduced to three fictional characters in a short, colour illustrated picture book (Appendix 2). Four stories were used, each of which was developed for use in research such as this. Each story was created in a design similar to materials used in English primary schools (e.g. Oxford Reading Tree). The picture books and characters were used successfully with this age range in two previous research projects at the University of Leeds (Harrison, 2009; Rowlinson, 2011). The content of each of the stories was identical, depicting a cat that got stuck up a tree and included a happy ending. However, the central character in the story (male- Alfie; or female- Alfina), was illustrated as being either of average weight or overweight. Two other characters, both of average weight, were also present. To help participants relate to the story characters and therefore aid the interview process the story involving a male central character was read to male participants and female participants were read the story involving a female central character. This decision to match the sex of the character with the participant's sex is one which is often chosen by research interviewing children (e.g. Wellman & Johnson, 1982; Hill & Pallin, 1998; Lowes & Tiggemann, 2003).

The reading activity allowed the researcher to build a rapport with the participant, while also introducing the fictional character who was used within the interviewing procedure. Overall, this process provided a context for the questioning.

Measures

Understanding of Weight Change

After reading the picture book, the participant was presented with two pictures of the central character on one A4 laminated sheet of paper (Appendix 3 for an example). These pictures represented a change in weight for the central character. All other features remained the same. As the pictures were shown, the participant was told "*This is Alfie/Alfina from the story when he/she is 5 years-old* (adjusted to match the age of the participant) (researcher points to the first, left hand side picture), *and this is still Alfie/Alfina but he/she is a little bit older"* (researcher points to second picture). Participants who were presented with the average weight character in the book were presented with the average character first, on the left hand side of the page, followed by the overweight character on the right hand side. Children presented with the overweight character in the picture book were shown a

picture of the overweight character first and as average weight second. The two pictures remained, in view of the child, throughout the interview process.

The child was then asked a series of questions, including *"Do you think Alfie/Alfina has changed?", "How might this have happened?"* (See Appendix 4 - for interview schedule). Depending on the child's responses some follow-up questions varied, and some children required further prompts in order to elicit as much relevant information as possible. The questions were designed to assess the child's understanding of weight change strategies, motivations for these, and of the possible positive and negative consequences resulting from weight change. All responses were recorded using a digital voice recorder.

To ensure the suitability of the procedure and questions, the interview schedule was piloted on the first two participants; one boy (aged four) and one girl (aged six). The pilot highlighted that due to their stage of language development four year-olds might have difficulty understanding the question; '*Has Alfie/Alfina'changed?'*. Therefore, if a child was unable to understand this, the question was altered to; *'Is anything different about Alfie/Alfina?'* No other changes were made to the interview schedule and the data gathered from these two participants was deemed suitable for inclusion in the final analysis.

Self-Perceived Body Size

To assess the participant's own perceived body size the body shape scale by Collins (1991) was used (Appendix 5). This scale is commonly used with young children (Musher-Eizenman, Holub et al., 2003; Holub, 2008;) and comprises seven figures representing preadolescents of different body sizes ranging from very thin to obese. Separate scales of male and female figures are available. In line with Holub's (2008) study each child was asked; *"Which child looks the most like you?"*

The Collins scale (1991) is moderately correlated with participant weight (= .36, $p < .05$) and Body Mass Index (= .37, $p < .05$), but has a satisfactory test-retest reliability (.71) for figure selections after three days for children aged between six and eight (Collins, 1991).

Procedure

With agreement from the head-teacher (Appendix 6 for school participation letter), the parents/guardians of all children in Reception and Year 1 classes within

the two consenting schools were sent an information letter informing them of the research (Appendix 7) and a consent form (Appendix 8), asking them to allow their child to participate.

Each interview took place either in a quiet location within the school library or within a small room away from the classrooms. On the interview days, the teacher was given a list of children whose parents had consented, and informed the class that some children would be asked to complete a small task with the researcher. The teacher then chose one child from the list to go first. As the teacher was unaware of which weight group (weight loss or weight gain) the child would be in and the participant was unknown to the researcher, random assignment to the weight condition was ensured. Children were alternately allocated to either the weight loss or weight gain group, regardless of their sex. Once the child was seated in the interview area, information about the task was provided and verbal assent was obtained from the child (Appendix 9). Participants were informed that the interview would be audio recorded.

The researcher selected the picture book required for the sex of the participant and the weight group they were assigned to, and read the picture book to the participant. Audio recording began with the reading of the story. The reading task took approximately two minutes to complete. Following this, the researcher presented the participant with two, single pictures of the central character required for the sex of the participant and the assigned weight group, and explained that Alfie/Alfina was now a year older. Each child was then asked the interview questions in the same order each time. Finally, the participant was asked to indicate their self-perceived body size. Audio recording was then stopped and the children were given a sticker to thank them for their participation. The participant was asked to return to their class and the teacher sent another child from the list.

The Interview

To help engage the children with the interview process, and to help them feel comfortable and at ease, efforts were made to reduce the power imbalance between the adult interviewer and the child as much as possible. For instance, the location of the interviews were chosen carefully to ensure that the conversation could not be heard by others, but somewhere which was familiar to the children and where they felt relaxed (i.e. a space within the library). During the interview the interviewer sat

next to the child, rather than opposite them, on settee type chairs where possible, in the hope that this would be less formal. In addition, before the task began and during the reading of the story, the interviewer engaged the children in light conversation about themselves. For example, by asking questions about their day, what activities they'd been doing at school, and whether they had any pets (when the cat was mentioned during the story) etc. As part of gaining verbal assent from the children they were all informed that there were no right or wrong answers, and that the researcher was interested in everything they had to say. Furthermore, throughout the interview the interviewer observed the child's nonverbal communication. If there were long pauses after a question, the child gazed away from the pictures or the interviewer, or fidgeted in their seat, the interviewer checked whether the child was okay to continue, understood the question and rephrased it if necessary. It was hoped that having made these considerations, as recommended by Curtin (2000) and Kirk (2007), the children would feel comfortable sharing their thoughts and ideas about weight change.

Data Analysis

The digital voice recordings of the participants' responses were all transcribed verbatim by the researcher; a process which began whilst the data were still being collected. This meant that the researcher became familiar with the data from the start. Each transcript was analysed using thematic analysis, using guidelines provided by Braun and Clarke (2006). Thematic analysis was the methodology of choice as it allows a flexible approach which is not restricted by any particular pre-existing theoretical model. This was considered important due to the uncertainty of the type of responses which were going to be generated. Due to the limited available research in this topic area, a thematic analysis allowed for a detailed inductive analysis to be conducted. By being data-led, this form of analysis was not constricted by predetermined coding frame (Braun & Clarke, 2006). Alternative approaches such as content analysis were considered, however because this methodology is predominantly used deductively and it is often criticised for removing the meaning of words from the context (Joffe & Yardley, 2004), it was disregarded.

The initial stage of analysis began during the interview process (transcribing of data, reading and re-reading, noting down initial thoughts). Once all interviews had been conducted the next phases of analysis took place. This involved systematically generating initial codes across the full data set, relating each code to

the individual interview questions and the aims of the research. Due to the young age of the participants, the codes often took the form of specific words (rather than researcher-led interpretation coding) that the children used. From coding, initial themes were generated for each research question. These themes were continually reviewed and refined until final master and super-ordinate themes were decided upon. At this stage word/code-frequency counts took place for each theme. This generated quantitative count data which were repeatedly reviewed alongside the generated themes. Thematic maps were created and example responses were extracted for each theme.

The count data generated from the children's responses were organised and tabulated using Excel for Windows, according to the primary and secondary questions asked during the interview. Descriptive and Chi-squared tests were used to test for equality of proportions in statements regarding weight loss and gain, and between girls' and boys' responses. The likelihood of difference was expressed as a risk ratio with 95% confidence intervals.

Credibility Checks

As recommended by Elliot, Fischer and Rennie (1999), steps were taken to ensure the quality and reliability of the thematic analysis. At each stage of analysis the results were shared, checked and explored with my supervisors, and agreements on codes and themes were reached. Furthermore, each theme was grounded using a number of different example quotes, both within the thematic maps and in the results section commentary.

CHAPTER 3: RESULTS

Children's Perception of Change

At the start of the interview all children were asked if they thought Alfie/Alfina ('A') had changed, and if they did, how did they think he/she looked. Over half (56%) of children identified the change as relating to 'fat' and 'thin' (e.g. *"He's got fat!"*), 26% in relation to size (e.g. *"Alfina's a bit bigger"*), and 7% to shape (e.g. *"He's got round"*). Only 6% of children failed to recognise or identify the change.

Table 1 shows how many questions/prompts the interviewer needed to ask before the children gave their response. Overall, children in the *weight gain group* required fewer prompts before providing their conceptualisation response than those in the *weight loss group*. For instance, children who required two questions had responded 'yes' to the first question, '*Has 'A' changed*?' and then responded to the question '*How has he/she changed*?' However, children in the *weight loss group* often required further prompts to obtain their response. Children who did not require any questions ('no questions') noticed and responded to the change before the interviewer asked anything.

Table 1: The number of questions asked before the children gave their change response

	Weight Gain		**Weight Loss**	
	Alfie N = 29	**Alfina N = 22**	**Alfie N = 32**	**Alfina N = 17**
	% (N)	**% (N)**	**% (N)**	**% (N)**
No questions	14 (4)	5 (1)	3 (1)	0 (0)
1 question	7 (2)	0 (0)	6 (2)	6 (1)
2 questions	45 (13)	86 (19)	19 (6)	18 (3)
3 questions	7 (2)	9 (2)	31 (10)	35 (6)
4 questions	0 (0)	0 (0)	9 (3)	0 (0)
5+ questions	21 (6)	0 (0)	28 (9)	24 (4)

Question 1: What do Children Think *Causes* Weight Change?

Table 2 shows that 96% (49/51) of children mentioned food in relation to weight gain and 55% (27/49) in relation to weight loss. This difference in proportions was significant (χ^2 (1) = 23.0, p <.01) and showed that children were 1.74 (95% CI: 1.34, 2.26) times more likely to mention food in relation to weight gain than to weight loss. Although girls were slightly more likely than boys to mention food regardless of the direction of weight change (85% vs. 70% respectively), this difference was not significant (χ^2 (1) = 2.6, p = .053).

Table 2 also shows that only 37% (19/51) of children mentioned exercise (mainly lack of it) in relation to weight gain whereas 65% (32/49) did so in relation to weight loss. This difference in proportions was significant (χ^2 (1) = 7.87, p <.01) and showed that children were 1.75 (1.16, 2.64) times more likely to mention exercise in relation to weight loss than to weight gain. However, there was no reliable sex difference in reference to exercise (girls 59% vs. boys 45%, χ^2 (1) = 1.63, p = .101).

Table 2: Children's responses to, 'What do you think caused 'A' to change?'

	Weight Gain		**Weight Loss**	
	Alfie N = 29	**Alfina N = 22**	**Alfie N = 32**	**Alfina N = 17**
	Yes % (N)	**Yes % (N)**	**Yes % (N)**	**Yes % (N)**
Mentioned Food	93 (27)	100 (22)	50 (16)	65 (11)
Mentioned Exercise	24 (7)	56 (12)	66 (21)	65 (11)

Further examination showed that 80% (39/49) of the children who mentioned food in relation to weight gain did so without being prompted during the interview, whereas only 11% (2/19) mentioned exercise without a prompt. This difference in proportions was highly significant (χ^2 (1) = 27.28, p <.001) and showed that children were 7.56 (2.02, 28.26) times more likely to mention food unprompted than exercise in relation to weight gain. Similarly, children who mentioned food in relation to weight loss were 2.70 (1.31, 5.60) times more likely to do so without a prompt than mention exercise without a prompt (59% vs. 22%, χ^2 (1) = 8.60, p <.01).

Regardless of the direction of weight change, there was no significant difference in the proportion of girls and boys who mentioned food without a prompt (girls 73% vs. boys 72%, χ^2 (1) = 0.004, p = .48). However, for those children who mentioned exercise, regardless of the direction of weight change, boys were more likely to do so without a prompt than girls (girls 4% vs. boys 29%, χ^2 (1) = 5.10, p <.01).

Table 3: Children's responses to, 'What kind of food might 'A' have eaten to make him/her change?'

	Weight Gain		Weight Loss	
	Alfie N = 27	**Alfina N = 22**	**Alfie N = 16**	**Alfina N = 11**
	Yes % (N)	**Yes % (N)**	**Yes % (N)**	**Yes % (N)**
Increased food intake	59 (16)	82 (18)	-	-
Decreased food intake	-	-	50 (8)	36 (4)
High calorie food	22 (6)	56 (12)	6 (1)	0 (0)
Low calorie food	22 (6)	36 (8)	31 (5)	45 (5)
Both high and low calorie food	41 (11)	9 (2)	19 (3)	18 (2)

Children who thought food was involved in 'A's' weight change were asked *'What kind of food might 'A' have eaten?'*. Table 3 shows that 69% (34/49) of children thought that 'A' had increased his/her food intake to increase weight, (example response: *"She's eaten lots of food"*) compared with 44% (12/27) of children who thought reducing food intake caused the decrease in weight. This difference in proportions was significant (χ^2(1) = 4.53, p <. 05), showing that children in the weight gain group were more likely to think 'A' had altered his/her food consumption than children in the weight loss group. However, there was no reliable sex difference regardless of the direction of weight change (girls 67% vs. boys 56%, χ^2(1) = 1.30, p = .13.).

Table 3 also shows that 37% (18/49) of children in the weight gain group spoke about 'A' eating high calorie food, compared with 4% (1/27) of children in the weight loss group. This difference in proportions was highly significant (χ^2(1) = 10.13, p <.001) and showed that children were 9.92 (1.40, 70.3) times more likely to mention high calorie food in relation to weight gain than weight loss (example response: *"Her eated lots of sweeties….and a big fat cookie!"*). Furthermore,

regardless of the direction of weight change there was a reliable sex difference in reference to high calorie food showing that girls were more likely than boys to mention high calorie food (girls 36% vs. boys 16%, $\chi^2(1) = 4.02$, $p < .02$).

In relation to children mentioning low calorie food, there was no significant difference between the weight groups (weight gain 29% vs. weight loss 37%, $\chi^2(1) = 0.58$, $p = .22$), nor any difference between girls and boys (girls 39% vs. boys 26%, $\chi^2(1) = 1.65$, $p = .10$) example response: *"He probably ate healthy food…vegetables, vegetables and fruit….cause they've got vitamins in."*)

It is also worth noting that some of the children thought that both high and low calorie food was involved in 'A's' weight change. For example, children said:

"He eats lots of food…(like) apples, orange, chocolate and ice-cream"

(Boy, Weight Gain Group)

"Eaten too much…fatty stuff…(like) broccoli, carrots, potato, erm chicken"

(Boy, Weight Gain Group)

Of the children who thought exercise was involved in 'A's' weight change, 32% (6/19) within the weight gain group mentioned a type of exercise 'A' may have participated in. This compares with 66% (15/23) of children in the weight loss group. This difference in proportions was significant ($\chi^2(1) = 5.55$, $p < .01$) and showed that children were 2.08 (1.02, 4.22) times more likely to mention a type of exercise in the weight loss group than in the weight gain group. Similarly, boys were 1.95 (1.05, 3.61) times more likely than girls to mention a type of exercise (68% vs. 35%, $\chi^2(1) = 5.55$, $p < .01$) regardless of the direction of weight change.

Example response:

"Exercise makes you more thin…(like) playing football"

(Boy, Weight Loss Group)

The children were then asked why they thought exercise had caused 'A' to change weight. Over three quarters of children (79%, 15/19) in the weight gain group and over half of children (59%, 19/32) in the weight loss group were able to

provide detailed answers to this question. This difference in proportions was not significant (χ^2 (1) = 2.05, p = .08). Similarly, there was no reliable sex difference in relation to how many girls and boys provided detailed answers (girls 65% vs. boys 68%, χ^2 (1) = 0.04, p = 0.42).

Many of the children in the weight gain group gave reasons which focused on the absence or reduction of exercise, however some believed that 'A' increased the amount of exercise he/she did in order to increase his/her size. By comparison, a high proportion of the responses given by the children in the weight loss group focused on how an increase in exercise would decrease 'A's' weight. Example responses:

"Exercise will make her thin so no…I think she's been lazing around and being lazy" (Girl, Weight Gain Group)

"Cos it (exercise) makes you fat if you do too much" (Girl, Weight Gain Group)

"He might of done star jumps and a little bit more sporty…cos they make you fit…fit and healthy" (Boy, Weight Loss Group)

Question: 2. What Reasons do Children Give for *Why* Individuals Want to Lose/Gain Weight?

Table 4: Children's responses to, 'Do you think 'A' wanted to change?'

	Weight Gain		**Weight Loss**	
	Alfie N = 29	**Alfina N = 22**	**Alfie N = 32**	**Alfina N = 17**
	Yes % (N)	**Yes % (N)**	**Yes % (N)**	**Yes % (N)**
How many children thought 'A' wanted to change?	31 (9)	41 (9)	84 (27)	76 (13)
How many children provided a detailed answer?	52 (15)	68 (15)	63 (20)	29 (5)

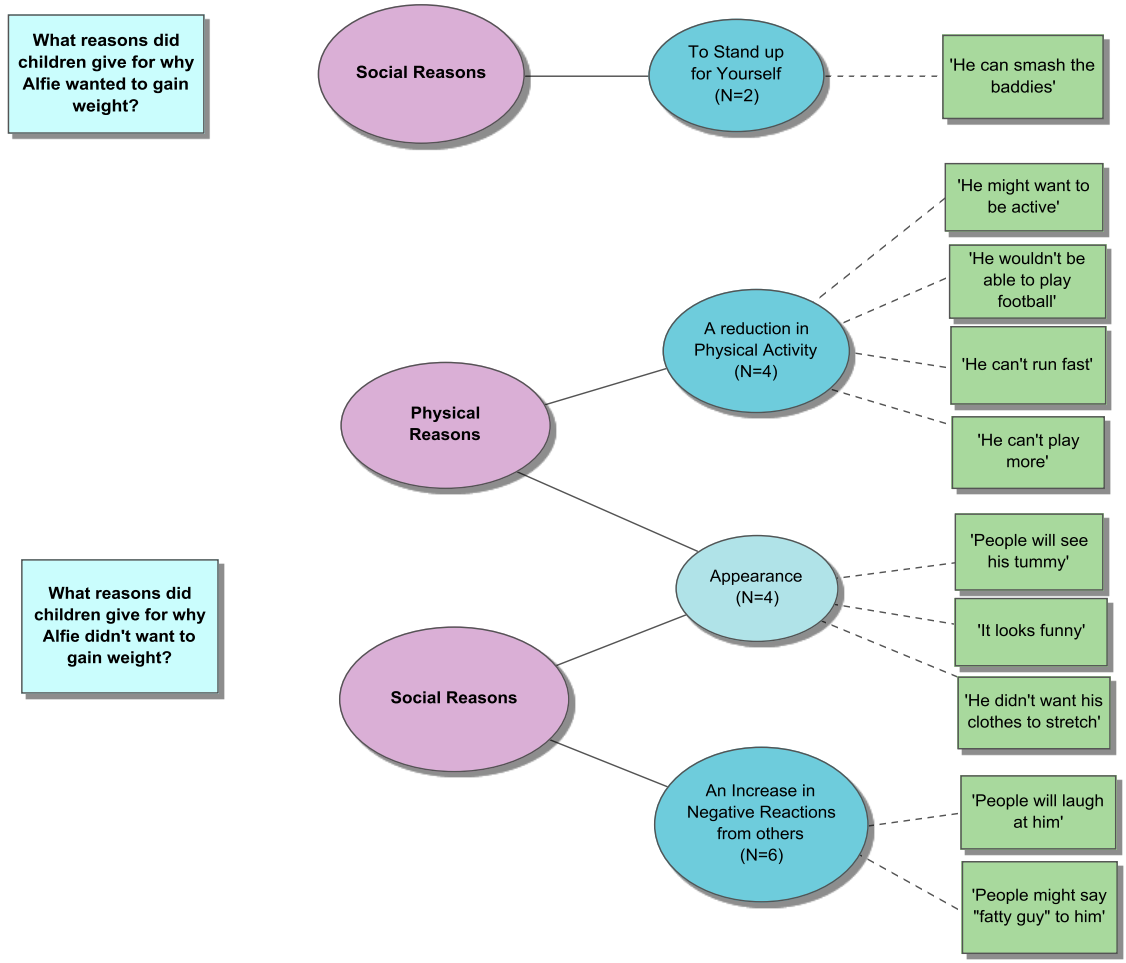
Table 4 shows that 82% (40/49) of children in the weight loss group thought that 'A' wanted to change weight (from fat to thin), compared with 35% (18/51) of children in the weight gain group. This difference in proportions was highly significant (χ^2 (1) = 22.03, p <.001) and showed that children in the weight loss group were 2.31 (1.56, 3.43) times more likely to think that 'A' wanted to change

weight than those in the weight gain group. However, there was no reliable sex difference in reference to children thinking 'A' wanted to change weight (girls 56% vs. boys 59%, χ^2 (1) = 0.07, p = .40).

Children were all then asked '*Why do you think 'A' did/did not want to change weight?*' Table 4 shows that 59% (30/51) and 51% (25/49) of children in the weight gain and weight loss groups respectively, provided detailed answers for their decision (χ^2 (1) = 0.62, p = .23). Similarly, there was no significant difference between the proportion of girls and boys who provided detailed responses (girls 51% vs. boys 57%, χ^2 (1) = 0.36, p = .28).

The following thematic maps summarise responses given by the children to the question '*Why do you think 'A' did/did not want to change weight?*'

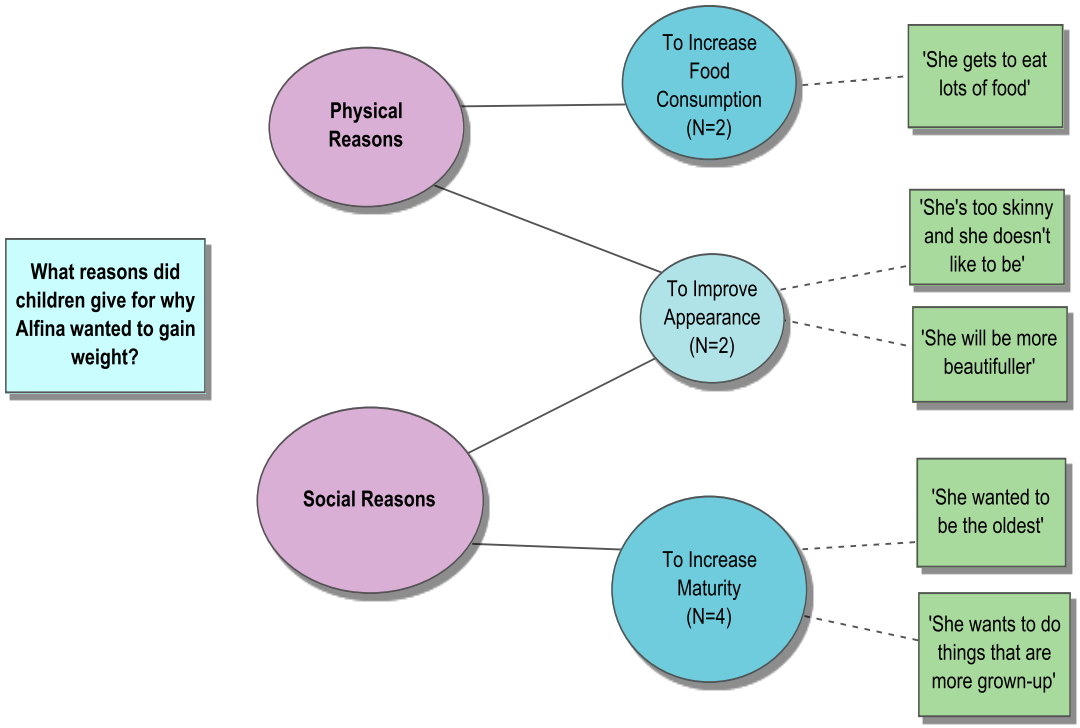
Figure 1: Thematic maps of the reasons boys' gave for why 'A' wanted, and did not want to gain weight; master and super-ordinate themes, and an example.



The frequencies noted (N) indicate the number of times a response/comment matched a theme; the majority of these were provided by different children, however on occasion, a single child would provide responses for more than one theme. The different sizes of the oval themes correspond to these frequencies; with larger sizes representing larger frequencies.

Figure 1 shows that under the master theme 'social reasons', only one super-ordinate theme *'to stand up for yourself'* emerged from responses by two boys as to why Alfie might have wanted to increase his weight. In comparison, both physical and social (reasons) master themes, and three super-ordinate themes, were provided as reasons for why Alfie did not want to gain weight. This indicates that boys had a good understanding of the range of potential psychosocial reasons why an individual might not want to increase their weight. Children felt that Alfie would experience an increase in negative reactions from others as a result of him gaining weight: *"He didn't want to be called 'fat'"*. Several children also felt that Alfie's physical activity levels and/or his physical ability would be negatively affected by an increase in weight: *"You can't do much like that" "if he kicks the ball it would only go so far".* The theme 'appearance' overlapped both physical and social reasons.

Figure 2: Thematic maps of the reasons girls' gave for why 'A' wanted, and did not want to gain weight



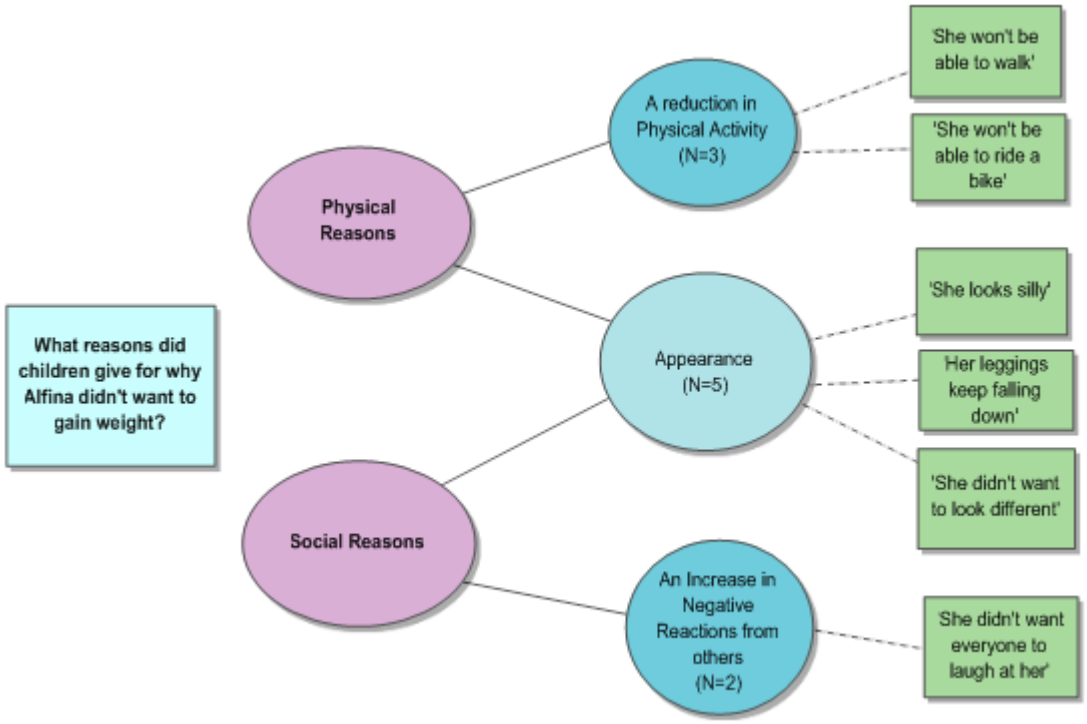


Figure 2 reveals that compared to boys, girls provided a greater number of reasons why an individual may want to gain weight. The main super-ordinate theme for the girls was '*to increase maturity'*, with some believing that Alfina would be older and therefore able to do different activities. Girls who held this view also conceptualised Alfina's weight gain as an increase in size. For example: *"She didn't want to be small, she wanted to big because she wanted to be older"*

Other girls felt that Alfina may have wanted to gain weight in order to improve her appearance, while two children thought that she wanted to change because it would mean she would get to increase her food consumption.

Figures 1 and 2 show that more girls provided detailed reasons for why an individual would want to gain weight compared to boys. However, girls also provided more reasons why Alfina would *not* have wanted to gain weight (Table 4). The themes that emerged from the girls were very similar to those from the boys although, the more dominant themes differed somewhat with more girls focusing on Alfina's appearance: *"She didn't want to look different…she wanted to look skinnier and the same (as others)", "she might look silly".*

Figure 3: Thematic maps of the reasons boys' gave for why 'A' wanted to lose weight

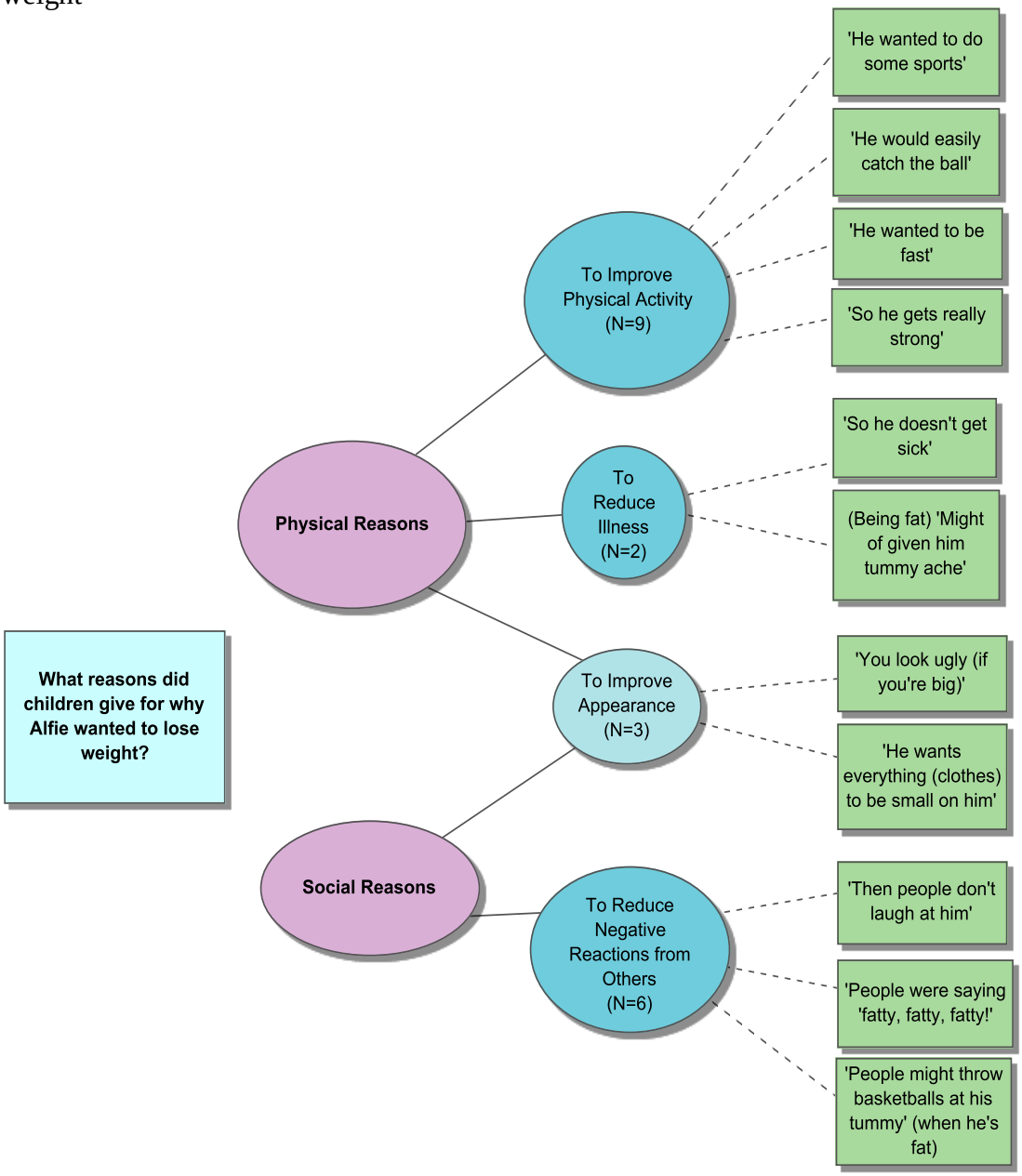
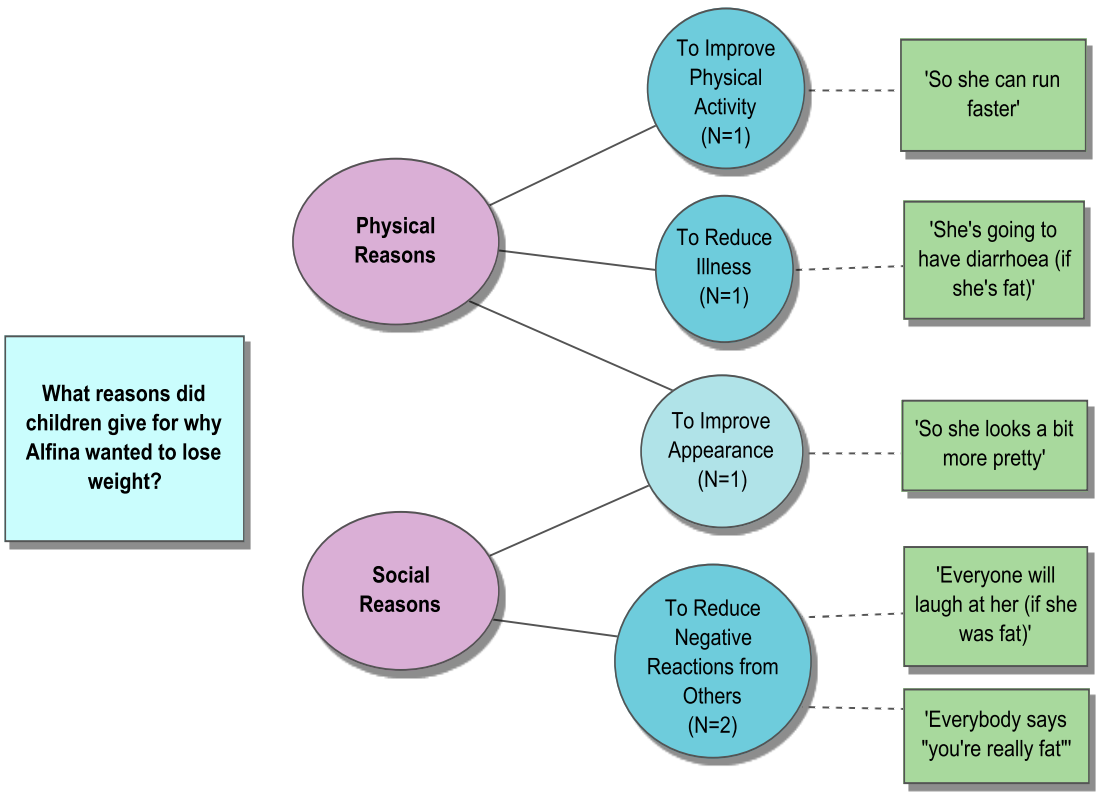


Figure 3 shows that boys provided both social and physical reasons for why Alfie wanted to lose weight. Many described the potential improvement in physical activity/ability they thought Alfie would experience from his weight loss. The boys thought these improvements would occur across a range of domains including skills, speed, strength and overall sporting ability: *"So he can do press-ups and more things", "He wanted to do some sports and be fast and catch balls."* Furthermore, as can be seen in Figure 3, many boys commented on that Alfie would want to lose

weight in order to prevent negative comments and behaviours from others *"cos he might be teased...(and say) 'look at Alfie, he's fat!'"*

These themes are opposite to those generated by the children in the weight gain group. However, two of the boys gave responses which related to a different theme of '*to reduce illness'*; they appeared to believe that a motivation for weight Alfie to lose weight included preventing tummy ache and sickness. Overall, these results indicate that the boys had a broad understanding of the variety of reasons an individual might want to lose weight. Figure 4 shows that this was also the case for girls; although the frequency of responses was lower compared to the boys, the themes generated were the same.

Figure 4: Thematic maps of the reasons girls' gave for why 'A' wanted to lose weight



Question 3: What do Children Think are the Consequences of Losing/Gaining Weight?

Table 5: Children's responses to, 'How do you think 'A' feels now he/she has changed?'

	Weight Gain		Weight Loss	
	Alfie N = 29	**Alfina N = 22**	**Alfie N = 32**	**Alfina N = 17**
	% (N)	**% (N)**	**% (N)**	**% (N)**
Positive Feelings	31 (9)	23 (5)	91 (29)	71 (12)
Neutral Feelings	7 (2)	5 (1)	3 (1)	6 (1)
Negative Feelings	45 (13)	64 (14)	3 (1)	12 (2)
Don't know/No response	17 (5)	9 (2)	3 (1)	12 (2)

In response to this question (Table 5), 27% (14/51) of children thought that 'A' would be experiencing positive feelings following his/her weight gain; *"happy"*, whereas over half of the children (53%, 27/51) felt he/she would be feeling negative emotions *"he's upset and sad"*. A small proportion of children provided a neutral feeling (6%, 3/51) *"he feels the same"*, and 14% (7/51) either were not sure how he/she would be feeling or did not provide a response.

The majority (84%, 41/49) of children in the weight loss group thought that 'A' would be experiencing positive feelings (Table 5). This difference between the number of children in the two groups who thought 'A' would be experiencing positive following his/her weight change was highly significant (χ^2 (1) = 31.92, p <.0001). This indicates that children were 3.05 (1.92, 4.83) times more likely to mention positive emotions in relation to the weight loss than to the weight gain.

Similarly, children were 8.65 (2.80, 26.67) times more likely to think 'A' was experiencing negative emotions due to weight gain than to weight loss (χ^2 (1) = 26.08, p <.0001). Furthermore, regardless of the direction of weight change there were reliable sex differences in reference to both positive (girls 44% vs. boys 62%, χ^2 (1) = 3.36, p <.05) and negative feelings (girls 41% vs. boys 23%, χ^2 (1) = 3.70, p <.05), indicating that boys were more likely than girls to mention positive emotions, and girls were more likely than boys to mention negative emotions.

Children were then asked, *'What are the good/bad things about changing weight?'* Table 6 shows that 78% (40/51) and 63% (31/49) of children in the weight gain and weight loss groups respectively, provided a detailed response. This difference in proportion was significant (χ^2 (1) = 2.79, p <.05) indicating that children in the weight gain group were more likely to provide a detailed answer than children in the weight loss group. However, there was no reliable difference in the number of boys and girls who provided detailed responses (boys 70% vs. girls 72%, χ^2 (1) = 0.02, p = .44). Children in the weight gain group reported a greater number of negative consequences than positive consequences, whereas the opposite was true for the weight loss group. Thematic maps of these responses are shown in Figures 5 through to 8.

Table 6: Children's responses to, 'What are the positive/negative things about changing?', and the frequency of responses under the two master themes

	Weight Gain		**Weight Loss**	
	Alfie N = 29	**Alfina N = 22**	**Alfie N = 32**	**Alfina N = 17**
	% (N)	**% (N)**	**% (N)**	**% (N)**
How many children provided a detailed answer?	69 (20)	83 (20)	72 (23)	53 (8)
Positive consequences – no. of responses	5	6	31	10
Negative consequences – no. of responses	26	31	4	1

Figure 5: Thematic maps of the positive and negative consequences boys' gave for 'A' gaining weight

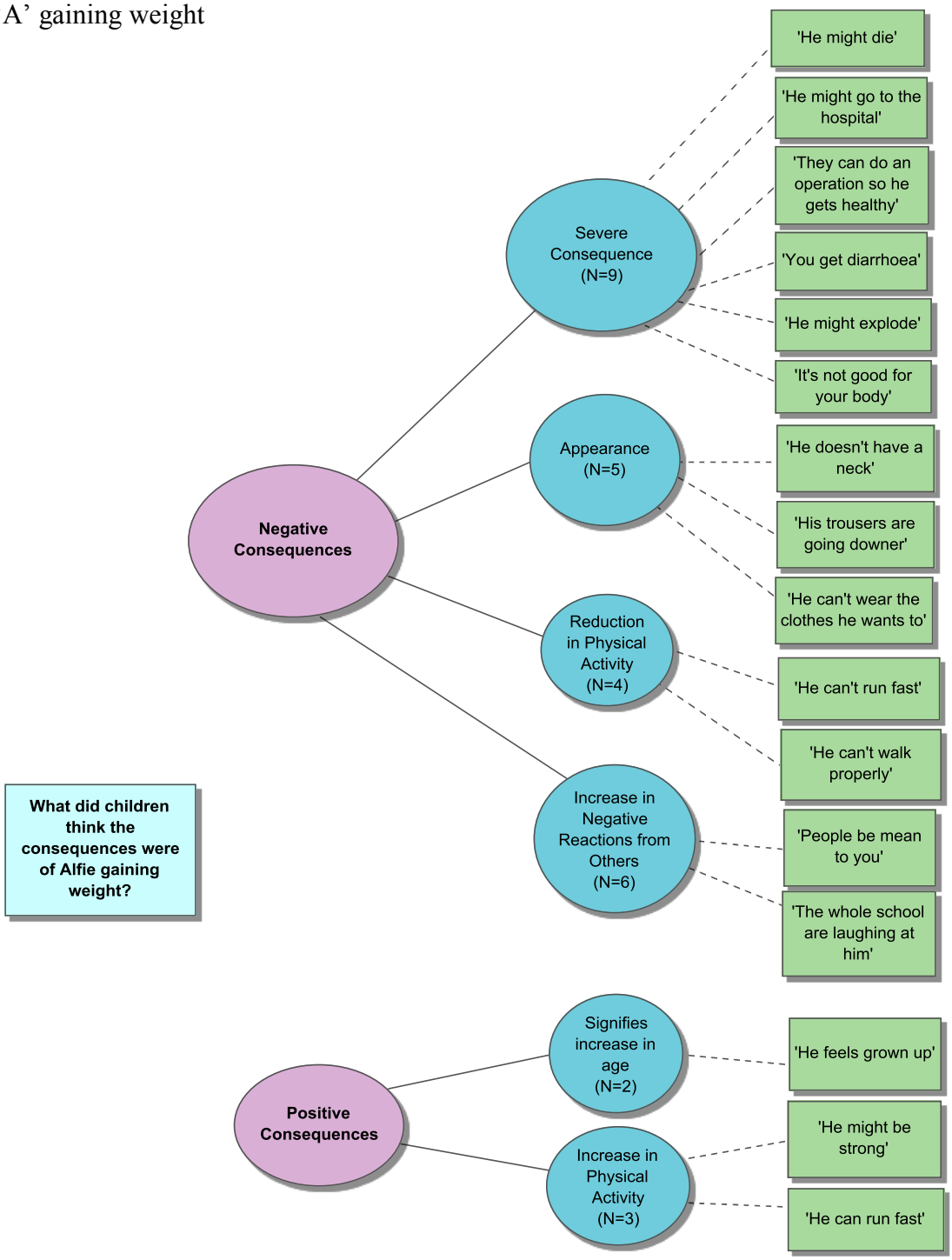
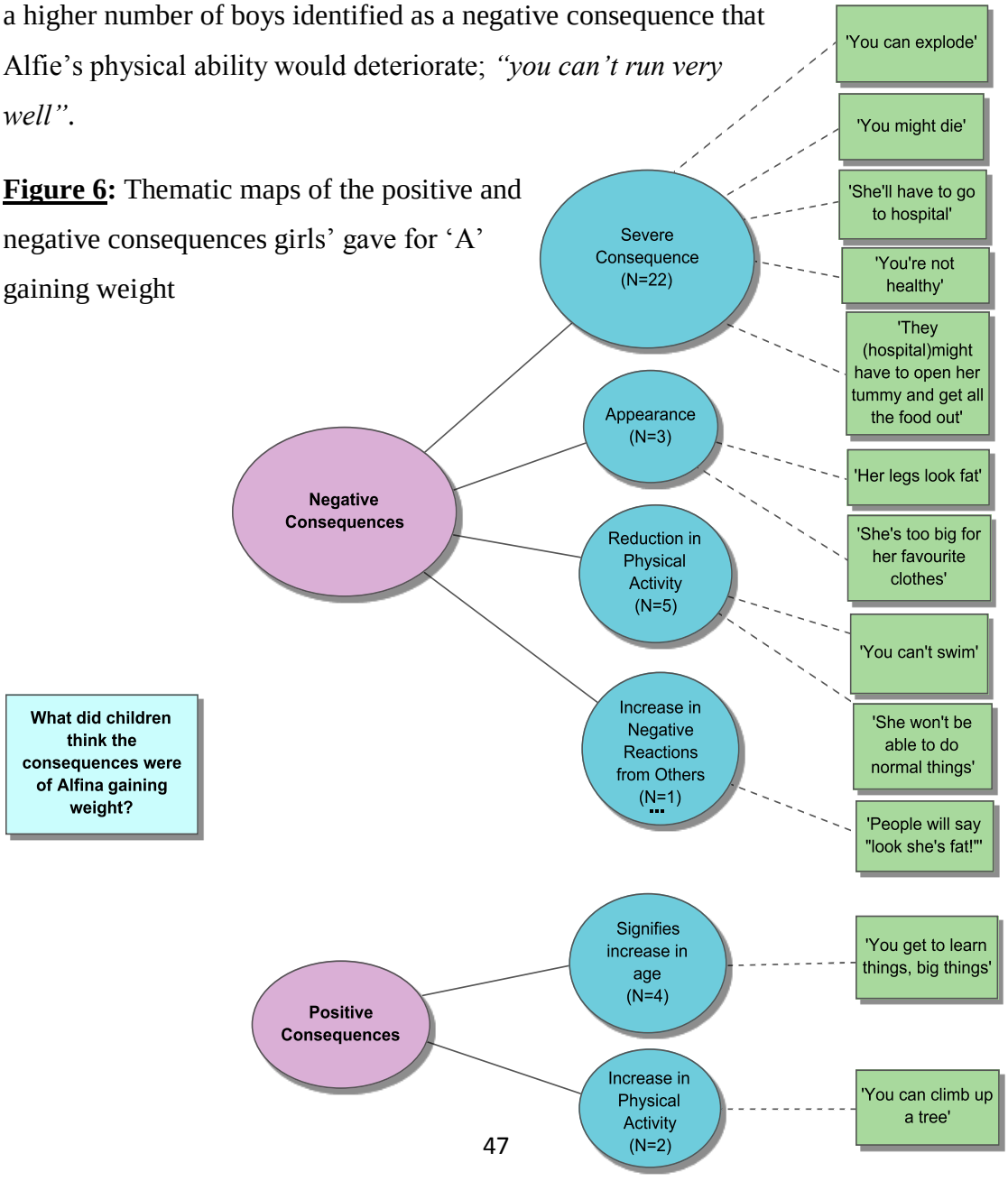


Figure 5 corresponds with Table 5 and reveals that the boys provided many more negative consequences than positive consequences of gaining weight. Four super-ordinate themes were generated from the boys' responses. The theme with highest frequency of comments was *'severe consequence'*. For example: *"you might die", "if you get fat his tummy will get so full and then he might go to hospital and*

they can do an operation so he gets healthy". Boys also felt that Alfie would experience an increase in negative reactions from others now that he had gained weight. These reactions included verbal teasing, laughing and physical behaviour; *"people be mean to you…they push you"*. These consequences corresponded with the emotions the boys felt Alfie would now be experiencing (Table 5).

Figure 5 also illustrates the positive consequences the boys felt Alfie would experience. Similar to the results (cf Question 2, Figure 2) reported above, whereby some girls thought Alfina might want to become "big" because it would signify an increase in age, some boys also identified this as a positive consequence. Furthermore, three boys thought Alfie would experience an improvement in his physical abilities as a result of his weight increase; *"he might be strong"*. However, a higher number of boys identified as a negative consequence that Alfie's physical ability would deteriorate; *"you can't run very well"*.

Figure 6: Thematic maps of the positive and negative consequences girls' gave for 'A' gaining weight



Girls made similar comments to the boys and the same super-ordinate themes emerged for both positive and negative consequences (Figure 6). The most frequent number of comments appeared in the super-ordinate theme *'severe consequence':* a large number of girls said they thought Alfina *"...might die"*, *"...have to go to hospital"*, might have to have an operation, explode, pop, or burst as a result of her weight increase. The second highest frequency of responses was made in relation to Alfina's potential reduction in physical activity; *"she can't walk"*. This second theme is different than the boys'; who, after the severe consequences, focused on negative reactions from others. Similar to the boys, girls thought good things about gaining weight centred around an improvement in physical ability and increasing maturity; *"if you're big you can reach up to a tree and you can climb up a tree", "being like a grown-up"*.

Figure 7: Thematic maps of the positive and negative consequences girls' gave for 'A' losing weight

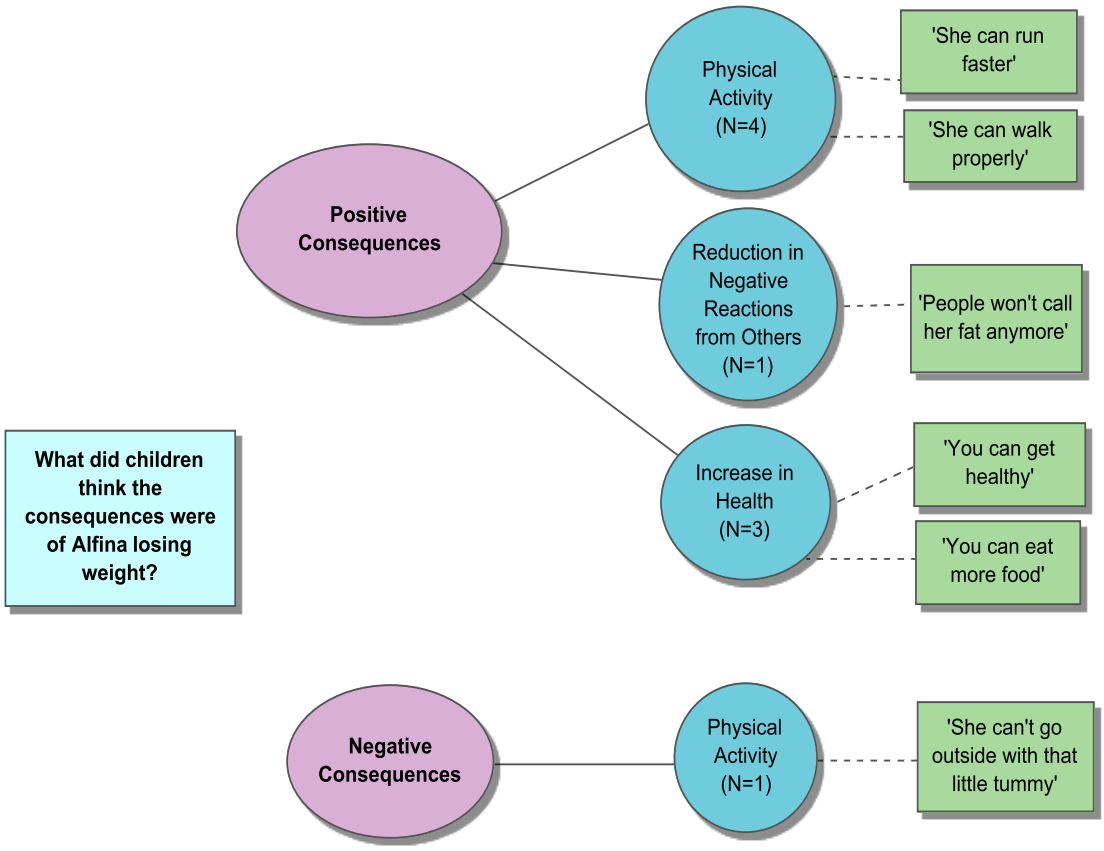


Figure 7 shows that girls in the weight loss group also spoke about Alfina experiencing an improvement in physical activity. This was the largest super-ordinate theme for this group. The girls also felt that Alfina would no longer be verbally teased, could eat more food and would be healthier. Only one girl provided a negative consequence of losing weight, saying Alfina *"can't go out with that little tummy"*. When probed about this, the child was unable to further expand on her reasoning.

Figure 8: Thematic maps of the positive and negative consequences boys' gave for 'A' losing weight

Figure 8 illustrates that boys also mentioned a range of positive and negative consequences of losing weight. As can be seen, the largest super-ordinate theme was '*physical activity*'; boys provided a high frequency of comments regarding Alfie's improved physical ability and increased activity levels: *"he's fast, catch balls and play sport…doing handstands…and jumping on the trampoline, and doing some tricks", "he can play football", "he can run around faster".*

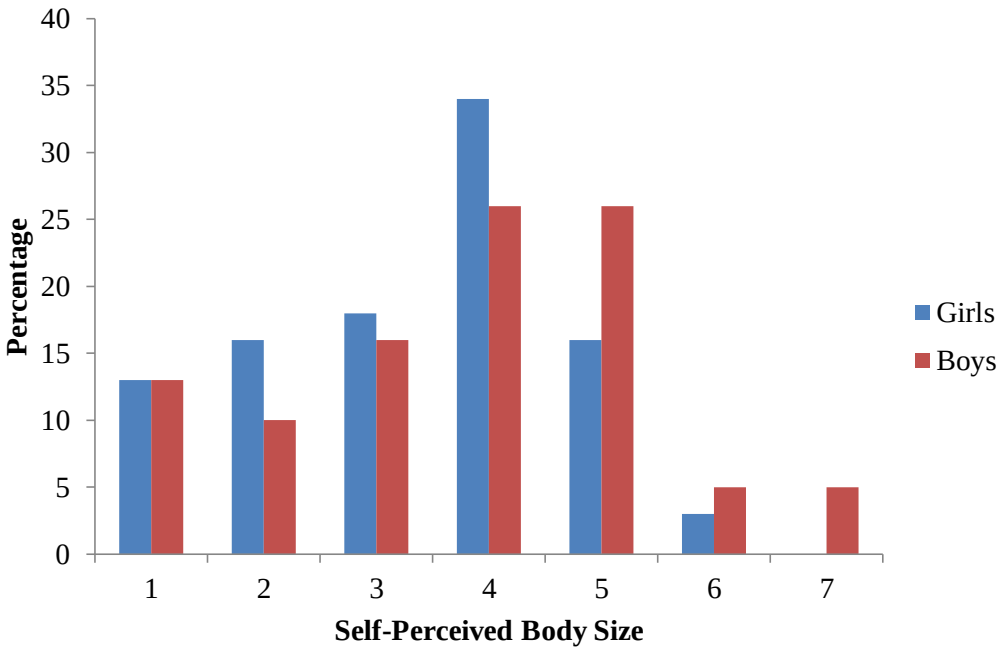
The boys also said that (weight loss) Alfie would no longer experience bullying from others and his health would improve (*"people need to be healthy, and be thin and not fatter…because it's good for people"*). Two boys provided responses which could not be coded; *"I think when you're a skinny you're a good boy"* and *"he likes it when he's more flat…you can send him in an envelope…slide him through the door and then you can fly him on a kite…"* More boys suggested negative consequences of weight loss than girls. These included a reduction in physical activity and weight loss signifying a decrease in age. Two boys spoke about the significance of losing too much weight and the possible severe consequences of this: *"when you're not eating food you're gonna die", "if you get too thin you could die"*.

Self-Perceived Body Size

At the end of the interview children were asked to rate their self-perceived body size using the Collins (1991) scale. This was completed in order to identify whether children's responses differed depending on their perceived body size. Figure 9 illustrates that the children's choices of figures ranged from the thinnest (figure 1) to the largest (figure 7) with over one third of girls choosing figure 4. An equal number of boys chose figures 4 and 5. However, there was no reliable difference between girls and boys in these choices ($t(98) = 1.47$ $p = .93$). By extracting a sample of 20 interviews, choosing participants from across the self-rated body scale as well as focusing on those who chose the thinnest and the largest figures, comparisons between the interview responses were made. No noticeably different responses were observed. Therefore, the choices the children made, i.e., their self-perceived body size, did not appear to influence the responses they gave during the interview.

Figure 9: Girls' and boys' self-perceived body size ratings

(1 = very thin, 4 = midpoint, 7 = very fat)



CHAPTER 4: DISCUSSION

Using a semi-structured, open-ended interview approach this study aimed to engage young children, aged between four and six years-old, in discussions about weight change (increases and decreases). Firstly, the interview revealed that children were able to notice a change in a fictional character's appearance, identify the change and explain their reasoning. The results showed that the children predominantly responded by describing the character as being *"fat"* or *"thin"*. Other popular descriptions included; *"bigger"*, "*smaller*", and *"round"*. Six children were unable to recognise or identify the change in 'A's' appearance. No other study has asked children of this age to use their own words to describe a weight-related change in an individual's appearance. However, studies have shown that older children and teenagers frequently use the term 'fat' to describe individuals who are considered overweight (Wills, Backett-Milburn, Gregory & Lawson, 2006).

Question 1: What Do Children Think *Causes* Weight Change?

The first aim of the study was to explore whether children have an understanding of what causes weight change. The results showed that children were significantly more likely to mention food as a cause of weight gain compared to weight loss, whereas they were more likely to speak about exercise as a cause of weight loss, compared to weight gain. Therefore, the results demonstrate that children had an understanding of the two main causes of weight change; food intake and exercise, however to different extents depending on the direction of change.

Further examination of the results revealed that in both weight groups the children who commented on food were more likely to do so without requiring a prompt, compared to the children who spoke about exercise. Additionally, children were able to speak about different quantities and types of food which might have been involved in the weight change, often doing so spontaneously. More children thought that an increase in food consumption was involved in weight gain, compared to the number of children who believed a decrease in consumption contributed to the weight loss. High and low calorie foods and their influence on weight change were also mentioned by some children. In relation to further comments made about exercise, while a high proportion of children provided further explanations as to how exercise might have caused the weight change, they focused predominantly on naming types of exercise. Some children spoke about how increases and decreases, respectively, in the amount of exercise 'A' did might have caused the weight loss or weight gain. However, the majority of children required prompting in order to elicit this information. This suggests that, in general, children found it easier to express their knowledge about the involvement of food than exercise. Overall, very few reliable differences were found between boys' and girls' responses in relation to this first aim, a result which is congruent with previous research with this age group examining both the causes of obesity (Fielden, et al., 2011) and weight loss (Lowes & Tiggemann, 2003).

Previous research examining children's understanding of the involvement of food, have found similar results. For instance, Wellman and Johnson (1982), Lowes and Tiggemann (2003) and Slaughter and Ting (2010) all report that by age six children have some understanding of the relationship between eating and the

potential effects on the body. However, although their participants also showed some understanding of which foods were healthy and unhealthy, they were unable to explain why. This was consistent with findings by Fielden et al. (2011), who interviewed four to five year-olds, as well as with children in the current study. However, the previous authors also highlighted that some children, aged six years and younger, do not yet fully understand the different nutritional values of foods and the consequences these can have on weight. This was also apparent in the current study. For example, one boy believed that eating too much broccoli, carrots and potato which he classified as *"fatty"* foods, had led to Alfie's increase in weight.

The results from the current study, taken together with those found by Wellman and Johnson (1982), Slaughter and Ting (2010) and Fielden et al. (2011), indicate that children below the age of six mainly focus on simple input-output relations between food and weight. However, some children of this age were able to go into more detail and comment on the influence that eating food which is 'healthy' or 'unhealthy' can have on weight, as well as on other biological outcomes such as health and growth. However, the majority were unable to rationalise their comments, indicating that it is likely that they have not yet learnt or understood the roles of different nutrients such as vitamins, minerals, sugars, fats etc. Slaughter and Ting (2010) and Fielden et al. (2011) also compared their younger participants' understanding of this topic with those of older children's (8-14 years, and 10-11 years, respectively), and found that by these ages children are able to demonstrate this higher degree of nutritional knowledge. Fielden et al.'s (2011) older participants were able to explain that they had learnt much of their knowledge through school, as well as through taking part in extra-curricular sporting activities, and from parents.

As discussed above, in comparison to the results found regarding children's understanding of food and the involvement it has on weight change, the participants appeared to have more difficulty expressing their awareness of exercise. They predominantly required prompts from the researcher in order to think about the role it can have. In addition, compared to when talking about food the children were less able to expand on their responses. These differing results in understanding are similar to those found by Abramovitz and Birch (2000). Furthermore, these results are consistent with those of Lanigan (2011), who found that children aged between

three and five years-old had difficulties identifying pictures which showed children engaging in healthy physical activities.

Taken together, however, these results may indicate that rather than children not being able to speak about the involvement of exercise in weight change, they may simply believe that exercise is *not* involved. Interestingly, in a large (N = 1,000) study (Martinez-Gonzālez, Martin-Almendros, et al., 1999) which examined the beliefs held by individuals aged 15 and above (with varying body weights), regarding the causes of weight gain, fat intake and increase in food consumption were considered the most important factors. Whereas, only 12% of the sample believed that physical activity was involved in weight gain. Jackson, Ball and Crawford (2001) also found that few adults (42% males, 27% females, N = 10,624) felt that exercise contributed to weight loss. If these are the general beliefs of adults then it is likely that children will not be educated on the important influence exercise can have on weight when combined with healthy eating. Furthermore, as highlighted by the authors, these findings have important implications for obesity programmes "since the promotion of physical activity as weight-reducing strategies is unlikely to be successful for individuals who do not perceive them as important causes of weight gain, or…in weight loss" (Jackson, Ball & Crawford, 2001).

That these young children thought food and exercise to be the only factors involved in weight change is congruent with Abramovitz and Birch's (2000) findings that their five year-old participants reported only these as reasons for people to become "thin" or "weigh too much". Moreover, they are also commonly thought of as the main causes of weight loss and weight gain by adults (Jackson, Ball, & Crawford, 2001). However, unlike adults, these children did not indicate that they had any awareness of other potential causes of weight change, such as illness or life events (Smith & Holm, 2011).

Placed in the wider context, these results suggest that young children may perceive that individuals have complete personal control over their weight and their ability to alter it. This viewpoint has various consequences. For instance, Musher-Eizenman, et al. (2004) found that preschool children held stronger prejudices against an overweight child if they perceived the causes of their weight gain to be internal. These results have also been found with older children (Tiggemann &

Anesbury, 2000). Additionally, research indicates negative stereotypes towards overweight individuals (e.g. that they are lazy, unmotivated, self-indulgent, lacking self-discipline and willpower) are common amongst adults (Puhl & Brownell, 2001). While the causes of weight change are complex, often involving a range of factors of which some are controllable while others are not (Weinsier, 1999), the effects of these attributions are great. For instance, children (aged 9-11) who believed their weight gain was entirely their fault had lower self-esteem compared to children who externally attributed the change (Pierce & Wardle, 1997). It is reasonable to suggest therefore that education on the range of causes of weight gain and weight loss, provided throughout a child's life, may have a positive impact by reducing the stereotypes and behaviour that occurs as a consequence (e.g. bullying) (Puhl & Latner, 2007).

In summary, young children have a good degree of understanding about the two main causes of weight change; however, they appear to have more knowledge about the influence of food, particularly in relation to weight gain. While previous research has examined aspects of young children's understanding around this topic area, this is the first study to generate results revealing their understanding of the role of food *and* exercise in both weight loss *and* weight gain.

Question 2: What Reasons do Children Give for *Why* Individuals Want to Lose/Gain Weight?

The results revealed that the majority of children believed that if 'A' was overweight he/she would want to lose weight, whereas 'A' who was average weight would not want to gain weight. Children were able to offer a range of social and physical reasons for these beliefs, indicating that children as young as four years-old have an understanding of the motivations an individual might have to change their weight. The main themes generated were *reduction/improvement in physical activity, appearance,* and *reduction/increase in negative reactions from others.* In general, these reasons were similar for both weight groups and both genders. Importantly, the overarching belief for both weight groups was that 'A' had many reasons to avoid being/becoming fat.

One of the dominant themes was that 'A' would experience negative reactions from others if he/she was overweight, and prevention of this was a

motivation for losing, or not gaining, weight. This perception is one which is documented as a motivation for weight change throughout the literature, although much of it has been conducted with older children, teenagers and adults. However, in one qualitative study using young children (five to six years-old), strong negative perceptions of being overweight was revealed. Among the results was the frequent topic of bullying, and one girl in particular spoke about how she wished to look skinnier *"so that my brother will not tease me anymore"* (Birbeck & Drummond, 2006). This theme of losing weight to reduce bullying is common amongst research exploring the views of older preadolescents (Nabors et al., 2011; Dixey et al., 2001a;b) and teenagers (Wills et al., 2006). Walsh-Pierce and Wardle (1997) revealed that 90% (N = 32) of overweight adolescents believed teasing would cease if they lost weight. Additionally, this is a motivation for dieting in adults (Werthem et al., 1997). It is worth noting that Dixey et al., (2001a&b) also reported the modest gender difference found in the present study, that girls appeared less concerned about the potential negative reactions from others than boys.

A further key motivation for weight change was the perception that physical activity would improve following weight loss, or be hindered by weight gain. This was a particular focus for the boys in the weight loss group. No other published research has directly or intentionally explored this aspect of young children's understanding. This is confirmed by Rees et al.'s (2011) recent systematic review of the views young children hold about obesity, body size, shape and weight. Qualitative research conducted with young teenagers (13-14 years-old; N = 36) which broadly examined their perceptions of their own and others' bodies, demonstrated that some teenagers who were overweight/obese felt that their weight slowed them down when running and made it more difficult to participate in sport (Wills et al., 2006). However, while such studies indicate that some children may be aware of the potential effects of being overweight on physical activity, none discussed with the children whether they thought this was a motivation for weight loss.

A third prominent theme which is consistent with much of the literature across a range of ages (Rees et al., 2011) focused on the link between appearance and the effect weight change may have on it. Specifically the children in the current study thought that 'A' would *"look silly"*, *"different"*, *"funny"*, *"ugly"* if he/she

was overweight, and his/her clothes would not fit properly or look good. However, much of the available research on this topic has focused on children's perceptions of what is an 'acceptable' body weight (Rees et al., 2011), and weight change in relation to body image (Ricciardelli & McCabe, 2001). Research exploring children's perceived and 'ideal' body size is extensive (Ricciardelli & McCabe, 2001; Tremblay & Limbos, 2009; Rees et al., 2011), with the few studies that focus on young children reporting that children as young as three prefer to have a thinner/smaller body size (Tremblay, Lovsin et al., 2011). However, very few studies have used qualitative approaches to ask children to explain their choices.

The present study indicates that these young girls and boys believe not only that overweight individuals do not look as good as thinner people, but that improving appearance is a motivation for weight change. In relation to this, the children also highlighted that worrying about how clothes look is a further reason to change weight. This motivation was also found by Dixey et al.'s (2001a;b) research with preadolescents. Furthermore, in the 1980s, researchers began to explore the reasons adults gave for wanting to lose weight and it has been consistently reported that wishing to improve appearance is a strong motivator (Colvin & Olson, 1983; Brink & Ferguson, 1998; Kwan, 2009). Moreover, research also reports this result in teenagers (Tiggemann, Gardiner & Slater, 2000). The current study suggests that these views, which may be based on negative stereotypes (Tischner & Malson, 2012) and Western society's construct that "thin is the ideal" (McCarthy, 1990), are being passed down to the newest generations.

Different themes emerged from children who thought 'A' *would* want to gain weight. For two boys, Alfie's increase in size meant that he would now be able to defend himself against others, a result consistent with Birbeck and Drummond (2006). As in their research, this positive reason for changing appearance was not a viewpoint shared by the girls. This perspective of 'if you are large then you are strong' is one which is linked to Western society's construction of what it is to be masculine (McCabe & Ricciardelli, 2004). However, unlike older boys, teenagers, and adults who commonly distinguish between a body which is large but lean, fit and strong (McCabe & Ricciardelli, 2004), and one which is large and overweight, these two young boys were not yet aware of this difference; they both described Alfie as 'fat'. Parkinson, Tovée, and Cohen-Tovée (1998) found that the shift from wanting a

body which is heavier to wanting a leaner, stronger body occurs around 11 years-old; a result which is replicated by others (Schur, Sanders & Steiner, 2000). This suggests that awareness of a social pressure on males to have a larger, muscular body may not develop until late preadolescence. However, compared to the high proportion of boys in the present study who gave reasons to avoid gaining weight, only two boys spoke about this potentially positive reason. This indicates that the negative social perceptions of being overweight are more prominent at this young age than the perception of larger bodies signifying strength.

In comparison, the girls reported more positive reasons for wanting to gain weight, with themes of *improving appearance, increasing food consumption* and *increasing maturity.* Ricciardelli and McCabe's (2001) review of the body image literature also suggested that some children may associate larger body sizes with being more grown-up. However, they also highlighted that this response may depend on the questions the children are asked and how they interpret them. In the current study, when the children were shown the second picture of 'A', prior to any questions being asked, all children were told "*This is still 'A' but he/she is a little bit older".* It appears that some girls may have focused on this statement, and been influenced by it. In relation to responses regarding food consumption, Birbeck and Drummond's (2006) qualitative study of five and six year-olds found that some children thought that overweight individuals were healthiest because they had eaten the greatest amount of food. Despite this, there is little or no previous research, either quantitative or qualitative, which has directly examined whether similar beliefs are held by other young girls, and how common these positive motivations are for weight increase.

Question 3: What do Children Think are the *Consequences* of Losing/Gaining Weight?

Children believed that 'A' would feel sad following an increase in weight and would experience a range of negative consequences as a result of the change. The opposite was true for 'A' who lost weight. The emergent themes included *appearance, physical activity, increase in health, increase/decrease in negative reactions from others* and *severe consequences*, revealing that young children had a

broad understanding of this topic. Overall there was little difference between the responses which girls and boys provided.

As can be seen, three of the five main themes are the same as those found for the motivators of weight change; *appearance, physical activity, negative reaction from others,* and similar responses were given by the children and applied to the consequences of change. To my knowledge, no study has previously explicitly asked young children what they believe the consequences are of gaining or losing weight, and so the research described in the previous section remains relevant and can be applied here. Combining the results of why children think individuals would change their weight, with the consequences of such change, suggests that children are well aware of the pressures placed on individuals to look a certain way, the stigmatisation and body dissatisfaction that occurs if they don't, and the effects being overweight have on physical abilities.

Research which has explored the perceptions of older children and teenagers also frequently finds that these topics are discussed. For instance, Dixey et al.'s (2001a;b) qualitative study, exploring 9-11 year-olds' understanding of healthy eating, reports similar comments regarding the consequences of eating unhealthy food on physical activity; *"If you're fat you can't run"*. This is consistent with Wills et al.'s (2006) research with teenagers and Rees et al.'s (2011) systematic review. Furthermore, Wills et al. (2006) report that their participants, mainly girls, also felt that as a consequence of being overweight they had more difficulties buying and wearing clothes that they liked. Participants in both studies reported that bullying is a common consequence of being overweight. In a recent study, Lumeng et al. (2010) found that overweight and obese children (8-11 year-olds, $N = 821$) were more likely to be bullied compared with non-overweight peers. This was independent of gender, race, social economic status, social skills, and academic achievement. This negative consequence was also repeatedly found in Puhl and Latner's (2007) systematic review. The psychological impact which weight-related bullying can have on overweight children has been widely examined; with low self-esteem, body dissatisfaction, and depression consistently reported (Puhl & Latner, 2007).

However, unlike many quantitative studies exploring children's perceptions, the children in the current study did not comment on other aspects of weight-based

stigmatisation and stereotypes: for instance, whether being overweight had negative consequences on friendships and popularity, whether overweight children have certain, negative personality traits (e.g. 'mean', 'lazy') or whether being overweight affects other aspects of people's personality, such as intelligence and attractiveness. Quantitative research which has examined these issues commonly uses forced-choice and/or leading questions to ask children about a range of characteristics, whereas the current study asked open-ended questions not directly assessing the children's knowledge of weight-related stereotypes. It is likely that while these are important issues, they were not a priority for these participants. Therefore, although it is consistently reported by quantitative research that weight stereotypes are held by children (Rees et al., 2011) as young as three years-old (Cramer & Steinwert, 1998), the current results suggest that these beliefs are not at the forefront of children's minds.

An important finding from the current results, and one which is not often reported, is that children from four years-old are aware that severe physical consequences can occur as a result of being overweight. This was a dominant theme for both genders, suggesting that from a very young age children are receiving information about the negative effects obesity can have on the body. Comments about going to hospital, having operations, becoming ill and dying were frequently made. One other study of children aged between four and five years-old has reported similar results (Fielden et al., 2011). Some five and six year-olds in Birbeck and Drummond's (2006) study also spoke about death occurring if someone became *too* fat. Research with older children (Dixey et al., 2001a;b) highlights that as children increase in age, so their understanding of these potential consequences on an individual's health expands to include awareness of high blood pressure, narrowing of the arteries, and heart disease. In addition, children believed other health problems such as cancer would occur in adulthood if an individual remained overweight. Interestingly, these severe health consequences of being overweight are indeed problems which adults worry about (Kwan, 2009), and which motivate them to lose weight (Brink & Ferguson, 1998). Nonetheless, while young children may not understand the full array of potential health difficulties faced by individuals who are overweight, they are clearly receptive to information that being overweight can lead to illness and premature death.

Although the children in the weight gain group focused on the negative consequences of the change, both boys and girls were able to provide positive consequences; *signifies increase in age,* and *increase in physical activity.* Unlike many children who thought an increase in weight would hinder 'A's' physical abilities, some believed that his/her strength and speed would be improved, while some thought being 'bigger' meant he/she was now older; a perception which (see above) was given as a positive reason for gaining weight by girls.

Children in the weight loss group generated different themes. However, as with the weight gain group, they commented on the positive consequences for physical activity, and negative reactions from others. They also believed that 'A' would experience an *increase in health*. However, children were unable to expand on these thoughts, suggesting that while some believed that losing weight was good for health they were unclear why. Interestingly, relatively few children spoke about this benefit of weight loss, whereas the dominant theme for the weight gain group was the negative consequences on health. It is likely that this difference is a consequence of the common negative stereotypes held against overweight individuals, combined with the information children are receiving from schools whereby regardless of body size, the focus is often on why to avoid obesity (Karnik & Kanekar, 2012). This may also be why children in the current study were generally less able to provide comments on the consequences of weight loss, compared to weight gain. While it is reasonable to question whether overweight children may have more understanding of the benefits of losing weight on health, due to education programmes aimed at them to promote weight loss, this does not appear to be the case. For example, Borra, Kelly, Shirreffs et al. (2003) interviewed eight to twelve year-old obese children and found that education focused around physical activity and eating healthily rather than the health consequences of remaining overweight. Additionally, the children explained that they did not give much thought to the importance of good health, either the immediate or long-term benefits of losing weight, but instead focused on the social consequences of being overweight.

Relative to the positive outcomes of losing weight, very few children provided negative consequences. The three themes which emerged were *severe consequences, signifies decrease in age,* and *physical activity.* Two boys believed that death would occur if Alfie lost too much weight. To my knowledge, this level of

understanding has not been revealed in such young children before, however it has been reported with older children (9-11 years-old) (Dixey, et al., 2001a;b; Fielden et al., 2011).

Question 4: Do the Responses Differ Between Boys and Girls?

Throughout the previous sections differences, or lack of, between the responses which boys and girls provided have been noted. Overall, the study has shown that between the ages of four and six years-old boys and girls have very similar levels of understanding of the topic of weight change. Any differences that were found regarding the reasons and consequences of weight change were in relation to the dominant themes generated and the number of comments provided for each. For instance, the boys in the weight gain group focused on the potential reduction in negative reactions from others (as in Dixey et al., 2001a;b), while more girls focused on decrease in appearance as motivators for weight loss. While the latter is unsurprising, given that females are consistently found to want to be thinner than they are (e.g. Grogan & Wainwright, 1996; Lowes & Tiggemann, 2003) in order to conform to what Western society believes is attractive (Tiggemann, Gardiner & Slater, 2000; Tischner & Malson, 2012), these differences were very slight. Similarly, the difference in frequencies of comments generated for the consequences of weight gain was minimal. The most common issues raised by the girls and boys related to *severe consequences,* for girls, the next most common theme was the negative effect on physical activity. However, the second most common issue for the boys related to negative reactions from others.

This suggests that both genders interpret the information they are subjected to in similar ways, and have not yet been significantly influenced by the gender specific information which is observed in Western society. Ricciardelli and McCabe (2001) suggested that this does not occur until around the age of eight years-old. If the young children in this study were more aware of the pressures that females encounter to have a thin body shape (Tischner & Malson, 2012; Wertheim, Paxton, Schutz, Muir, 1997), and to diet and use other weight loss strategies (e.g. Kostanski & Gullone, 1999; Davison, Markey & Birch, 2002; Skemp-Arlt & Mikat, 2007) in order to achieve this ideal, then there might have been greater difference between the number of girls and boys who provided appearance-related responses. Whereas,

more boys might have provided exercise/physical activity related responses. For instance, they might have focused on this issue as a specific reason for/consequence of losing weight/not gaining weight, or combined it with wanting a more muscular/lean appearance. Research with preadolescents (McCabe & Ricciardelli, 2005; Lawie, Sullivan, Davies, & Hill, 2007), and adolescents (e.g. McCreary & Sasse, 2000; Ricciardelli & McCabe, 2004) repeatedly report that this is indeed a goal for many boys.

Developmental Stage Considerations

While examining the results of the current study the cognitive-developmental theory was important to consider. According to Piagetian (1970) theory, these participants, aged between four to six years-old are in the pre-operational stage of development, during which they develop skills in using words and images to represent objects, forming stable concepts and mental reasoning. However, children of this age are thought to be concrete in their thinking, i.e. they focus on states rather than transformations, have not yet learnt that objects remain the same despite changes to their physical appearance, nor have they yet developed abstract reasoning skills. For this reason, it was believed that the children might have difficulties rationalising and expressing how the change of weight may have happened. Furthermore, because children at this stage are considered to be ego-centric, i.e. their thoughts and communications are typically about themselves (Piaget, 1970), it was considered that participants might struggle to identify the change in another individual, and/or find it difficult to explain the reasons for the change. However, neither of these potential difficulties was found to be the case here. One reason for this may be because, unlike Piaget (1970) who often used line-drawings or inanimate objects to assess children's cognitive abilities, the children in the current study were asked to identify change of a peer's appearance, albeit in a two-dimensional colour picture. Consequently, using stimuli which were familiar to the children, and with which they could identify, is likely to have enhanced their ability to recognise, and comment on the change.

Children in this stage of development are also continuing to master the use of language and the different meanings which words have (Piaget, 1983). Importantly, in the early years much of the children's learning of language comes from imitating

others and receiving reinforcement (Skinner, 1957). Skinner's learning theory of language, alongside Vygotsky's collaborative learning model (1962), whereby social interactions and conversations with others help develop children's cognitive and linguistic abilities, indicates that children are likely to have learnt the colloquial word 'fat' from others. Furthermore, unlike previous research, which has used a variety of predetermined terminology (e.g. 'fat/skinny' -Wellman & Johnson, 1982; 'thin'- Abramovitz & Birch, 2000; 'bigger' - Lowes & Tiggemann, 2003) to help assess children's understanding of a range of weight related topics, the current study used children's own descriptive words throughout each interview. Knowing that each child develops slightly differently, and at different rates, this was considered to be important. It is likely that this questioning style, which allowed the children to use terms they felt comfortable with, contributed to the children's high level of engagement in the task and the detailed level of answers provided throughout the interview.

Throughout the exploration of the study's results it was important to consider the above theories alongside that of social learning theory (e.g. Bandura, 1977). Much of children's learning is said to come from the observation and imitation of others, and the reinforcement or punishment which is received. It is likely that while young children are beginning to construct their own conceptions, and recognise that they have personal experiences of their bodies, they are "receiving messages from parents and others which typically reflect popular conceptions" (Wellman & Johnson, 1992). These messages are bound to affect greatly children's development of their understanding of weight change.

Self-Perceived Body Size

The children's self-rated body size appeared not to have had an effect on their responses and there was no noticeable difference in responses provided by children who rated themselves as having the largest size compared to those who rated their bodies as very small. However, these findings need to be interpreted with caution. Although research suggests that by 30 months old children are able to recognise their own body shape and size (Brownell, Nichols, Svetlova, Zerwas, & Ramani, 2010), others have found no correlation between young children's self-perceived body size and their BMI scores (Musher-Eizenman, et al. 2003).

Furthermore, while the Collins scale (1991) is often used with children of this age, no reliability data are available for this age range, therefore it is difficult to ascertain whether children below the age of six can successfully rate their own body size. In addition, there was no method available to reliably compare the children's ratings with their responses and then compare these against those of others.

Reflexive Analysis

Interviewing these young children was enjoyable, interesting and often surprising. Initially, I was amazed by the ease at which children as young as four years-old were able to engage with the interview process and provide well thought-out responses to my questions. Surprisingly, very few children gave nonsensical answers. Overall, the children provided a wide range of different responses, with many talking at length about their thoughts and ideas. I feel the high response rate suggests that the children felt relaxed during the interview and I feel this can be attributed to the way in which the interview was conducted. For instance, to help the children feel at ease before starting the interview I spent time speaking with them about their school day, what they'd been learning about, what activities they'd been doing, etc.

I also feel the adult/child power imbalance was reduced as much as inherently possible by carefully choosing where the interviews were going to take place, and how the seating was arranged. I also wonder whether being a young female helped to reduce the difference in power. For instance, I feel it may have further reduced the potential for the children to perceive me as a figure of authority, i.e. a 'parent' or 'teacher' figure, and therefore influenced their levels of comfort and openness in answering my questions. Furthermore, I feel that by using a story the interview questions were placed within a context, and by identifying, and using each child's own descriptive word for the change throughout the interview process made communicating easier and helped to elicit more information.

Prior to the start of interviewing I researched the topic of weight change and established what was already known about children's understanding of weight loss and weight gain. While this was a required and important process it also meant that I developed some preconceptions about how the children may respond to my questions. For instance, I believed that the girls would describe a range of weight

loss behaviours. Throughout the interview process I tried to be aware of these thoughts, wrote them down when they arose and reflected on them. By doing this I hoped I would not lead the questions in a particular direction, and to remain as open as possible to the children's responses.

I think it has been important for me to recognise that although a hundred children's voices were listened to for this study this is a relatively small number in comparison to the rest of the child population. Furthermore, the interviews were conducted at a specific time, in a specific location, and by a specific researcher, all of which would have impacted on the children's responses. It would be interesting to establish whether different responses would be found if the interviews took place in a different location, such as the child's home, or if the researcher was male. It is also highly likely that the children's understanding was influenced by the teaching they receive at school, and by interviewing them at a different time within the school year the results might have been different.

Finally, as an adult and a researcher, I feel privileged to have been able to elicit and listen to these children's thoughts and ideas regarding this topic, and gain an insight into their worlds. However, I also acknowledge the part I have played in this process and the final results. Although the responses obtained required little interpretation, I still asked the questions, analysed the results, and choose which quotes to use as a representation of the overall themes. Therefore, it is inevitable that I have influenced the results. Although the study was completed in consultation with two other individuals, my supervisors, it is likely that different themes might have emerged if the same interviews were conducted and analysed by a different individual. Overall, this was a highly enjoyable experience and one which I have learnt a great deal from. I hope others will also benefit from it.

Strengths and Limitations of the Present Research

Strengths

A major strength of this study is that it has shown that young children are able to engage in qualitative research, provide detailed answers to a variety of open-ended questions, and account for their decisions. This indicates that young children have the capability to articulate their thoughts and experiences, and with the

appropriate considerations and adjustments, are suitable participants for qualitative research (Curtin, 2000). This is an important finding as very few studies within this topic area have used open-ended, non-directive interviews with children as young as four years-old. The use of qualitative research with young participants has allowed us to "learn about their worlds and perspectives" (Curtin, 2000), further understand the beliefs they hold in relation to weight change, and appreciate that children as young as four have a breadth of knowledge about many aspects of weight loss and weight gain.

The questions that were asked of the children, and the responses generated, allowed for both quantitative and qualitative analysis. This mixed approach provided a richness to the overall results, allowing for the quantitative data to be illustrated and explained by the qualitative findings. Overall, this has resulted in a richer understanding of the knowledge young children hold about weight change. Previous to this, little was known about young children's understanding of the aspects of weight change covered by this research, whether different knowledge was held for weight loss than weight gain, and between boys and girls.

These results come at an important time, when the prevalence of obesity among children is increasing, as are stigmatisation of overweight individuals, societal pressure to be 'thin', unhealthy eating behaviours in children, and the development of healthy living education programmes for children and adults. This research highlights that young children have a broad understanding of weight change, which is greater than adults might predict. Furthermore, identifying that children's perceptions focus on the prevention and avoidance of becoming/being overweight, can inform the development of future education programmes.

Limitations

One of the study's aims was to compare the responses provided by girls and boys. Unfortunately, the ratio of girls to boys was unequal, particularly in the weight loss group. One reason for this is that, overall, fewer parents consented for their daughters to participate than parents with sons. It is possible that, despite the reassurance given in the information letters that only the children's understanding would be explored, and not their personal behaviours or their actual weight, the topic area of weight change may have made some parents reluctant to agree to their child's

participation. Some parents may have viewed this as a sensitive subject, particularly for girls. Furthermore, due to the randomisation method used, each participant, regardless of gender, was alternately placed into the weight gain or weight loss group.

However, while the overall consent rate (47%) was comparable to previous research (Rowlinson, 2011; Harrison, 2009), the proportions of males and females recruited (62% males, 38% females) differ from other studies. Many studies either have similar ratios (e.g. Wellman & Johnson, 1982; et al., Schur 2000; Lowes & Tiggermann, 2003; Birbeck & Drummond, 2006; Fielden et al., 2011) or a higher proportion of females (e.g. Penny & Haddock, 2007; Holub, 2008; Lanigan, 2010). However, many of these studies were not explicit in their recruitment method and so it is unclear whether similar procedures to the present study were adopted. Two studies with similar ratios are Cramer and Steinwert (1998) and Holub et al. (2005). Holub et al.'s (2005) study recruited their participants using a similar method as the current study and interviewed young children about dieting.

In relation to this, there were not equal numbers of participants in each of the three age groups (four, five and six year-olds). This meant that reliable comparisons between the responses for each age group could not be made. Therefore, it is difficult to determine whether the understanding of four year-olds differs from that of the six year-olds. While this is an important factor to consider, it was beyond the scope of this study to examine. Future research with large, equal numbers of each age group is required to make this specific comparison.

It is likely that children's levels of understanding of weight change depend on a variety of variables, such as their ethnicity, actual body weight and socioeconomic status (SES). However, these data were not collected for this study. Focusing on any one of the above variables would provide interesting details, but by doing so participant numbers may have decreased. For instance, ascertaining a child's actual body weight would involve weighing them. This would have required significant ethical considerations as it would have been intrusive, may have made the children feel uncomfortable, and therefore may have dissuaded parents from providing consent. Furthermore, it would have potentially affected the children's openness when answering the interview questions. Nevertheless, with design considerations,

research exploring whether children's knowledge differs depending on their body weight would be worthwhile. The same viewpoint applies to obtaining information on ethnicity and SES. A large sample size, assessing a variety of ethnicities and SES groups, would be required in order to draw reliable conclusions.

A further limitation is that the responses given to the interview questions are only a reflection of the children's understanding at that moment in time. It does not take into account where their understanding has come from, or what they may learn in the near future. In relation to this, the participants were recruited from two separate schools, both of which are likely to have different teaching styles and lesson topics (particularly in Reception year when the 'Early Years Foundation Stage' educational curriculum is more liberal). Furthermore, the interviews were conducted at two different times within the school year; at the end of the summer term and at the beginning of the autumn term. Therefore, some of the four/five year-olds had only just started school, while other children had completed almost two academic years. These differences are likely to have had a significant impact on the children's level of understanding, but were difficult to assess. Separating the results from the two schools would have dramatically decreased the number of participants in each group (male/female x weight loss/gain), and reduced the reliability of the analysis and findings.

Practical Implications

By exploring children's awareness of weight change, we have begun to grasp a clearer understanding of what children between the ages of four and six know about this topic. Having this knowledge allows recommendations to be made to schools and public education programmes (e.g. 'Change4Life'). For instance, it may be important to teach children that weight gain in particular can occur for a variety of reasons and not just because someone has eaten too much or exercised too little. By instilling this knowledge in children from a young age, it may reduce the negative impact of weight-related stereotypes (as found by Bell & Morgan, 2000) and reduce the likelihood of children developing low self-esteem and mental health difficulties due to body image concerns. This might be particularly important around the age when children enter puberty when they gain height and often weight, as their bodies change shape.

The participants in this study provided evidence that children as young as four years-old have an awareness of the body shapes that Western society considers 'ideal', and the negative consequences, including laughter and naming calling, that occur if you are not perceived to attempt to conform to such ideals. These results therefore reinforce suggestions made by other researchers (e.g. Puhl & Latner, 2007; Smolak, Levine & Schermer, 1998; Irving, 2000) that school based stigma-reducing interventions need to be implemented from an early age. A focus of these education programmes should be on promoting body size acceptance, difference and diversity in order to reduce weight-related teasing. An example of a successful programme comes from Irving (2000) who used puppets to teach children about different body shapes, to discourage the teasing of others and promote the general importance of treating others well. Although schools and teachers are likely to have a great impact on children's attitudes and behaviours towards others, for weight stereotypes to be significantly reduced education strategies need to be available for parents too. Puhl and Latner's (2007) review highlights that these are in short supply. It is important that parents and other family members are at least made aware of the impact their views, and the sharing of these in front of children, can have on the perceptions and behaviours of the next generation. Furthermore, a change needs to occur in the mass media (Puhl & Latner, 2007). In general, there needs to be an increase in the number of overweight characters with neutral/positive personality traits and storylines in TV and films, a reduction in the mocking of overweight individuals and the observation of them engaging in stereotyped behaviour (e.g. eating large amounts of food) (Yoo & Kim, 2012), and an increase in the number of average/large sized models (Kim & Lennon, 2007).

By implementing these strategies, not only will negative stereotypes and behaviours reduce, but children are more likely to grow up with positive body image attitudes, and less likely to engage in unhealthy eating behaviours. In addition, the success rates of obesity prevention/reduction programmes are likely to improve. For instance, overweight individuals may feel more inclined to engage in physical activity if they know they are not going to be teased.

A further important implication of these results relates to the numerous obesity management programmes such as the NCMP, which aim to support public health initiatives such as 'Change4Life' and 'Live Well' and other local

weight/health programmes. The 2011/12 NCMP data reveals no significant reduction in the prevalence of overweight/obese children in Reception year to 2006/7, while the number of overweight/obese children in Year 6 has been steadily rising since 2006/7 (The Health and Social Care Information Centre, DoH, 2012). Overall, this suggests that public weight management programmes are not effective at reducing obesity levels. The current research reveals that by the time children reach Year 1 of their schooling they already have a substantial understanding of what influences weight change, what motivates people to want to change their weight, and what consequences it can have. Therefore, teaching on these topics needs to begin at preschool/Reception to ensure that children grow up knowing about all aspects of healthy living, and to reduce their misconceptions as early as possible. Relatedly, given current weight loss programmes seem unhelpful, initiatives such as 'Health at Every Size' (HAES) (Robison, 2005; Bacon, 2008) may be the way forward. HAES teaches that the natural diversity of body shapes should be accepted and respected, and eating and exercise should be seen as important aspects of healthy living, and not weight control. By doing so, general healthy living and self-confidence can be improved, along with compassion for others (Robison, Putnam & McKibbin, 2007). Approaches such as these should be made a compulsory part of schools' curricula, both at primary and secondary schools. With suggestions that weight-loss programmes may be doing more harm than good (Ikeda, Crawford & Woodward-Lopez, 2006), it may be important for clinicians to endorse strategies such as HAES.

Recommendations for Future Research

As already noted, the current study did not explore whether children's understanding differed depending on their SES, ethnic background, or their own actual body weight and size. It would be of interest to examine these factors. In addition, further exploring gender differences by randomly providing girls and boys with either a male or female fictional character, or giving all children the same gendered character, would be appealing. Previous research into similar topic areas has shown that older children's knowledge of nutrition differs depending on whether they are from low or high SES groups (Hart, Bishop, & Truby, 2002). However, this is not consistently observed (Hatano, Seigler et al., 1993). A longitudinal study (Davison, Markey, & Birch, 2002) highlighted that children's own weight (BMI) was positively associated with weight dissatisfaction, dietary restraint and eating

attitudes. It would be interesting to investigate whether this is also positively associated with understanding of weight change strategies. It is reasonable to suggest that while all children receive similar healthy living educational programmes at school (such as 'The National Healthy Schools Programme'), children who are overweight may receive specialist advice and information from dieticians, doctors, teachers, (for example, the 'Families for Health' scheme in Warwickshire, Robertson, Thorogood, Inglis, Grainger, & Stewart-Brown, 2012) as well as from parents, and therefore may have a higher level of understanding of the causes and consequences of weight gain, and of ways to reduce their weight.

Using the same interview method but adjusting the wording of the questions, and possibly including the use of toy figurines to aid the interview process, exploring even younger children's understanding would also be of interest, in order to establish whether similar results are found. It would be at that point that we could understand at what age these perceptions about weight change begin to develop, and gain further awareness of what information is misunderstood. Appropriately designed educational programmes for parents, nursery schools and play groups can then be implemented. Furthermore, by conducting longitudinal studies, the development of children's understanding of weight change overtime could be explored. This knowledge could then inform any educational schemes.

As well as continuing to examine children's levels of understanding, exploring where their knowledge comes from could also be of importance. It has been suggested, particularly in relation to children's body image, that peers, parents, and the media play an important role in the development of children's perceptions (Hayes & Tantleff-Dunn, 2010). Although not a focus of the present research, some children did volunteer thoughts about what had influenced their knowledge of weight change. For instance, one girl said in relation to the negative responses 'fat' people receive, *"my mum and dad keep saying that, my brother keeps saying that and he's down in Reception….he says it to other people"*. While one boy explained that *"I have an Uncle in Greece and he's so fat and he went to an operation"*, revealing his knowledge of (weight loss) surgery had come from the experiences of family members. Fielden et al.'s (2011) study reports that some young children may gain this information from the media, for example *"I seen this film right the boy was fat right…he will have to go to hospital, he was fat."* Dixey et al.'s (2001a;b) study with

older children reported that girls were aware of social pressures portrayed by the media, for example; *"They make clothes for stick-thin people and in magazines everybody's thin and you don't get fat people in them."* However, other comments illustrated that they did not feel they had to conform to some of these ideals; *"I want to be a model but I'm not going to think that I've got to be thin."*

Research has examined the portrayal of weight-related stereotypes within the media, including those aimed specifically at children, and consistently found that overweight characters are depicted as having negative personality traits (e.g. Herbozo, Tantleff-Dunn, Gokee-LaRose, & Thompson, 2004; Yoo & Kim, 2012), as being physically less attractive than thinner individuals (Gilbert, 1998; Herbozo et al., 2004), and deserving of being mocked and laughed at by others (Yoo & Kim, 2012). In Western society today it is common to see television programmes about people who are overweight, with titles such as *I used to be fat, The Biggest Loser, Embarrassing Fat Bodies, My Big Fat Operation* in which topics such as bariatric surgery and health consequences of obesity are used for entertainment. A recent study (Yoo & Kim, 2012) examining the portrayal of overweight individuals in TV programmes, found that individuals were commonly the target of humour, and teasing from others. They found that video clips on 'YouTube' (an online media channel) which showed overweight individuals being teased were watched significantly more often, than those which portrayed an overweight individual but not being teased. The authors, along with others (e.g., Himes & Thompson, 2007) suggest that these programmes are likely to normalise people's attitudes and reinforce weight-based stigmatisation (Harrison, 2000). Repeated exposure to such messages may contribute to children's beliefs that individuals should avoid being overweight at all costs. Due to the ease with which these programmes can be accessed, and the likelihood that adults engage in conversations about them in the home, there is huge potential for young children to watch/hear about them, and be influenced by them.

Longitudinal experimental research needs to be conducted in order to explore whether there is a causal link between the ways in which overweight individuals are portrayed in the media, the potential messages children are receiving from parents, and the development of young children's ideas about weight change. It is only when these studies are combined with qualitative research asking young children

themselves where their ideas come from, that we will be able to attempt to alter society's perceptions.

Conclusions

This study explored young children's understanding of weight change. Analysis of the data revealed that children aged between four and six years have a comprehensive knowledge of the causes, motivators and consequences of weight change. The children were able to speak easily about their understanding of how food was involved in the change, while also commenting on the influence exercise can have. Reasons for wanting to change weight included both positive and negative motivators, giving rise to themes of *improve/reduction in physical activity, appearance, increasing maturity,* and *reducing/increasing negative reactions from others.* The children were able to provide a variety of both positive and negative consequences of gaining/losing weight. The themes generated included; *severe consequences, appearance, physical activity, increase/decrease in negative reactions from others* and *increase in health.* Overall, the responses offered by the children for why someone would want to change weight, and the potential consequences of change focused on the avoidance of becoming/being overweight.

Children as young as four years-old have a clear understanding of the pressures faced by individuals to have a certain body shape, and the negative consequences which occur if they don't, indicating that education on these topics needs to occur at a very young age. These programmes should focus on the promotion of difference and diversity in terms of body shapes and sizes, along with the importance of showing compassion towards others, and the variety of factors which can be involved in weight change. Finally, there should be a continued emphasis on the importance of a healthy/balanced lifestyle, but one which is adapted to suit individual needs. These are messages which need to be taught in school, at home, and by those in wider society. It is only then that weight-based stereotypes will diminish, obesity levels amongst children and adults decrease, and individuals overall will develop better body-images and healthier attitudes towards food and exercise.

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APPENDIX

Appendix 1: Ethical Approval Confirmation

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UNIVERSITY OF LEEDS

Sarah Baxter
Psychologist in Clinical Training
AUBPS, Leeds Institute of Health Sciences,
University of Leeds
Charles Thackrah Building
101 Clarendon Road, Leeds LS2 9LJ

21 February 2012

Dear Sarah,

Ethics reference: **HSLTLM/11/012**
Title: **Young Children's Understanding of Weight Change**

I am pleased to inform you that the above research application has been reviewed by the Leeds Institute of Health Sciences and Leeds Institute of Genetics, Health and Therapeutics and Leeds Institute of Molecular Medicine (LiHS/LiGHT/LiMM) joint ethics committee and following receipt of the amendments requested, I can confirm a favourable ethical opinion on the basis described in the application form, protocol and supporting documentation as submitted at date of this letter.

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval. This includes recruitment methodology and all changes must be ethically approved prior to implementation. Please contact the Faculty Research Ethics and Governance Administrator for further information (FMHUniEthics@leeds.ac.uk).

Ethical approval does not infer you have the right of access to any member of staff or student or documents and the premises of the University of Leeds. Nor does it imply any right of access to the premises of any other organisation, including clinical areas. The committee takes no responsibility for you gaining access to staff, students and/or premises prior to, during or following your research activities.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited.

It is our policy to remind everyone that it is your responsibility to comply with Health and Safety, Data Protection and any other legal and/or professional guidelines there may be.

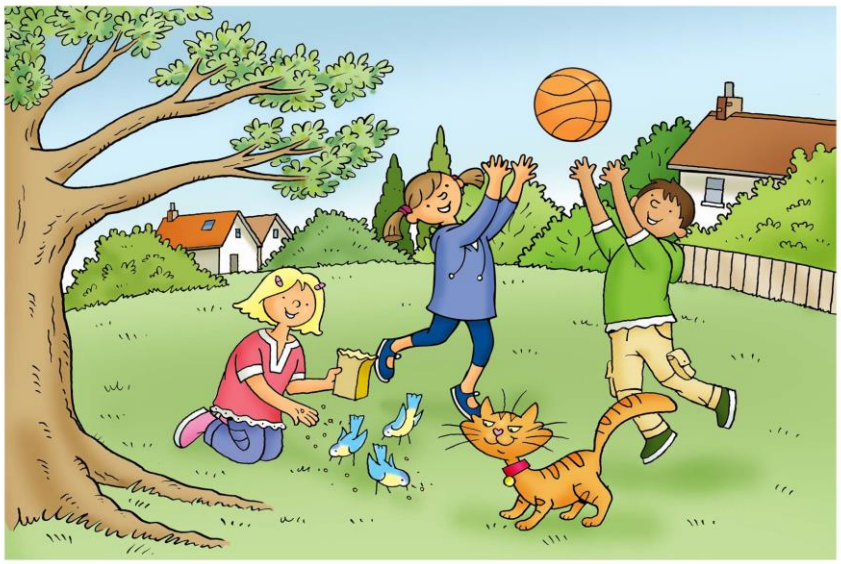
I wish you every success with the project.

Yours sincerely

Laura Stroud

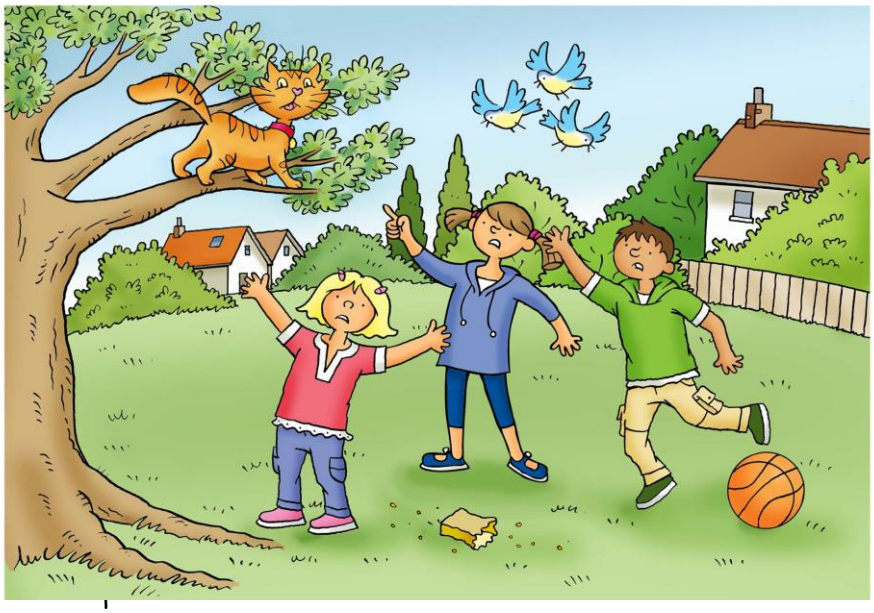
Professor Alastair Hay/ Mrs Laura Stroud/ Dr David Jayne
Chairs, LIHS/ LIGHT/ LIMM Joint REC

Appendix 2: Example of the Illustrated Story – Characters are of Average Weight

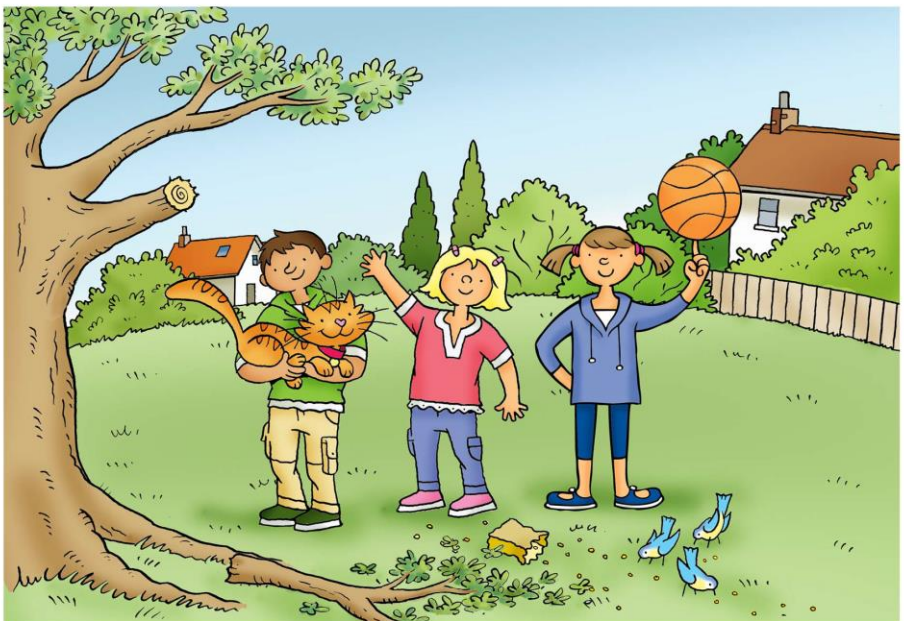


Alfina, Holly and Thomas were playing in the garden.
Alfina was throwing the ball to Thomas.
The sun was shining and the birds were singing.
Holly was feeding the birds.

Toby the cat chased one of the birds up the tree.
The other birds flew away.



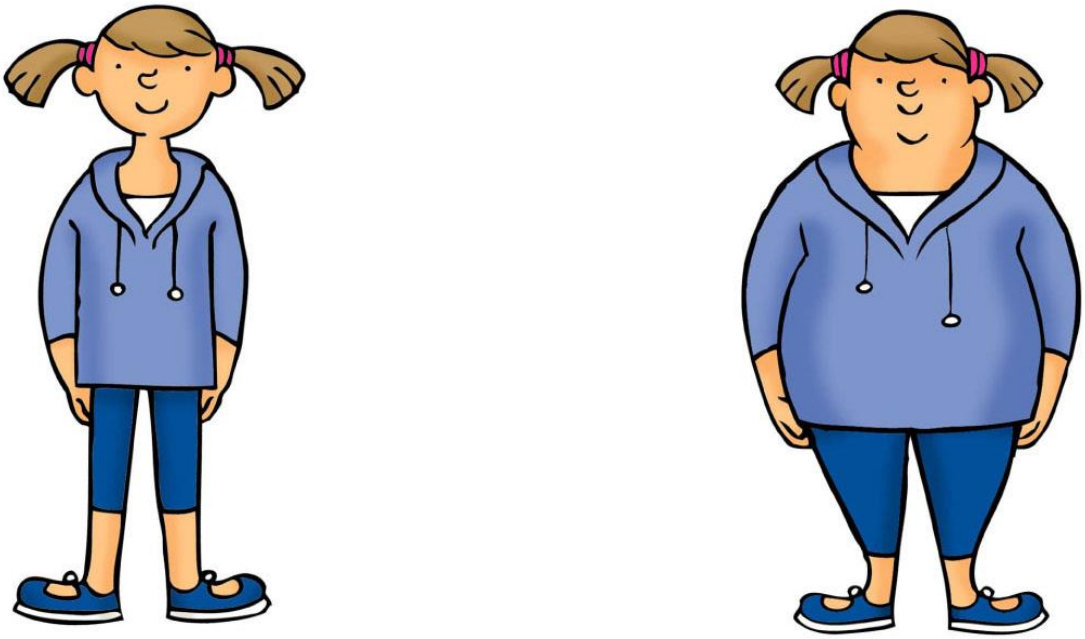
Toby would not come down from the tree.
Thomas, Alfina and Holly did not know what to do.
"Toby!" they all shouted!



Suddenly the branch Toby was standing on broke
Everyone gasped and held their breath!
Toby jumped to the ground and landed safely on his feet.
Alfina was happy that Toby was safe.
Thomas picked up Toby and said "What a silly cat!"

Appendix 3: Example of the Weight Change Character –

Alfina as Average Weight and as Overweight



Appendix 4: Semi-Structured Interview Schedule

(Primary questions are highlighted in bold; those which are not were supplementary questions)

- **Do you think Alfina has changed?**
- **What's changed about her?**
- What is different about Alfina?
- **What might have made her (child's own word for change used)?**
- How do you think this happened?
- Is there anything else that might have made her (child's own word for change used)?
- How might eating/exercise have caused her to become (child's own word for change used)?
- Why do you think food/exercise made her (child's own word for change used)?
- What foods might have made her (child's own word for change used)?
- What exercise might have made her (child's own word for change used)?
- **Do you think Alfina wanted to (child's own word for change used)?**
- **Why do you think she wanted to change?**
- **How do you think she feels now she's (child's own word for change used)?**
- **Are there any good things about becoming (child's own word for change used)?**
- **Are there any bad things about becoming (child's own word for change used)?**

Appendix 5: Collins Scale (1991)

Appendix 6: School Participation Letter

Address

Date

Dear Head Teacher

I am a graduate psychologist currently working on my Doctorate in clinical psychology at the University of Leeds. As part of my training I am completing a research project exploring ***whether young children, aged 4 -6 years, have an awareness and understanding of weight change.*** In particular, this will look at whether children understand how weight change occurs, why and the possible consequences of change and whether understanding differs between boys and girls. I would like to explain a little about the research and would welcome the opportunity to discuss with you **the possibility of undertaking this project in your school.**

I plan to conduct my research with reception and Year 1 pupils. This would involve me spending some time with your pupils on a one to one basis for approximately 10 minutes to read a short story, specifically designed for children of this age. The art work in the story has been specially designed by an illustrator for the purposes of this study, and follows the style of the Oxford Reading Scheme. The story is colourful, clear and simple, and aims to be fun and enjoyable for the child taking part.

Ideally the story would be read to the child in an area the school uses for reading, such as a quiet corner of the classroom, so there would be minimum disruption. Following the story, the child will be shown two separate pictures of the main character from the story. These pictures will show the character as having changed weight, with all other features being identical. The child will be asked a few questions about whether they notice any differences between the two characters, what they think might have caused the change and why. The children's responses will be recorded on a digital voice recorder. The parents of children in reception class and Year 1 will be sent a letter asking for consent for their child's participation.

I am looking to include children from around six Primary schools. If you feel your school is in a position to help with this study then in return we will be able to provide a summary of the final report.

I will ring you shortly to ask whether I could arrange an appointment to come and discuss the study further. Alternatively, you can contact me via email at umslb@leeds.ac.uk or my supervisor Andrew Hill on the above telephone number or address.

Many thanks,
Yours sincerely,

Sarah Baxter
Psychologist in Clinical Training

Professor Andrew J Hill
Professor of Medical Psychology
Dr Sylvie Collins
Clinical Psychologist

Appendix 7 – Parental Information Letter

Charles Thackrah Building
University of Leeds
101 Clarendon Road
Leeds
LS2 9LJ
0113 3430815
umslb@leeds.ac.uk

Date:

Dear Parent/Guardian

Your child's head teacher has agreed to help with a research project involving reception and Year 1 pupils in this school on the subject of **young children's understanding of weight change.** This study is part of my Doctoral degree in Clinical Psychology. Your child is eligible to participate, but can only do so with your permission.

A children's story has been prepared and printed. The study firstly involves your child reading the story with the researcher. They will then be shown two separate pictures of the main character from the story. These pictures will show the character as having changed weight, with all other features being identical. Your child will be asked a few questions about whether they notice any differences between the two characters, what they think might have caused the change and why (e.g. How does Alfie look now? How might this have happened?). This should take around 10 minutes. The task should be fun to complete and the story follows the style of the Oxford Reading Scheme. The researcher will read the story with your child in their classroom and their class teacher will be present at all times. The researcher is experienced and qualified to work with children.

Several Primary schools in the area are also participating and the intention is to include over 100 children in the study. Your child's participation is entirely voluntary and the study will form part of normal classroom activities. The only information I need to record about your child is their age and gender. To help with the analysis and write-up of the study, your child's responses to the questions will be recorded on a digital voice recorder, all of which will be fully anonymised. All information collected during the course of the research will be kept strictly confidential and will not be linked to children's names.

If you agree to your child's participation please complete the permission slip enclosed and return it to your child's teacher as soon as possible. Please speak to your child about taking part and if you or your child have any questions about the research project, please speak to your child's teacher, email me at the address above or leave a message for myself at the address/ number above.

With many thanks

Sarah Baxter
Psychologist in Clinical Training

Supervised by Professor Andrew Hill
Professor of Medical Psychology

Dr Sylvie Collins
Clinical Psychologist

Appendix 8 – Parental Consent Form

Young Children's Understanding of Weight Change

Permission to participate form

- I have received and understood the information provided
- I understand that my child's participation is voluntary
- I understand that and that I am free to withdraw them from the study prior to the data being analysed, without giving any reason
- I agree to my child's responses being audio recorded
- I agree that anonymised extracts of my child's responses can be used
- I agree for my child to take part in the above study

Name of Child …….

Name of Parent / Guardian ……

Signed by ……. Date ……..

Relationship to the child (i.e. parent/guardian) ……...

Appendix 9: Protocol for Obtaining the Child's Consent for Participation

Hello, my name is Sarah

I'm going to read you a story about three friends who are about your age.
Then I'd like us to have a chat about the children in the story. I will ask you a few questions about them. Is that okay?

There are no right or wrong answers. I am just interested in what you think about the children in the story.

And you don't have to answer any of questions if you don't want to.