

OBESITY STIGMA IN YOUNG CHILDREN

Madaleine Rowlinson

Submitted in accordance with the requirements for the degree of
Doctor of Clinical Psychology (D. Clin. Psychol.)
The University of Leeds
Academic Unit of Psychiatry and Behavioural Sciences
School of Medicine

July 2011

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

This copy has been supplied on the understanding that it is copyright material and that no quotation from the thesis may be published without proper acknowledgement.

ACKNOWLEDGEMENTS

I am grateful to Professor Andrew Hill for his advice, encouragement and support. I have appreciated both your expertise and your calming influence. I would also like to thank Phil Munroe for creating the beautiful story illustrations. I am grateful to my Mum, Dad and brother for providing a place for me to escape the pressures and truly relax. Thank you to my friends for providing endless support and distraction, in equal measure! I must also thank the Clinical Psychology office staff members who have been unwaveringly kind and encouraging. My final thanks go to the schools. I am grateful to the staff and teachers for their enthusiasm and practical support. I could not have asked for a warmer welcome in any of the schools. Most importantly, thank you to every child who took part in this research. Your energy and interest not only made the project possible, but also incredibly enjoyable!

Thank you.

ABSTRACT

The prevalence of obesity has increased over recent years but obesity stigma remains widespread. The main aim of this study was to examine whether the hypothesised rejection of fatness by young children is specific to overweight or common to other visible difference. Whether the body size of the character's peer group moderates or accentuates the rejection was also examined.

One hundred and fifty, four to six year old school children (79 girls, 71 boys, mean age of 5 years and 7 months), were individually interviewed. The main character was presented in a story as either overweight, in a wheelchair or average weight. The character's peer group was also varied in weight. Two methods were used to evaluate the character's perceived attributes. The main and comparison characters were rated on five point scales. Then participants chose which character was most likely to possess the attribute. Participants also made a friendship choice.

Forced choice attribute questions showed a preference for the average weight over the overweight character for happiness with her looks, number of friends, likelihood of receiving party invites, being good at school work and likelihood of winning a race. The character in a wheelchair was also rejected but on fewer attributes. Ratings showed significant differences on similar attributes but the mean scores were neutral or positive, rather than negative. On the friendship choice between the overweight and average weight characters children rejected the overweight character. The weight of the character's peer group was also found to affect perceptions of the main character.

Young children perceive and evaluate obesity differently to other visible difference but not overwhelmingly negatively. Peer relationships appear to be the attribute most affected. Social context also appears to be important at this age. The way in which children are asked to make judgements appears to affect the degree of negativity.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	2
ABSTRACT	3
TABLE OF CONTENTS	4
LIST OF TABLES	7
LIST OF FIGURES	7
INTRODUCTION	8
Obesity in young children	10
Development of obesity in childhood.....	12
Obesity stigma.....	13
Obesity stigma in childhood.....	16
Perceptions of obesity stigma in relation to other visible physical difference	16
Childhood obesity stereotypes	17
The age at which obesity stigma develops	19
Developmental stage considerations.....	23
Moderators of obesity stigma.....	25
Influential factors relating to the stigmatised individual.....	25
<i>Gender</i>	25
<i>Overweight peers</i>	26
Individual differences in anti-fat attitudes	27
<i>Beliefs around control and responsibility</i>	28
<i>Own body size</i>	30
<i>Self-perceived body size</i>	31
Methodological limitations	32
Rationale for the current study.....	33
Aims and hypotheses	35
METHOD.....	37
Design.....	37
Participants	38

Materials	39
Story books.....	39
Measures.....	40
Rating scales.....	40
Forced choice questions	41
Self-perceived body size.....	41
Character body size ratings.....	42
Procedure.....	42
Data analysis	44
RESULTS.....	45
Scaled attributes	45
Impact of Alfina’s presentation upon ratings of Holly	47
Forced choice decisions	49
Peer group weight status	52
Self-perceived body size effects.....	54
Children’s perception of the characters’ relative weights.....	55
DISCUSSION.....	57
Perceptions of overweight.....	58
Attitudes to overweight compared to average weight.....	58
<i>Attributes</i>	58
<i>Friendship choice</i>	60
Obesity in relation to other visible physical difference	60
Methodological differences	62
Moderators of obesity stigma.....	65
Gender.....	65
Influence of the social context.....	66
<i>Ratings for the comparison character when presented with an overweight or</i>	
<i>wheelchair using character</i>	66
<i>Peer group weight status</i>	68

Self-perceived body size effects.....	71
Clinical implications.....	72
Strengths and limitations	74
Recommendations for future research.....	78
Conclusions	80
REFERENCES	82
APPENDICES	96
Appendix 1 – Ethical approval confirmation.....	96
Appendix 2 – Illustrated stories	97
Appendix 3 - Examples of the ratings scale questions.....	109
Appendix 4 – Examples of the forced choice questions	115
Appendix 5 – Example of the friendship choice question	117
Appendix 6 – School participation letter	118
Appendix 7 – Parental consent letter	119
Appendix 8 – Protocol for gaining the child’s agreement to participate.	121
Appendix 9 – Summary of regression analysis for perceived body size	122

LIST OF TABLES

Table 1: Study design.....	37
Table 2: Mean (SD) ratings of Alfina and Holly in story versions 1, 2 and 3.....	46
Table 3: Odds (95% CI) of overweight or wheelchair Alfina being chosen over the control, compared with average weight Alfina over the control, in a forced choice test.....	50
Table 4: Mean (SD) ratings for Alfina as average weight and overweight with her peer group weight status at average weight and overweight.....	53
Table 5: Mean (SD) body size ratings for characters on 1-7 scale.....	57

LIST OF FIGURES

Figure 1: Mean scores for being happy with her looks.....	42
Figure 2: Mean scores for the likelihood of being invited to parties.....	43
Figure 3: Mean scores for the likelihood of winning a race.....	43
Figure 4: Self-perceived body size ratings.....	54

INTRODUCTION

In western society the prevalence of obesity in children has been rising for many years (Wang & Lobstein, 2006; World Health Organisation, 2000; World Health Organisation, 2011). In addition to the health concerns associated with obesity it has been found that overweight children experience stigmatisation and that this stigma has increased over the past four decades (Latner & Stunkard, 2003). The development of interventions aimed at promoting healthy lifestyles is essential but the challenge is to do so without further stigmatising children for being overweight (Musher-Eizenman, Holub, Miller, Goldstein & Edwards-Leeper, 2004).

Stigmatisation is of particular concern during childhood years when social relationship skills are first being developed. Children may be especially vulnerable and sensitive to weight stigmatisation and its consequences (Puhl & Latner, 2007). Accordingly, experiences of peer relationship difficulties and social isolation have been described in obese children (Puhl & Latner, 2007; Zeller & Modi, 2006; Neumark-Sztainer, Falkner, Story, Perry, Hannan & Mulert, 2002). Furthermore, the impact of stigma on children has been associated with mental health difficulties in later life (Thompson, Coovert, Richards, Johnson & Cattarin, 1995; Wardle & Cooke, 2005).

Research over the past 40 years has consistently observed that young children hold negative attitudes towards overweight peers (Sigelman, Miller, & Whitworth, 1986; Cramer & Steinwert, 1998). Some studies have suggested that stigma develops in children as young as three to four years of age (Musher-Eizenman, Holub, Miller, Goldstein & Edwards-Leeper, 2004; Cramer & Steinwert, 1998). Descriptions of the attributes assigned to overweight children have begun to be explored (Brylinsky & Moore, 1994). However, little is known about the factors which may influence stigmatisation, such as the rater's actual and self-perceived bodyweight (Holub, 2008) and the body sizes of the child's peer group (Penny & Haddock, 2007). Some

inconsistencies have been noted and methodological concerns have also been raised (Jarvie, Lahey, Graziano & Framer, 1983; Morgan & Wisely, 1996).

This study aimed to examine obesity stereotyping and stigmatisation in young children and to address these methodological concerns. Previous research findings have been drawn together and salient factors relating to obesity stigma are explored. A comprehensive literature review was performed. The databases PsychInfo, Ovid Medline and Embase were searched using the following terms: children, childhood, obesity, overweight, physical difference, difference, stigma, stereotypes, prejudice, discrimination, anti-fat attitudes and attitudes.

In this paper the terms obesity and overweight are used. As highlighted by Puhl and Brownell (2003), there are limited benefits of using body mass index (BMI) cut-offs to determine the use of obesity and overweight labels when referring to stigmatisation. This is due to the lack of evidence suggesting an association between the degree of obesity and the level of stigma experienced (Myers & Rosen, 1999). Therefore, in line with their recommendations overweight and obesity will be used interchangeably to refer to having excessive weight rather than a specific BMI (Puhl & Brownell, 2003).

Stigma is thought to represent negative perceptions, and hence expectations and opinions, about groups of people at a societal level (Corrigan, 2000). Puhl & Latner (2007) provide a comprehensive definition of stigmatisation which draws upon the theory that a stigmatised person possesses an attribute or characteristic that is linked to a devalued social identity (Crocker, Major & Steele, 1998; Goffman, 1963) and that stereotypes increase the person's vulnerability to status loss, unfair treatment, prejudice, and discrimination (Link & Phelan, 2001). Weight stigma refers to negative weight related attitudes and beliefs that are manifested by stereotypes, bias, rejection, and prejudice towards children because they are overweight or obese (Puhl & Latner, 2007).

This review will describe the current climate of childhood obesity and outlines a model to structure the influential factors for the development of obesity. Obesity stigma research will then be explored before looking specifically at stigmatisation in childhood. The difference between obesity stigma and stigma directed towards other visible physical difference will be highlighted here. Research into the psychosocial implications of childhood obesity will be outlined and the obesity stereotypes suggested to be held by children will be discussed. Both recent and formative research suggesting the young age at which obesity stigma develops will then be discussed. Developmental theories outlining pertinent developmental issues for four to six year old children will be outlined. This review will then go on to look at potential mediating and moderating factors for childhood obesity stigma. Factors relating to both the degree of obesity stigma received and the level of anti-fat attitudes held by children will be included. Finally, methodological limitations will be highlighted before the rationale, aims and hypotheses for this project are stated.

Obesity in young children

The prevalence of childhood obesity has risen during the last three decades, particularly in first world countries (Wang & Lobstein, 2006; World Health Organisation, 2000; World Health Organisation, 2011). In 2004, 30% of four to eleven year olds in England were overweight, with prevalence increasing by 1.9% annually (Lobstein, 2010). Some evidence suggests a levelling off of this rapid increase, but stabilisation is occurring at a high prevalence level and there is very little evidence of decline (Lobstein, 2010).

The physical health implications of obesity include both immediate and long-term risks (Reilly, Houston-Callaghan, Donaghey & Hammed, 2010). In the short term, childhood obesity adversely affects physical health and there is a high prevalence of co-morbidity.

During childhood the presence of cardiovascular risk factors and the impact upon the development and exacerbation of asthma have been well documented (Reilly, Kelnar, Alexander, Hacking & Methven, 2003). More recent research has suggested a link with endocrine (Bordini, Littlejohn & Rosenfield, 2009; Wilkin, 2008) and orthopaedic abnormalities (Goulding, Taylor, Jones, Manning & Williams, 2002). Research into the long-term consequences of childhood obesity includes increased risk of stroke in later life (Lawlor & Leon, 2005) and adult coronary heart disease (Baker, Olsen & Sorensen, 2007). An increase in adult mortality associated with being overweight in childhood and adolescence has also been suggested (Gunnell, Frankel, Nanchahal, Peters & Davey-Smith, 1998).

Obesity in childhood has been linked to adult obesity, with weight gain occurring between the ages of 2 and 5 years (McCarthy, Hughes, Tilling, Davies, Smith & Ben-Shlomo, 2007) and being overweight by 8 years of age (Centres for Disease Control and Prevention, 2009) as specific predictors of adult obesity. It is difficult to determine the link between obesity and secondary diseases as these illnesses are often multi-factorial and are also found in non-obese individuals (Lean, 2010). However there is a clear health care burden attributed to obesity in adulthood, with varying degrees of risk for health problems including type-2 diabetes, coronary heart disease and cancer (Lean, 2010; World Health Organisation, 1998). Therefore obesity has both immediate and long-term health consequences for the child. It also increases the likelihood of being obese as an adult, with the associated health risks.

Concerns for the consequences of childhood obesity have led to the development of obesity prevention schemes. The National Child Measurement Programme (The Information Centre for Health and Social Care, 2008) is a detection and signposting service that aims to engage parents with the importance of healthy weight in children. However, the need to reduce obesity must involve motivating action without blaming obese children for their weight status (Adler & Stewart, 2009). The challenge is to

implement schemes without further stigmatising and isolating those already overweight (Musher-Eizenman et al., 2004).

Development of obesity in childhood

The search for a medical explanation for childhood obesity has been unsuccessful; underlying pathological causes of obesity are very rare (Reinehr, Hinney, de Sousa, Austrup, Hebebrand & Andler, 2007) and the search for an obesity gene has been unsuccessful (Speakman, 2006). The balance between energy intake and expenditure (i.e. eating and exercising behaviours) is thought to be the central determinant of body size (Linde & Jeffery, 2011). However, within obesity research, the complexity of factors influencing activity levels and dietary patterns has been acknowledged (Crawford, Ball, Jeffery & Brug, 2010).

The Six-Cs Model (Harrison, Bost, McBride, Donovan, Grigsby-Toussaint, Kim, Liechty, Wiley, Teran-Garcia & Jacobsohn, 2011) brings together multidisciplinary research findings to produce a developmentally adaptable model of the contributors to overweight and obesity in childhood. This ecological model builds on the basic premise of the imbalance between energy intake and expenditure, but incorporates the vast array of factors affecting these behaviours such as the opportunities and resources available, cultural, familial and individual practices, and personal attributes. The Six-C's model is constructed of six spheres, from proximal to distal; the Cell (genetic/biological characteristics), the Child (child characteristics), the Clan (familial characteristics), the Community (local community/organisational characteristics), Country (state and national characteristics) and Culture (cultural and societal characteristics). Within each of these six spheres there are five zones: Zone 1, nutritional-related opportunities and resources; Zone 2, activity-related opportunities and resources; Zone 3, nutritional-related practices; Zone 4; activity-related practices; Zone 5, personal and relational attributes. For example, in the community sphere a nutrition-related resource may be

the presence of vending machines in schools, whilst in the child sphere an activity-related practice may be excessive media use. The two-fold aim of this model is to organise both the influential factors of childhood obesity and to structure the development of prevention and intervention programmes. The need for such a comprehensive and flexible model highlights the complexity of childhood obesity.

Obesity stigma

Despite knowledge of the complexity of the factors influencing obesity (Wadden, Brownell & Foster, 2002; Harrison et al., 2011), negative stereotyping of overweight or obese adults is both widespread and socially accepted (Puhl & Brownell, 2003; Puhl & Heuer, 2009). Stereotypes include laziness, sloppiness, lacking self-discipline and being less competent (Puhl & Brownell, 2001; Puhl & Brownell, 2003; Teachman, Gapinski, Brownell, Rawlins & Jeyaram, 2003).

Negative stereotyping leads to prejudice and inequality (Hill, 2011; Puhl & Heuer, 2009), with weight-based discrimination occurring in most areas of life (Puhl & Brownell, 2001). In America, obesity discrimination is at a level comparable to racial or age discrimination and appears to be increasing (Andreyeva, Puhl & Brownell, 2008). Weight stigma has been found in the domains of education (Karnehed, Rasmussen, Hemmingsson & Tynelius, 2006; Baum & Ford, 2004; Puhl & Brownell, 2006), employment (Hastings & Snowden, 2009; Klarenbach, Padwal, Chuck, & Jacobs, 2006), health care (Puhl & Brownell, 2001; Teachman & Brownell, 2001) and interpersonal relationships (Chen & Brown, 2005; Ball, Crawford & Kenardy, 2004). These pervasive anti-fat attitudes focus on blame and personal responsibility (Andreyeva, Puhl & Brownell, 2008).

The prevalence of mental health difficulties in the obese population raises particular concern (Puhl & Heuer, 2009; Hill, 2011). An increased likelihood of depression, suicidal

thoughts and suicide attempts has been found (Carpenter, Hasin, Allison & Faith, 2000). A bi-directional relationship between obesity and depression has been proposed (Markowitz, Friedman & Arent, 2008; Napolitano & Foster, 2008) and obesity stigma is thought to act as a mediating factor between obesity and depression (Friedman, Reichmann, Constanzo, Zelli, Ashmore & Musante, 2005). The prevalence of eating disorders is higher than in the general population (Striegel-Moore & Franko, 2008). Body image dissatisfaction (Friedman et al., 2005) and low self-esteem (Annis, Cash & Hrabosky, 2004; Carr & Friedman, 2005) are also common in the obese population. The psychosocial implications of obesity may be best illustrated by quality of life research which suggests that obese individuals reported a poorer quality of life across domains in comparison to average-weight contemporaries (Doll, Petersen & Stewart-Brown, 2000).

It is important to understand the impact of obesity upon peer relationships during childhood when the learning of social skills is occurring (Puhl & Latner, 2007). Despite findings that children do not reject obese peers (Philips & Hill, 1998), in light of the impact of stigma upon obese adults, there is concern that the stereotypes held by children may influence peer relationships. Specific childhood experiences of social marginalisation (Pierce & Wardle, 1997), low levels of support from peers (Zeller & Modi, 2006) and bullying (Neumark-Sztainer et al., 2002; Griffiths, Wolke, Page & Horwood, 2006) have been identified. Overweight children have been found to do less well academically (Datar & Sturm, 2006), may be missing out on potentially beneficial health care (Jeffrey, Voss, Metcalf, Alba & Wilkin, 2005) and may even be discriminated against within their own families (Crandall, 1995).

Childhood obesity has also been linked to mental health difficulties in later life (Wardle & Cooke, 2005). Depression is thought to emerge during adolescence (Atlantis & Baker, 2008), particularly for obese girls, and is thought to be mediated by social and psychological factors (Sjoberg, Nilsson & Leppert, 2005). As with obese adults, there is

thought to be a bi-directional relationship between obesity and depression in adolescents (Napolitano, & Foster, 2008). Low self-esteem (Franklin, Denyer, Steinbeck, Caterson & Hill, 2006), particularly linked to physical appearance (Phillips & Hill, 1998) has been found in overweight children. Overall quality of life has also been found to be lower for overweight or obese children (Williams, Wake, Hesketh, Maher & Waters, 2005; Zeller & Modi, 2006), with one study finding a comparable quality of life for obese children as in non-obese children undergoing chemotherapy (Schwimmer, Burwinkle & Varni, 2003).

The comparison of anti-fat attitudes with racism has highlighted important similarities and differences between the two forms of stigmatisation (Crandall, 1994). Anti-fat attitudes, like racism, have been linked to ideological values and the rejection of deviance from them. However, obese individuals do not appear to gain a sense of belonging or acceptance from other overweight people (Crandall, 1994; Latner, O'Brien, Durso, Brinkman & MacDonald, 2008). The lack of in-group membership has been examined from a Social Identity Theory (SIT) perspective. SIT proposes that an individual will favour members of groups to which they belong and rate members of other groups more negatively (Tajfel & Turner, 1986). This intra- and inter-group framework has been usefully applied to racial prejudice in adults. However for obesity, a comparable sense of belonging and pride for obese in-group members does not exist. The reporting of anti-fat attitudes by obese individuals cannot be explained by SIT.

The lack of acknowledgement of obesity stigma in Western society, let alone the lack of legal protection and social sanctions against obesity stigma, also sets it aside from other forms of stigma (Fishbein & Ajzen, 1974). Obesity stigma remains widespread and acceptable (Crandall, 1994; Latner et al., 2008). Society's acceptance may relate to the process of adjustment to difference, as it compares to levels of social acceptance for racism as it was in the 1950s. In the 1980s Sigelman, Miller and Whitworth (1986) suggested that the positive impact of increased public consciousness on racial, sexist

and disability difference has not yet translated to weight difference. However, the situation appears to have continued unchanged over the last 30 years since this observation was made (Puhl & Heuer, 2009; Andreyeva, Puhl & Brownell, 2008).

The current pervasive level of obesity stigma is proposed to require, both culturally and personally, a situation where obesity is perceived as undesirable and is believed to be controllable (Crandall, 1994). A meta-analysis found moderate effects for a “beautiful is good” stereotype where success and desirable personality traits were attributed to physically attractive individuals (Eagly, Ashmore, Makhijani & Longo, 1991). Concern over weight and shape is a strong cultural narrative in Western society and involves both an idealising of thinness as well as a stigmatising of fatness (Hill, 2007).

Obesity stigma in childhood

Despite the increasing prevalence of childhood obesity (Wang & Lobstein, 2006; World Health Organisation, 2000; World Health Organisation, 2011) and the growing understanding of its complexity obesity stigma and prejudice in childhood appears to parallel that experienced by obese adults (Puhl & Brownell, 2003; Hill & Silver, 1995; Latner & Stunkard, 2003). A preference for thinness has been seen in children as young as 6 years of age (Collins, 1991). Young children have also been found to hold negative attitudes towards overweight peers (Sigelman, Miller, & Whitworth, 1986; Cramer & Steinwert, 1998). Stigma encountered by overweight and obese children can be expressed overtly or subtly. Examples include verbal teasing, physical bullying, being the target of rumours or being ignored or avoided (Puhl & Latner, 2007).

Perceptions of obesity stigma in relation to other visible physical difference

The understanding of stigma is aided by examining how stigmatised groups are perceived by children. Research into children’s perceptions of body size variations over the last 40 years has found obese children to be less liked than both average weight

and thin peers. Early research asked a sample of boys and girls between 10 and 11 years old to look at simple drawings of six children, the same sex as themselves (Richardson, Goodman, Hastorf and Dornbusch, 1961). The six drawings depicted children with different disabilities, including an obese child, and one with no visible physical disability. A preference ordering was obtained by asking the child to select the child they liked the best. This selection continued until a rank order had been produced. The child with no visible physical disability was ranked top and the obese child ranked bottom. A review of the literature in the 1980's reported consistency in this rank ordering (DeJong & Kleck, 1986).

In 2003, Latner and Stunkard replicated Richardson et al.'s (1961) study and found the degree of obesity stigmatisation in children to have increased further. By using Richardson et al.'s (1961) original drawings and methodology, and a similar age and gender mixed sample, a comparison was made on the rank ordering of physical disabilities. The results show that not only was the obese child still ranked bottom, but that the obese child was favoured even less whilst the top ranking (no physical difference) was ranked even higher than in 1961.

Of the other disabilities, only the facially disfigured child had increased in ranking; both the child using crutches and the child in a wheelchair were ranked lower. The same gender differences were also found with boys rating functional disabilities lowest and girls rating disabilities related to appearance lowest. Significant agreement on these rank orderings was found within the sample which suggests obesity stigma is a pertinent difference for both girls and boys during childhood (Latner & Stunkard, 2003).

Childhood obesity stereotypes

Although anti-fat attitudes held by adults are difficult to elicit due to social desirability effects (Wang, Brownell & Wadden, 2004) obesity stereotypes regarding children have been found in specific populations, such as educators (Neumark-Sztainer, Story &

Harris, 1999). It has also been suggested that parents may communicate weight-based stereotypes to their children (Adams, Hicken & Salehi, 1988).

An exploration of the attitudes children hold towards other children has led to research into the behavioural and personality traits associated with different body shapes and sizes. Staffieri (1967) investigated bodyweight stereotypes in six to ten year old children by asking them to assign adjectives to silhouette representations of extreme endomorph, mesomorph and ectomorph body types. These body types were employed to reflect fat, muscular and thin figures respectively. Adjectives most commonly assigned to the endomorph figure included; cheats, argues, gets teased, lazy, dirty and stupid. Adjectives assigned least included good looking, smart, healthy and lots of friends. The authors summarised the findings to show an unfavourable and socially aggressive stereotype for the endomorph (i.e. fat) body type. This study found a negative overweight stereotype, but the thin figure also received negative attributes suggesting a preference for the muscular body type rather than a specific rejection of the overweight figure.

Brylinsky and Moore (1994) used a semantic differential method which involved rating figures on a seven point scale between bipolar adjectives such as many friends/few friends, happy/sad, and smart/stupid. A sample of 368 five to ten year old children rated a same sex thin, average and overweight figure on twelve pairs of adjectives. This study of stereotypes revealed two dimensions across the three different body shapes. The first dimension included attractiveness, politeness, popularity and intelligence; the authors referred to this as social and interpersonal interaction. The second dimension was termed physical attributes, and included strength, health and physical dominance. The results suggested that although stereotypes were not clear cut they could be identified. The overweight stereotype emerged mainly as negative scores on the social and personal interaction dimension. It also was seen negatively on the physical attributes dimension, but not as negatively as the thin stereotype. The thin stereotype

emerged as a combination of positives on the social and interpersonal dimension and negatives on the physical attributes dimension. The average stereotype was positive on both stereotypes. It was most positive on the physical attributes but not as positive on the social and personal interaction dimension. This study provides a useful framework for further exploration of obesity and weight related stereotypes.

The age at which obesity stigma develops

Sigelman, Miller and Whitworth (1986) built on findings that as children grow older attitudes towards obesity become more negative whilst attitudes towards physical disability become more positive (Richardson, 1970). The aim was to explore the development of stigmatisation of physical difference in young children. Four year old children were found to show negative reactions to any physical difference to their personal norm, whilst from five years of age the degree of stigmatisation towards difference polarised. Attitudes towards physical disability and race became more positive whilst those towards obesity became more negative. However, these results were found using a choice methodology. Although described by the authors as an open-choice format, children were required to allocate positive and negative adjectives to drawing of children with a range of physical differences. However, although children could choose freely they were required to allocate all adjectives including the negative ones. Therefore they were forced to provide negative evaluations of some of the drawings. When a free-choice or open question format which did not require children to allocate negative adjectives was used very few children rated any child with a visible difference negatively (Sigelman, Miller and Whitworth, 1986).

As already outlined, Brylinsky and Moore (1994) also found specific body weight stigmatisation to develop in a similar aged sample. The emergence of the overweight stereotype, which was most negatively perceived on the social and personal interaction dimension and to a lesser extent negatively on the physical attributes dimension, was

seen to emerge between six and seven years of age and developed through childhood. In particular there was a clear change in the stereotype between five and nine years of age. In the youngest age group the overweight child was rated mildly positively on the physical attribution dimension. In the seven years old sample evaluation was negative and for nine year olds the overweight child was clearly viewed negatively on the physical attribution dimension. This contrasts to the thin stereotype which was found to remain constant across age groups.

Cramer and Steinwert (1998) further explored the development of stigmatisation. Thirty children between 41 and 71 months old (i.e. approximately three and a half to six years of age) were read four stories. Two stories used female and two stories used male characters. One of each of these two stories was realistic whilst one was fantasy. The purpose of this distinction was to produce one situation in which participants were able to draw on similar experiences or relate it to people they may know, whilst in the other they were not. Four sets of pictures (two sets of girls and two sets of boys) were created. Each set had one overweight and one thin figure. Features such as height, clothing and hair styles were kept identical. Each child was read all four of the stories and was then presented with a picture set and asked to identify which was the mean and which was the nice person from the story. The results showed that the overweight figure was more likely to be chosen as the mean child in both the realistic and the fantasy stories.

In a second strand to this study, Cramer and Steinwert (1998) included a sample of children as young as three years of age. Evidence was found that at the age of three children assigned more negative attributes to the overweight rather than average size figure. There were also fewer positive adjectives assigned to the overweight than the average target. In the four year old sample both these stigmatisations were stronger with the overweight target being rated more negatively and less positively than both the average and thin target. This stereotyping was stronger again in the five year old

sample. However, this finding was only moderately internally consistent across the three tasks used to examine anti-fat attitudes. These differences across groups were not found using a forced-choice format. Therefore at 3 years of age the extent and reliability of anti-fat attitude findings is questionable.

In an extension of the above study Musher-Eizenman et al. (2004) asked 42 four to six year old children to rate three body figure drawings (overweight, average and thin) on bipolar adjective rating scales. The adjectives nice/mean, smart/stupid and has friends/has no friends were on a continuum and the child was asked to place the figure at the point between the adjectives where they thought it belonged. In total, 18 figure drawings were used for this adjective task. These figures were then presented in a friendship selection task. Each child was asked to pick three figures they would most like to play with followed by which figure they would most like to be best friends with. The results of the adjective rating task show the overweight figure to receive the most negative adjectives. This supports Cramer and Steinwert's (1998) findings, but here the overweight figure was most negatively rated across a wider range of adjectives than used in the original study. The overweight figure was also least likely to be chosen as both a playmate and best friend (Musher-Eizenman et al., 2004), adding to the evidence that obesity stigma develops in children as young as four years of age.

However, a critical evaluation of these studies suggests methodological limitations that bring into question the reliability of the findings. The use of bi-polar adjectives where participants were asked to place underweight, average weight and overweight drawings of children on a scale between these adjectives is an attempt to avoid the problem of participants reporting their knowledge of obesity stereotypes rather than eliciting their individual attitudes towards difference. But when children are presented with all three body sizes this may prompt them to the focus on weight difference. Equally they were prompted that both positive and negative responses are available and potentially expected. Having two adjectives on the scale may also be

developmentally challenging for young children. It may be more developmentally appropriate for children to rate characters on one adjective at a time. Overall, the materials used are appropriate for children but little effort has been made to present the tasks in a manner that aids the child's understanding of and involvement with the task. These studies could be improved by making materials and methods more engaging for young children. Despite these limitations, these studies provide a platform to consider issues they have not addressed fully and to incorporate the examination of additional factors thought to influence obesity stigma. They will therefore be returned to later in this section.

The degree of obesity stereotyping by four to six year old children was explored using an overweight male character by Harrison (2009). A priority in this study was to maximise engagement and understanding of the task for this young age group. Children were introduced to the characters in a professionally illustrated story designed specifically for this sample. The large, modern illustrations over four pages accompanied a story which the child was encouraged to read with the researcher. In order to avoid cueing children into weight variations different versions of the story were created including showing the main character as either average weight or overweight. Body shape and weight were not mentioned at any point in the story or the questions. Incorporating a choice question following each ratings question allowed the researcher to examine whether the way the child was asked would have any impact upon the findings. Therefore the main methodological issues identified in previous research were addressed. Obesity stigma was differentiated from other physical difference by including a character in a wheelchair. Both were rated and chosen in comparison to a character with no visible physical difference. Participants were randomly allocated to one of the three research conditions (main character either being average weight, overweight or in a wheelchair). Both the main character and a same sex peer were scored on a five point scale for attributes such as likelihood of winning a race, being invited to parties and amount of time spent watching television.

Participants were also asked to choose which character they would be friends with. This study found fewer positive perceptions of the overweight character than the average weight character. To a lesser extent the child in the wheelchair was also rated less positively than the child with no visible physical difference. The overweight child was viewed to have significantly fewer friends, be less likely to be invited to parties and be less likely to win a race than the average weight child. The overweight child was also significantly less likely to be chosen as a friend than the average weight child. These findings suggest a clear preference for the average weight male character, particularly in relation to the overweight character, in children as young as four years old. Children therefore seem to perceive visible physical differences and make preference choices for specific body types from four years of age. This highlights the importance of research into obesity stigma in this young age group and in particular the value of making the materials and tasks assessable and enjoyable for this young age group. This will be discussed again when discussing the methodological limitations of previous research and in the rationale for this study.

Developmental stage considerations

Consideration of the developmental stage of the child is important in understanding their responses to difference. As highlighted by Aboud (1988), prejudice in children cannot be seen as a miniature version of that in adults. Childhood is unquestionably a time of rapid development across domains. A four to six year old child is developing socially, linguistically and cognitively. In terms of social development peer relationships tend to dominate with the focus shifting from learning to play with others to gaining peer acceptance (Keenan & Evans, 2009). Understanding the perspectives of others is thought to be developed by the age of four and the skills needed to build allies, influence others and make interpersonal comparisons are being learned throughout childhood (LaLonde & Chandler, 1995). Self-identify is also a developmental issue at this age. By six years of age a sense of self will be developing as children begin to attach

values and person traits to their self-descriptions (Harter, 1998). According to Piaget, a four to six year old child is in the pre-operational stage of development (e.g. Piaget, 1983). At this stage the child tends to rely on perceptual cues, to think only from his or her own perspective, is not yet able to perform mental operations on objects and tends to only focus on one aspect of an object or problem. Children have not yet learnt that objects remain the same despite changes to their physical appearance and that objects can belong to both subcategories and broader groups. Only when a child reaches the concrete operational stage at around seven years of age do they develop a less ego-centric view, begin to think more flexibly and develop abstract reasoning skills (Keenan & Evans, 2009; Miller, 2011; Piaget, 1983).

Sigelman, Miller and Whitworth (1986) drew upon socio-cognitive developmental theory to understand obesity stigma. As children get older they move from a global evaluation of “like me” versus “not like me” to a range of “not like me” categories linked to specific personality traits (Livesley & Bromley, 1973). Children categorised as similar to them will be preferred over those who are dissimilar. Four to six year old children will be developing more sophisticated “not like me” categorisations. In relation to understanding difference in others, children are beginning to pay more attention to internal rather than external characteristics and are starting to understand that people who look different may not actually act differently. However, they may still retreat to more basic categorisation methods when faced with obvious visible differences or when processing more complex concepts. Developmental theory suggests that as children get older they learn to understand themselves in relation to others in a more sophisticated, complex manner (Miller, 2011). When looking at prejudice in childhood, Aboud (1988) noted that own-group biases peaked between five and seven years of age and then steadily decline beyond nine years of age.

Moderators of obesity stigma

Obesity stigmatisation has been clearly demonstrated but some people experience more stigma than others and some people hold stronger anti-fat attitudes than others (Crandall, 1994). Understanding these influential factors may guide stigma reducing strategies. This section will review research findings that are applicable to early childhood years.

Influential factors relating to the stigmatised individual

Research has increasingly explored the potential factors which affect obesity stigma. Adult research has suggested factors such as gender, facial attractiveness and degree of obesity may be implicated. However, research into the impact of these factors during childhood is only beginning to emerge. In addition to the variations in stigma at different ages discussed previously, gender and peer group influences are explored.

Gender

Research into anti-fat attitudes towards different gender characters and comparing boys and girls has generated mixed findings. As already described, Brylinsky and Moore (1994) found gender differences related to thin but not overweight stereotypes. Early research into children's attitudes towards visible physical difference found girls to value physical appearance and boys to value physical capacity (Richardson, 1970). When rating same sex figures with various visible physical differences, girls have been found to rank obesity lower than boys (Latner & Stunkard, 2003). However, when research has examined evaluations of weight difference girls were found to be less stigmatising towards an overweight target than boys when using a neutral gender target figure (LeBow, 1988).

When looking at anti-fat attitudes held by girls compared to boys, Turnbull, Heaslip & McLeod (2000) found no difference but suggested that young children exhibit stronger anti-fat attitudes towards females than males. Both boys and girls between two and

five years of age made forced choice attributions of personal, social and behavioural traits to drawings of both average and overweight males and females. For the female dolls there was a significant difference in attribution scores between the average and overweight doll, with the overweight doll being more negatively rated. Also, a significant effect of age on prejudice was found against the overweight female doll, with the older boys and girls being more prejudiced than the younger ones.

The interactions between the target figure's gender and the rater's gender have also been explored. Cramer and Steinwert (1998) found a tendency for stronger cross-gender than same-gender stigmatisation in one of their two studies but not the other. Overall, they report their findings as showing no effect of gender on stigmatisation. Hill and Silver (1995) did not find any interaction between the sex of the child rating and the target child sex for overweight individuals in a large sample of nine year old children. Kraig and Keel (2001) also explored gender interactions using a sample of 34 male and female seven to nine year old children. Findings support the presence of weight based stigma but ratings on attributions failed to find evidence to support the hypothesis that girls would be subject to more negative weight based stigmatisation than boys. However, an interesting pattern was identified. For boys, children distinguish being overweight from being average or thin, whilst for girls, children distinguish being thin from being average or overweight. This suggests being overweight is salient for boys and being thin is salient for girls. These findings suggest that obesity stigmatisation is expressed and experienced by both genders. However, the interaction between rater and target gender may affect the degree of stigmatisation and the specific negative attributes associated with obesity. Further research is needed to better understand gender differences in weight bias.

Overweight peers

Recent research has also suggested that a child's peer group can influence how they are perceived, with an overweight peer group leading to more negative appraisals of an

individual. Penny and Haddock (2007) found a “mere proximity effect” (Helb & Mannix, 2003), whereby a target character’s likeability was influenced by the weight of their peers, in children aged five to ten years. Penny and Haddock (2007) created male and female cartoon images that were either average or overweight and presented each target character surrounded by four same sex background characters that were all either average weight or overweight. The participant was asked to ignore the background characters and only make judgements of the target character. They were asked “How much would you like to be friends with them?” on a ratings scale from 1 (no) to 4 (yes). The results show that overweight targets were liked significantly less than average weight targets. In relation to proximity effect predictions, results showed that an overweight female target was liked significantly less when presented with average weight background characters than overweight background characters. Average weight targets were liked significantly less when presented with overweight background characters than with average weight characters. This supports the proximity effect theory but was only seen for female target characters. Penny and Haddock (2007) suggested that a group is liked only as much as the least liked person. This has implications for stigma reduction programmes, as it may provide a hypothesis for understanding the motivation for a child’s peer interactions leading to the social isolation experienced by some overweight children.

Individual differences in anti-fat attitudes

Differences in anti-fat attitudes held by adults may be influenced by factors such as social class, ethnicity, past experiences and familiarity with obesity, beliefs around responsibility for one’s body size, and the individual’s actual or self-rated body size. Adult obesity research findings are beginning to be explored in children. The relationship between anti-fat attitudes and social class has been explored in four to eleven year old children and findings suggest children from higher social class schools attribute fewer positive characteristics to overweight figures than peers from lower social class schools (Wardle, Volz & Golding, 1995). Familiarity has also been shown to

affect children's attitudes towards physical difference. Zajonc (1968) has suggested that the more times a person has encountered an object the more favourably it will be evaluated. A study assessing children's evaluations of physical disabilities both before and after their integration into a mainstream school found a more positive appraisal was given once the children had spent time interacting (Rapier, Adelson, Carey & Croke, 1972). However, the fact that the prevalence of childhood obesity has increased whilst stigmatisation has increased (Latner & Stunkard, 2003) suggests this familiarity is not facilitating a reduction in stigmatisation of obesity. Research has also explored the association between parents' beliefs and body sizes on children's obesity stereotyping (Hansson & Rasmussen, 2010). Obesity stereotyping was greater for children who had a leaner parent or whose parent held stronger beliefs about personal control over body weight, but children and their parents were found to hold different weight based stereotypes. The findings that relate to causal beliefs for obesity and the impact of one's own actual and perceived body size will be explored in depth in this section.

Beliefs around control and responsibility

Richardson (1970) proposed that perceived responsibility may be linked to obesity stigmatisation. Accordingly, in children between four and six years of age it has been found that a perceived high level control over one's body weight was associated with greater stigmatisation towards a drawing of an overweight child (Musher-Eizenman et al., 2004). However, research has reported mixed findings for the relationship between blame and peer rejection in young children (Sigelman, 1991; Musher-Eizenman et al., 2004; Iobst, Ritchey, Nabors, Stutz, Ghee & Smith, 2009)

Attribution theory suggests that people have a tendency to search for causal links when making sense of a situation. These identified causes are then used to form reactions to people or events (Rush, 1998). The level of controllability a person is perceived to have over the cause of stigma and its potential for change are central determinants of stigmatisation. Research into adult obesity stigma used measures of the perceived

controllability and stability, alongside affective and behavioural responses and identified significant associations (Weiner, Perry & Magnusson, 1988). Two distinct groups were suggested by the authors, termed mental-behavioural and physically-based stigmas. Obesity stigma fell within the mental-behavioural stigmas which were associated with high levels of controllability and propensity for change. When perceived this way, obesity elicited low levels of pity and high levels of anger, resulting in social distancing and a lack of support or help. Crandall (1994) applied attribution theory to obesity and found that it was possible to alter anti-fat attitudes by changing the perceived causes for a person's body size. By providing genetic and physiological explanations obesity was seen as less controllable. This research suggests that it is possible to alter the attributions people assign to physical differences and that these changes can elicit less stigmatising responses.

These distinctions relating to the cause of stigma and its controllability fit with previous research into children's perceptions of physical difference. Children showed a preference for a child using crutches or a wheelchair, which were physical causes of difference and are outside the child's control, over obesity (Richardson et al., 1961). Attribution theory has been specifically explored in adolescents and children by manipulating the causal reasons given for a visible physical difference. Teenagers were found to stigmatize an overweight girl less when personal blame was removed by providing a medical explanation for her weight (DeJong, 1980).

However, in a nine to eleven year old sample, although it was possible to alter the perceived controllability of obesity, this did not translate into a reduction in obesity stigmatisation (Anesbury & Tiggemann, 2000). Similarly, at six to nine years of age it was possible to reduce the perceived responsibility a person has for their body weight but this did not change their liking for the obese girl (Sigelman, 1991). For children as young as four to six years old overweight characters that were perceived to be responsible for their weight were rated less positively. However, again this did not

extend to friendship selection (Musher-Eizenman et al., 2004). This contrasts with Lobst et al. (2009) who found that as blame increased, peer acceptance decreased, with preschool children showing lowest acceptance. This suggests it is possible to alter attribution beliefs held by children but it is not clear whether a change in behaviour towards the individual will necessarily follow.

Changing children's attributional beliefs has had negative consequences when applied to other medical conditions. Altering children's beliefs around the cause of diabetes or epilepsy has been found to isolate the child further (Potter & Roberts, 1984). Similarly, Bell and Morgan (2000) found that providing information resulted in less blaming of the individual, however only the youngest children translated less fault into more positive ratings. Furthermore, when looking at the impact on behaviours in the older group of children providing medical information actually reduced their willingness to include the obese child in an academic activity. The authors wondered if providing medical information actually increases children's awareness of the physical difference at an age when conformity is so important. Blame and personal responsibility may be influential factors in how adults respond to obesity but the connection between causal beliefs and behaviour is not so clear for children.

Own body size

The impact of the rater's own body size has received an increasing amount of research attention. Social identity theory proposes that people evaluate others who are perceived to be similar (their in-group) more positively than those who are perceived to be different (their out-group) (Tajfel & Turner, 1986). As already outlined, in relation to obesity stigma, this would suggest that average weight individuals would rate people with average weight body shapes more favourably and those at any other bodyweight more negatively. Conversely, the theory would suggest that overweight individuals would rate other overweight individuals more positively and other weight individuals more negatively. However, adult research suggests that overweight individuals do not

hold fewer anti-fat attitudes than average or thin individuals; they are as anti-fat as anyone else (Latner, Stunkard & Wilson, 2005; Wang, Brownell & Wadden, 2004).

In group favouritism has been found in children as young as three years old (Yee & Brown, 1992). But, as with adults, research findings suggest that children's body weights are not related to anti-fat attitudes (Counts, Jones, Frame, Jarvie & Strauss, 1986; Cramer & Steinwert, 1998; Kraig & Keel, 2001).

Self-perceived body size

One recent study found that a child's self-perceived body weight may moderate anti-fat attitudes (Holub, 2008). Differences in anti-fat attitudes of sixty-nine four to six year old children were explored. The interaction of age, gender, actual body size and perceived body size on anti-fat attitudes were analysed. Actual body size was measured by calculating their body mass index (BMI). Perceived body mass was ascertained using the Collins (1991) figure arrays. This involves the child choosing one of seven black and white figures ranging from thinnest (rated 1) to heaviest (rated 7) in response to the question "which child do you most look like?" Two methods for rating anti-fat attitudes were used. The first measure used the same Collins (1991) figures to rate the acceptability of the three above average body weight figures; acceptability scores ranged from 0 to 3 depending on the number chosen as acceptable. The second measure, involved rating a thin, average and overweight character on seven-point scales containing two bi-polar adjectives (e.g. has friends/has no friends). This allowed for the calculation of a mean score of all adjectives for the overweight character, the difference between ratings for the average and overweight figures and the mean rating across all adjectives for the thin figure. The findings suggest that a child's perceived body size, not actual body size, was related to their anti-fat attitudes. Children who perceived themselves as heavier held fewer anti-fat attitudes.

Methodological limitations

Inconsistencies and methodological concerns have been raised. Previous research has been criticised for using a forced-choice methodology which may overestimate negative attitudes (Jarvie et al., 1983; Morgan & Wisely, 1996). For example, if a child is asked to rank figures from most to least acceptable (Richardson et al., 1961; Richardson, 1970; Harper, Wacker & Cobb, 1986), one figure must be ranked least acceptable but it does not follow that the child views this figure as unacceptable, just less acceptable than the others. Likewise, if a list of adjectives have to be assigned to a choice of figures (Staffieri, 1967; Cramer & Steinwert, 1998) the figure least favoured is likely to receive the most negative attributes. But this may be more connected to not giving these attributes to their favoured figure rather than choosing negative attributes for the lesser favoured figures. Studies using a scale between bipolar adjectives (Brylinsky and Moore, 1994; Musher-Eizenman et al., 2004) avoid the forced choice design, but if children are asked to rate all three figures of varying body size or physical difference, cues as to the variable of interest may have been very clear to participants. The implication of all these methodological difficulties is that research may have described children's awareness of anti-fat attitudes rather than their adherence to these (Jarvie et al., 1983).

Other methodologies have been explored. Hiller (1981) asked the child to write a story based on either an average or overweight character and coded stories according to the emotional tone (i.e. positive, good/happy or negative/bad/sad). Lerner and Shroeder (1971) allowed for an unprompted study of anti-fat attitudes by directly assessing the words used by children to answer questions such as "what would a fat/thin boy be like?" However, this may have been a difficult task for young children to understand and is open to the effects of social desirability. Other research found children to have a preference for a disabled over a non-disabled child when photographs of children were used, rather than silhouettes or drawings (Morgan & Wisely, 1996). This raises questions as to whether the materials used in many previous studies were too

impersonal so hindered identification with and empathy for the child. Social desirability biases also threaten this study, but it provides a strong case for making test materials more accessible to children.

As already outlined, a recent study (Harrison, 2009) found children of 4 to 6 years of age to hold more negative attitudes towards an overweight than average weight character. When a forced-choice design was used the overweight child was consistently rejected in favour of an average weight child. However, when a rating scale was used children rated the overweight child neutrally or positively, just not as positively as the average weight child. This study is consistent with Kraig and Keel's (2001) findings that children rate an overweight child least favourably, but still generally positively. This supports Jarvie et al.'s (1983) suggestion that the degree of obesity stigma in young children reported in previous research may have been an over-estimation due to methodological limitations.

Rationale for the current study

Research into children's attitudes towards physical difference, including body size difference, has led to hypotheses that stereotypes and stigmatisation begin to develop in children as young as four years of age. However, being aware of a stereotype and holding stigmatising beliefs are two different constructs. The methodological limitations outlined above suggest this distinction may not be being clearly identified in research so is an area in need of further study.

Research is beginning to build a picture of obesity stigma in childhood. This study will focus on the young age group when stigmatisation is first thought to be expressed and experienced. Methodological limitations and the adaptation of research methods to make them appropriate for young children will also be addressed by this study.

The development of research methodologies which both facilitate the examination of children's attitudes towards characters whilst minimising the likelihood that children are either by default rating characters negatively or simply reporting their awareness of stereotypes have made important advances. Positive steps are being made to address criticism that the anti-fat attitudes found in previous research may have been falsely overstated due to methodological limitations (Jarvie et al. 1983).

This study aims to build on the findings described previously by Harrison (2009). A desire to increase the accessibility of materials prompted the writing and professional illustration of a story in a familiar style for this age group. Three versions were created that were identical with the exception of the main character. Obesity stigma was differentiated from other physical difference, in this study as a character in a wheelchair, in comparison to a character with no visible physical difference. Participants were randomly allocated to one of the three research conditions (main character either being average weight, overweight or in a wheelchair). Two methodologies were used to determine attitudes. Both the main character and a same sex peer were scored on a five point scale for attributes relating to social, educational and activity achievements. The same attributes were also examined by asking participants to make a choice between the two characters, requiring children to indicate who they thought would be most likely to possess the specific attribute or characteristic they had just rated. Children were also asked who they would most like to be friends with.

Harrison (2009) found that the negative attitudes towards an overweight character were dependent upon the methodology. Forced choice questions revealed anti-fat attitudes but ratings scales described neutral or positive, not negative, evaluation of overweight. This comparison suggests anti-fat attitudes based on forced choice questions may be exaggerated. Each child was also assessed on attitudes towards only one character at a time so fewer visual cues are available to prompt the child to body

size, thereby minimising the likelihood that children will report the obesity stereotypes they may believe are being looked for. This may reduce the likelihood of children producing answers merely showing their awareness of stereotypes. The materials used were also developed using an illustrated story format to allow children to both understand the task and to identify with the figures. This methodology appears to have been successful in exploring methodological limitations but the study was confined to anti-fat attitudes towards a male character.

The key alteration for the current study was the change of gender for the main character. This study aimed to explore attitudes towards a female character. Attitudes towards females are particularly important as any gender differences found in previous research have suggested anti-fat attitudes to be more negative towards girls than boys.

Knowledge of the specific factors relating to both children's stigmatising behaviour and experiences of stigma are likely to guide obesity prevention interventions. There is much research still to be continued in this area. However, two specific factors are examined by the present study. The impact of a child's peer group weight status will be explored. As the character in the Harrison (2009) study was initially presented in a story with two other children it was possible to create separate conditions where the peers were either average weight or overweight which allowed this analysis to be incorporated. In addition, and following the observation of Holub (2008), the influence of self-perceived body size was investigated.

Aims and hypotheses

The main aim of the study was to examine how four to six year old children perceive visible physical difference. The study was interested in whether the overweight character would be rated more negatively than an average weight control figure on a range of attributes. In addition to the rating scales, a forced choice question format

was used for each attribute to determine the impact of methodological differences on research findings. It was expected that the forced choice format, in contrast to the rating scales, would result in more negative evaluations of the overweight character. In addition, the forced choice format allowed a direct friendship choice to be made between characters of different body sizes. The study was also interested in whether the expected negative appraisals of the 'overweight' character were shared with another visible physical difference, in this case those of a wheelchair user.

Specific factors thought to mediate or moderate anti-fat attitudes were also incorporated. Gender effects, the influence of the peer group's weight status upon attitudes towards the main character and the impact of participant's self-perceived body size upon anti-fat attitudes were analysed.

Hypotheses:

1. Children will negatively stereotype and reject the overweight character, compared to the same character presented at an average weight.
2. The character in the wheelchair will also be negatively stereotyped and rejected, but to a lesser extent than the overweight character.
3. The rating scale method will reveal less negative attitudes to the overweight character than the forced choice method.
4. The presence of an overweight peer group will negatively influence the ratings of the target character.
5. Children who perceive themselves as heavier will hold less negative attitudes towards the overweight character.

METHOD

Design

This study comprised two experiments with a total of five conditions. Both were experimental in design. Each condition was represented by a specific story version (Table 1).

The first experiment examined anti-fat attitudes by comparing participants' evaluations of overweight and average weight characters. In order to compare weight-based stigma with attitudes towards other physical differences a story version with a character in a wheelchair was incorporated. This created three between group research conditions based on whether a main character was: average weight, overweight, or in a wheelchair. The impact of age and self-perceived body-size was incorporated in these analyses.

Table 1: Study design

Story version	Character presentations	Experimental data used for:	
		Anti-fat attitudes	Impact of peer group weight status
1	Alfina: Average weight Peers: Average weight	✓	✓
2	Alfina: Overweight Peers: Average weight	✓	✓
3	Alfina: In a wheelchair Peers: Average weight	✓	
4	Alfina: Average weight Peers: Overweight		✓
5	Alfina: Overweight Peers: Overweight		✓

In the second experiment there were four research conditions focusing on the impact of peer group weight status upon children's evaluations of the character. This provided four groups and a 2x2 design with the two factors being the character's weight status and the peer group weight status, both either average weight or overweight.

Power calculations were computed in order to determine the required sample size. G*Power software (Faul, Erdfelder, Lang & Buchner, 2007) was used to compute the group sizes needed to ensure the experiment is powerful enough to detect significant differences between experimental and control groups. For the hypotheses examining attitudes towards the overweight character in relation to average weight and wheelchair using characters calculations were based on effect sizes from Harrison (2009). To be adequately powered to avoid type two errors sample sizes between 22 and 89 were calculated. As Harrison (2009) found significant differences and had a large effect size with group sizes of 30 participants the decision to replicate this was made. In order to incorporate the examination of context effects, two further experimental groups were required. A lack of directly comparable previous research and a need to consider the feasibility of data collection within the time frame led to the pragmatic decision to use group sizes of 30 participants across all five research conditions. This resulted in an aim for a total sample size of 150 participants.

Participants

Children were recruited from four schools in the North of England. Participation was open to all children in Reception and Year One classes, but required parental consent and the child's assent. Parental consent was provided for 153 out of a possible 300 children. One child did not want to participate. In addition, two participants were excluded, one due to a lack of understanding of the task and another due to not engaging with it. Therefore a total of 150 children were included in the data analysis.

Their mean age was 5 years and 7 months (mean = 5.66 (SD = 0.68)), and ranged from 4 years 5 months to 6 years 11 months. Fifty three percent were female and 47% male.

Ethical approval was granted by the Leeds Institute of Health Sciences and Leeds Institute of Genetics, Health and Therapeutics (LIHS/LIGHT) (Appendix 1).

Materials

Story books

Fictional characters were introduced to the participants in an illustrated story. The story used in the Harrison (2009) study was re-drawn by the same professional illustrator to change the gender of a main character. The male character, Alfie, was replaced with a female, Alfina. The narrative remained the same, aside from the name change, and the only illustrative change was to the main character. The two peers (Thomas and Holly) remained the same. As in the Harrison (2009) study, three story versions were created with Alfina presented as either average weight, overweight or in a wheelchair. In this study a further two story versions were created to incorporate changes to the peer group weight status. The appearance of these stories was consistent with commonly used children's books, such as the Oxford Reading scheme. The story was presented over four pages, with the colour illustration positioned above the text on each page (Appendix 2). The story entailed a cat that got stuck up a tree, with the three children in the story depicted as a similar age to the participants. It was written and illustrated to avoid strong preferences for any of the characters. There was a happy ending to the story. The purpose of the story was to familiarise the participants with the characters. To aid engagement with the task the story was made enjoyable to read through the use of bright, colourful illustrations and a buoyant narrative.

Measures

The attribute questions devised by Harrison (2009) were used here to examine anti-fat attitudes. They were designed to represent the domains of self-competence assessed in Harter and Pike's (1984) measure of self-esteem and to incorporate attributes used in previous research. Concrete examples of attributes were presented as young children find this easier than evaluating generic personality traits (Harter and Pike, 1984). These attributes were presented in two formats, a rating scale for the two characters separately and a forced choice question.

Rating scales

Attitudes towards Alfina (the main character) and Holly (the comparison) following all story versions were rated separately on a five-point scale. Each attribution question was presented individually on a series of cards, as they were in the Harrison (2009) study. The character being rated (either Alfina or Holly) was illustrated in the centre of a laminated A4 sheet of paper. The question was presented above and the rating scale below the image (see Appendix 3). As one character was presented at a time, each question was asked twice.

The first time the question was presented it was introduced by a sentence incorporating two brief statements. This sentence simultaneously suggested that some children are very good at a particular task whilst others are not very good at the task (Harter & Pike, 1984). This was followed by a question asking where they think the main figure would rate on a five point visual scale. In the presentation of the second character the question was asked without the introductory sentence.

The response scale was presented as five numbered circles ranging from small to large across the page from left to right. The child was told that the question should be answered by pointing to one of the circles relating to how likely they thought the character was to exhibit the specific behaviour or characteristic in question.

Two versions of the questions were used to ensure that Alfina and Holly were presented with the introductory sentence and rated first for an equal number of participants. Therefore there were A and B alternatives for each of the five story versions. In total there were 10 response booklets, two for each of the five story versions. The same figure was consistently presented first for each participant. This order alternated each time a version of the story was used.

Forced choice questions

Participants who were allocated to one of the story versions examining anti-fat attitudes (story versions 1, 2 and 3) first rated characters on the scales described above. They were then presented with the forced-choice questions. Illustrations of Alfina and Holly were presented side by side with their names beneath on an A4 laminated page (Appendix 4). The attributes examined by the forced choice methodology were identical to those for rating scales, but were framed in a “who would be most likely...” format, presented above the illustrations. The participant was asked to point to their choice for each question. For all forced choice questions, if the participant initially answered “both” or “neither” this was recorded and acknowledged as their preferred answer. They were then encouraged to choose between the two characters and this response was also recorded.

A forced-choice question was also used to determine the friendship choice. All participants, regardless of their experimental condition were asked to choose either Alfina or Holly as their friend (Appendix 5).

Self-perceived body size

Self perceived body size was determined using the Collins (1991) pictorial scales illustrating a child’s body size ranging from very thin to obese. These were gender specific seven point scales commonly used to assess self-perceived body size. In line

with Holub's (2008) study, each participant was presented with the same sex scale and asked "which child do you most look like?".

Character body size ratings

In order to determine if participants perceived the story characters as either average weight or overweight, as intended, a validity check was incorporated. A sub-sample of participants were presented with either an average weight or overweight version of each character alongside the appropriate gender rating scale, as used to determine self-perceived body size (Collins, 1991), and asked "which child does this girl/boy most look like?". The combination of overweight and average weight presentations of characters for each participant was determined by random number generation.

Procedure

Parents or guardians of all children in reception and year 1 classes of consenting schools (Appendix 6) were written to, to inform them of the research and ask consent for their child to participate (Appendix 7). Schools within the West Yorkshire area were initially contacted if were thought likely to be interested in participating in research or if they had participated in previous studies.

At the beginning of each data collection session the teacher introduced the researcher and research project to the class. Each child took part in the study individually. Participation order was arranged by the teacher, teaching assistants or the children and took place in a quiet area in the class room. After a brief introduction the child was asked for their agreement to participate (Appendix 8).

Participants were allocated to one of the five versions of the illustrated story in a pre-determined sequence (from 1 through to 5), each child being allocated to the next story version. The story was read together, with children choosing whether to read the

story themselves, with the researcher or to be read to. Each child read only one version of the story.

Participants allocated to versions 1, 2 or 3 provided ratings and then a forced choice answer for each attribution. Those allocated to versions 4 and 5 provided ratings only, with the exception of the forced choice friendship question. The questions were presented in the same order each time, but to avoid possible order effects the starting place in the booklet moved forward by one question each time. It was anticipated that questions towards the end may not be given equal consideration if the participant's attention was waning, and that questions at the beginning may not be responded to accurately whilst the child's confidence and understanding of the task increased over the first few questions. These variations in engagement were expected to vary idiosyncratically between participants but by changing the order of questioning any impact was spread across all questions.

The self-perceived body size rating was obtained following the completion of the attribution and choice of friend questions.

A sub-sample of 58 participants also contributed to the validity check. These participants rated a sample of all the possible permutations of the characters on the seven point visual scale also used to assess self-perceived body size rating. This provided between 27 and 31 ratings of perceived body size for each of the story characters presented. The equivalent male characters (Alfie and Thomas) from the Harrison (2009) study were also incorporated.

At the end of participation, each child was asked if they had any questions or comments before returning to class.

Data analysis

Attitudes to visible physical difference were examined using both rating scale and forced choice data. The rating scale mean scores were analysed using paired t-tests. Two x 3 factor ANOVAs were used to examine the impact of variations in Alfina's presentation (average weight, overweight and in a wheelchair) on the ratings of Holly who remained average weight throughout. The forced choice questions allowed for the generation of odds ratios for the likelihood of overweight Alfina being rejected in favour of average weight Holly, in relation to average weight Alfina being rejected over average weight Holly. Equivalent odds ratios for Alfina in a wheelchair were also produced.

The impact of the peer group weight status was explored using rating scale mean scores for Alfina. Two factor ANOVAs examining the main effects and interaction of Alfina's weight status and peer group weight status (both either average weight or overweight) were computed.

Self-perceived body-size was analysed for any moderating effects in relation to the participant's attribution ratings for the main character. This was done by including the rating as a co-variate in ANOVA.

Multiple regressions were also conducted to examine the potential influence of children's self-perceived body size, gender and age upon ratings for Alfina, Holly and the discrepancy between them.

T-tests were used to examine children's perceptions of the character's relative weights.

RESULTS

Scaled attributes

The mean ratings of Holly and Alfina in the five story versions are summarised in Table 2. In story 1, where all characters were presented as average weight and without physical difference there were no significant differences between the ratings of Holly and Alfina. This confirms that children did not favour either character when presented at an average weight on any of the main attributes.

In Story 2, when Alfina was overweight she was rated as significantly less likely to be happy with her looks ($t(30) = 3.47, p < 0.01$), have less friends to play with ($t(30) = 3.57, p < 0.05$), get less party invites ($t(30) = 3.67, p < 0.01$), do less good school work ($t(30) = 3.23, p < 0.05$) and be less likely to win a race ($t(30) = 3.03, p < 0.001$) than Holly presented as average weight.

Alfina in a wheelchair was significantly less likely to be invited to parties ($t(31) = 3.39, p < 0.01$), do less well at her school work ($t(31) = 3.26, p < 0.01$), and be less likely to win a race ($t(31) = 3.00, p < 0.01$) than Holly.

Although Alfina was clearly rejected in favour of Holly when overweight or in a wheelchair on several attributes, the actual scores she received were still positive or neutral rather than negative. On the five-point scale a mean score of 3 divided positive from negative ratings. On the positively framed questions a higher number reflected a positive rating and vice-versa for those framed negatively. Where there were significant differences in ratings between overweight Alfina and Holly children still rated Alfina positively. Similarly, where there were significant differences between Alfina in a wheelchair and Holly, Alfina still received a positive or neutral mean score (Table 2).

Table 2: Mean (SD) ratings of Alfina and Holly in story versions 1, 2 and 3.

	Alfina:		Overweight		Wheelchair	
	Average weight		Average weight		Average weight	
	(N=29)		(N=30)		(N=31)	
Holly:	Holly	Alfina	Holly	Alfina	Holly	Alfina
How <i>happy</i> do you think X is with the way she looks?	4.07 (1.44)	4.62 (0.98)	4.67 (0.88)	3.47 ** (1.71)	4.26 (1.24)	3.61 (1.59)
If X was at you school, how many <i>friends</i> do you think she would have to play with?	4.10 (1.45)	4.24 (1.22)	4.50 (1.11)	3.57 * (1.72)	4.26 (1.03)	3.84 (1.59)
How often do you think X would get invited to <i>parties</i> ?	3.83 (1.39)	4.21 (1.26)	4.67 (0.76)	3.67 ** (1.54)	4.42 (0.89)	3.39 ** (1.61)
If X was at your school, how often do you think she would get <i>called names</i> about the way she looks?	2.93 (1.71)	2.79 (1.66)	2.70 (1.90)	3.47 (1.90)	2.48 (1.69)	2.77 (1.77)
If X was at your school, how good do you think her <i>school work</i> would be?	4.00 (1.46)	3.41 (1.64)	4.33 (1.35)	3.23 * (1.74)	4.39 (1.02)	3.26 ** (1.61)
How <i>naughty</i> do you think X would be at school?	1.93 (1.44)	2.62 (1.80)	2.37 (1.85)	3.03 (1.81)	2.32 (1.74)	3.00 (1.79)
How likely do you think X would win in a <i>race</i> ?	3.72 (1.46)	3.79 (1.59)	4.60 (0.81)	3.03 *** (1.79)	4.91 (1.22)	3.00 ** (1.69)
How much time would X spend <i>watching TV</i> ?	3.69 (1.69)	2.93 (1.73)	3.50 (1.61)	2.83 (1.76)	3.61 (1.45)	3.00 (1.48)
How much <i>food</i> do you think X would eat?	3.76 (1.55)	3.59 (1.43)	3.63 (1.45)	3.50 (1.70)	3.58 (1.36)	3.42 (1.56)

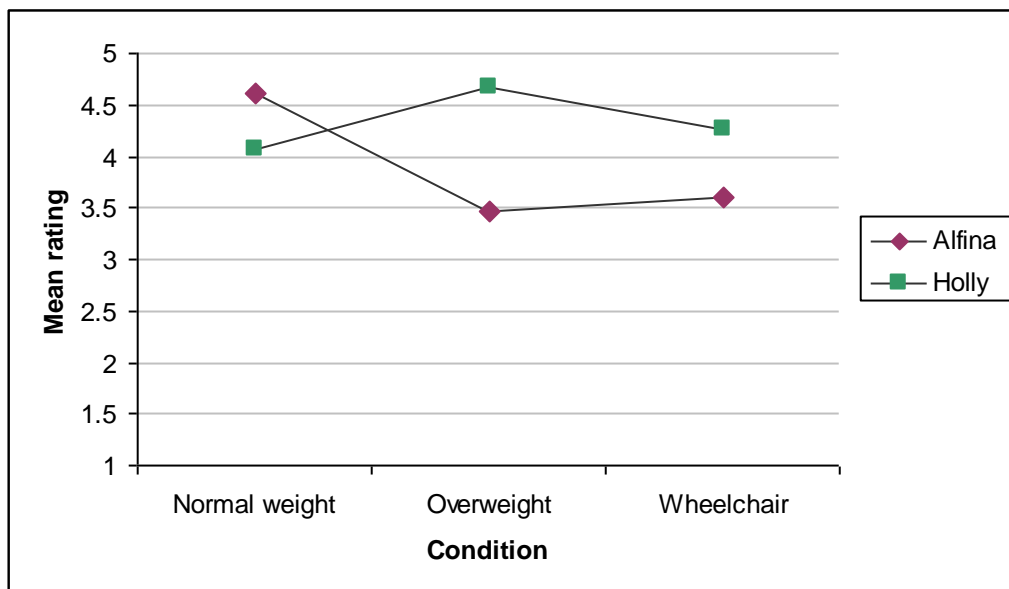
Paired t-tests. * p<0.05, ** p<0.01, *** p<0.001

Impact of Alfina's presentation upon ratings of Holly

The mean ratings for the comparison figure Holly on some of these attributes appeared to vary according to the form in which Alfina was presented. Therefore, for attributes with a significant difference between ratings for Alfina and Holly (Table 2) 2x3 ANOVAs testing for character by condition interactions were carried out. In total five ANOVAs were run. Overall, there were three significant interactions between the ratings given to Holly and the form Alfina was presented. These were for the attributes relating to happiness with her looks, likelihood of being invited to parties and likelihood of winning a race (Figures 1, 2 and 3).

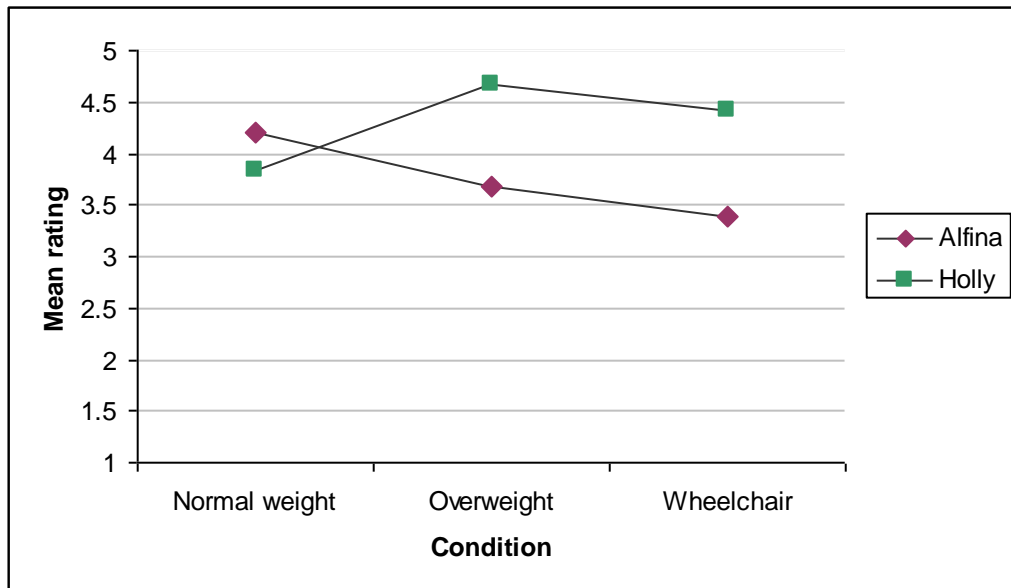
There was a significant character by condition interaction in ratings for being happy with her looks ($F(2,86) = 5.68, p < 0.01$; Figure 1). Alfina was rated most positively when presented at average weight than when overweight or in a wheelchair. Conversely, Holly was rated most positively when presented with Alfina in the overweight and wheelchair conditions.

Figure 1: Mean scores for being happy with her looks.



There was also a significant character by condition effect on the social attribute of being invited to parties ($F(2,86) = 5.93, p < 0.01$; Figure 2).

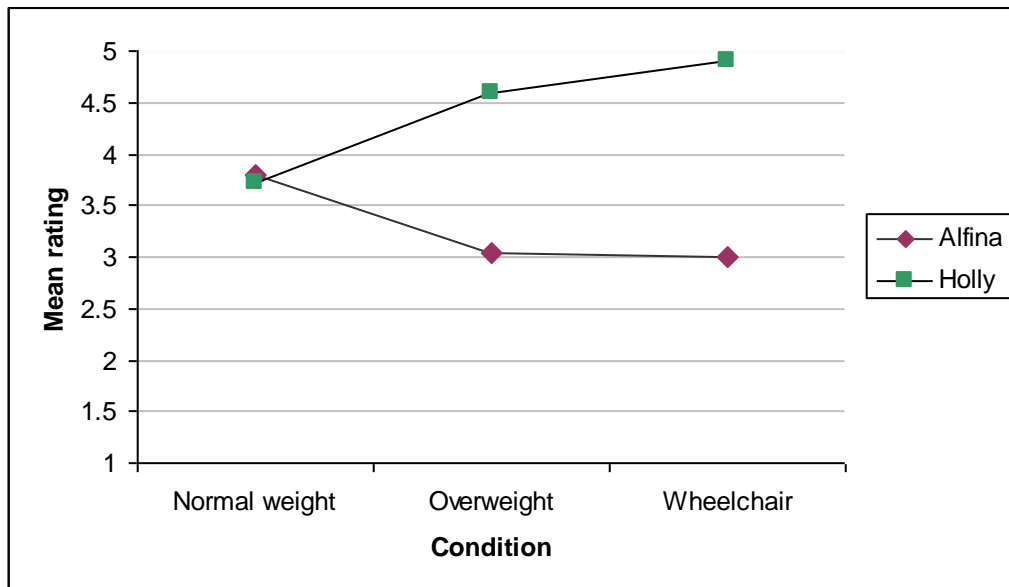
Figure 2: Mean scores for the likelihood of being invited to parties



Alfina was rated most positively when presented at average weight than when overweight or in a wheelchair. Conversely, Holly was rated most positively when presented with Alfina in the overweight and wheelchair conditions but not in the average weight condition on this attribute.

A significant character by condition effect was also seen on ratings for being likely to win a race ($F(2,86) = 4.33, p < 0.05$; Figure 3). Alfina was rated most positively when presented as average weight than when overweight or in a wheelchair. Conversely, Holly was rated most positively when presented with Alfina in the overweight and wheelchair conditions but at a similar level to Alfina in the average weight condition.

Figure 3: Mean scores for the likelihood of winning a race



Forced choice decisions

Odds ratios were calculated to determine the likelihood of overweight Alfina being chosen over Holly in comparison to average weight Alfina being chosen over Holly (Table 3).

When participants were asked to choose one of the characters as a friend, overweight Alfina was much less likely to be chosen than average weight Alfina (OR = 0.08 (0.02-

0.38)) (Table 3). When Alfina was overweight only two participants choose her over Holly in comparison to 14 participants who chose average weight Alfina over Holly.

Table 3: Odds (95% CI) of overweight or wheelchair Alfina being chosen over the control, compared with average weight Alfina over the control, in a forced choice test.

	Alfina: Holly:	Average weight Average weight (N=29) A ¹	Overweight Average weight (N=30) A ¹	Wheelchair Average weight (N=31) A ¹
How <i>happy</i> do you think X is with the way she looks?	1.00	22	0.05 (0.01-0.19)	4 0.18 (0.06-0.54)
If X was at your school, how many <i>friends</i> do you think she would have to play with?	1.00	19	0.19 (0.06-0.58)	8 0.38 (0.13-1.08)
How often do you think X would get invited to <i>parties</i> ?	1.00	13	0.31 (0.10-0.99)	6 0.50 (0.17-1.46)
If X was at your school, how much do you think she would get <i>called names</i> about the way she looks?	1.00	16	1.63 (0.57-4.67)	20 0.51 (0.18-1.44)
If X was at your school, how good do you think her <i>school work</i> would be?	1.00	14	0.27 (0.08-0.85)	6 0.21 (0.06-0.69)
How <i>naughty</i> do you think X would be at school?	1.00	19	1.73 (0.55-5.41)	23 1.29 (0.43-3.83)
How likely do you think X would win in a <i>race</i> ?	1.00	16	0.13 (0.03-0.45)	4 0.39 (0.14-1.11)
How much time would X spend watching <i>TV</i> ?	1.00	9	1.48 (0.51-4.33)	12 2.37 (0.82-6.81)
How much <i>food</i> do you think X would eat?	1.00	12	1.85 (0.66-5.21)	17 1.33 (0.48-3.69)
Who would you <i>choose to be friends with</i> ?	1.00	14	0.08 (0.02-0.38)	2 0.37 (0.13-1.10)

A¹ is the number of children who chose Alfina over Holly in each group

For the forced choice questions relating to participants' opinions of Alfina (Table 3), overweight Alfina was significantly less likely to be chosen in comparison to average weight Alfina on the attributes relating to social relationships: 'how many friends do you think she would have to play with?' (OR = 0.19 (0.06-0.58)) and 'how often do you think X would get invited to parties?' (OR = 0.31 (0.10-0.99)). There was a significant difference on the attribute relating to body image and attractiveness: 'how happy to you think X is with the way she looks' (OR = 0.05 (0.01-0.19)) and athletic ability 'how likely do you think X would win in a race?' (OR = 0.13 (0.03-0.45)). A significant difference was also seen on the attribute for intellectual ability; 'how good do you think her school work would be?' (OR = 0.27 (0.08-0.85)).

No significant differences were found on the negatively framed attributes of likelihood of being called names and being naughty. Nor was overweight Alfina perceived differently to average weight Alfina on the question of 'amount of time spent watching TV' and 'the amount of food eaten'.

Similarly, odds ratios were calculated to determine the likelihood of Alfina in a wheelchair being chosen over Holly, in comparison to average weight/no physical difference Alfina being chosen over Holly (Table 3). There was no significant difference between the likelihood of Alfina in a wheelchair being chosen as a friend over Holly and the likelihood of average weight/no physical difference Alfina being chosen over Holly. Therefore Alfina in a wheelchair was not rejected as a friend.

Alfina in a wheelchair was rejected on two of the attributes, one relating to body image and attractiveness; 'being happy with her looks' (OR = 0.18 (0.06-0.54)) and the other relating to perceived intelligence; 'how good her school work would be' (OR = 0.21 (0.06-0.69)).

Peer group weight status

The mean scores for Alfina when presented as average weight and overweight with either average weight or overweight peers are summarised in Table 4. Two by 2 ANOVAs were used to investigate the impact of peer group weight status upon ratings of Alfina. The main factors related to weight status: of Alfina and her peer group.

Peer group weight status had a significant effect on the rating of Alfina on the question of: 'how good do you think her school work would be?' ($F(1,114) = 5.84, p < 0.05$). Overall, Alfina was rated as doing better school work when with overweight peers, with the highest rating ($M = 4.63$) for average weight Alfina when with overweight peers (Table 4). In addition, children rated Alfina as more likely to watch TV when with overweight peers compared to average weight peers ($F(1,114) = 11.03, p < 0.001$). That is, when the peer group were overweight, Alfina was rated significantly higher on the amount of time spent watching TV regardless of her own weight. The effect of peer group weight status also approached, but did not reach, significance for the amount of food children rated she would eat ($F(1,114) = 3.67, p = 0.058$).

Alfina's weight had a significant impact on the ratings for 'how happy do you think Alfina is with the way she looks?' ($F(1,114) = 19.657, p < 0.001$), 'how likely do you think Alfina would win a race?' ($F(1,114) = 16.275, p < 0.001$), 'how many friends do you think she would have to play with?' ($F(1,114) = 5.792, p < 0.05$) and 'how often would she get invited to parties?' ($F(1,114) = 4.252, p < 0.05$), 'how good do you think her school work would be?' ($F(1,114) = 5.995, p < 0.05$) and 'how naughty do you think Alfina would be at school?' ($F(1,114) = 5.768, p < 0.05$). Overweight Alfina was rated as less likely to be happy with her looks, to win a race and do well at her school work, and to have fewer friends to play with and receive fewer party invites than average weight Alfina. Overweight Alfina was rated as more likely to be naughty at school than average weight Alfina. There were no significant interactions between the target character and peer group weight status.

Table 4. Mean (SD) ratings for Alfina as average weight and overweight with her peer group weight status at average weight and overweight.

	Alfina:	Average weight	Average weight	Overweight	Overweight
	Peers:	Average weight	Overweight	Average weight	Overweight
		(N=29)	(N=30)	(N=30)	(N= 30)
	Alfina	Alfina	Alfina	Alfina	Alfina
How <i>happy</i> do you think X is with the way she looks?		4.62 (0.98)	4.77 (0.63)	3.47 (1.71)	3.77 (1.65)
How many <i>friends</i> do you think she would have to play with?		4.24 (1.22)	4.50 (1.08)	3.57 (1.72)	3.93 (1.60)
How often do you think X would get invited to <i>parties</i> ?		4.21 (1.26)	4.20 (1.16)	3.67 (1.54)	3.67 (1.58)
How much do you think she would get <i>called names</i> about the way she looks?		2.79 (1.66)	2.60 (1.85)	3.47 (1.90)	2.97 (1.90)
How good do you think her <i>school work</i> would be? ¹		3.41 (1.64)	4.63 (0.77)	3.23 (1.74)	3.40 (1.85)
How <i>naughty</i> do you think X would be at school?		2.62 (1.80)	2.27 (1.80)	3.03 (1.81)	3.43 (1.81)
How likely do you think X would win in a <i>race</i> ?		3.79 (1.59)	4.70 (0.79)	3.03 (1.79)	3.17 (1.76)
How much time would X spend watching <i>TV</i> ? ²		2.93 (1.73)	3.63 (1.56)	2.83 (1.76)	4.10 (1.47)
How much <i>food</i> do you think X would eat?		3.59 (1.43)	3.90 (1.27)	3.50 (1.70)	4.17 (1.09)

2x2 ANOVAs. ¹ = $p < 0.05$, ² = $p < 0.001$

Self-perceived body size effects

Self-perceived body size ratings (Figure 4) for the whole sample showed a range of choices of figure but with a third of the children selecting the thinnest figure, figure 1. There was no gender difference in these choices ($t(148) = 0.59$, NS). The ratings did not differ across the five story groups ($F(4,145) = 0.46$, NS), and were not influenced by children's age (age as covariate, $F(1,144) = 1.32$, NS).

Figure 4: Self-perceived body size ratings (1 = very thin, 4 = midpoint, 7 = very fat)



In order to investigate the potential influence of children's own perceived body size, linear regressions were conducted using the ratings of Alfina, Holly and the discrepancy between them as dependent variables. The primary variables under investigation were self-perceived body-size, gender and age (Appendix 9). Findings for the question 'how happy do you think Alfina is with the way she looks' are reported here as an example of these analyses but multiple regressions were conducted for all attributes across all five story versions. These analyses did not yield significant regression models.

Using ratings of Alfina as the dependent variable the model was significant for story version four when Alfina was average weight and her peers were overweight ($F(3,26) = 3.67, p < 0.05, R^2 = 0.30$). The only significant predictor was self-perceived body size, such that children who perceived themselves as heavier rated average weight Alfina as less happy with her looks. No significant regression models were found for the ratings of Holly or using the discrepancy score between Alfina and Holly.

Children's perception of the characters' relative weights

Asking participants to rate the body size of each character at both average weight and overweight provided a manipulation check i.e. established whether children perceived the difference in shape/weight of drawn characters. Ratings on the 7 point visual scale (1=very thin, 4=midpoint, 7=very fat) show that characters were seen as either average weight or overweight as intended (Table 5).

Table 5: Mean (SD) ratings for characters on 1-7 scale (1=very thin, 7=very fat).

Character	Average weight	Overweight
Alfina	3.62 (1.78)	6.34 (0.97)
Holly	3.67 (1.85)	5.18 (2.20)
Alfie	3.11 (1.97)	6.67 (0.84)
Thomas	3.33 (1.49)	6.87 (0.34)

The participants rated overweight Alfina as significantly larger than average weight Holly ($t(57) = 6.91, p < 0.001$). There was also no significant difference between ratings of average weight Alfina and average weight Holly ($t(57) = 0.11, NS$).

In addition, ratings for the male characters used in the Harrison (2009) study were taken in order to determine whether the overweight male character was seen as a

comparable size to overweight Alfina. The results show no significant difference between overweight Alfina and the comparable overweight male character, Alfie ($t(57) = 1.39$, NS).

As with the current study, overweight Alfie was also rated to be a significantly larger body size than his average weight comparison figure, Thomas ($t(55) = 10.53$, $p < 0.001$). There was no difference between Alfie and Thomas when they were both average weight ($t(53) = 0.47$, NS). Therefore, as was intended, the participants rated the overweight and average weight characters as relatively different in size. The characters were also rated as comparable at the average body size and the overweight body size.

DISCUSSION

The main aim of this study was to examine how young children perceive visible physical difference, specifically obesity. The study was interested in whether an overweight character would be rated more negatively on a range of attributes than an average weight character and chosen as a friend by fewer children. Obesity in relation to another visible physical difference, in this case being a wheelchair user, was explored. In addition to the rating scales, a forced choice question format was used to determine the impact of methodological differences on research findings. The impact of the character's peer group weight status and the participant's self-perceived body size upon anti-fat attitudes were also analysed.

In relation to the initial research hypotheses, children rejected the overweight character in favour of the average weight character on several attributes. The character in a wheelchair was also rejected in comparison to the average weight character but on fewer attributes than the overweight character. However, the overweight child was not rejected on all attributes and this rejection was only found using the forced-choice methodology. The rating scale scores show the overweight character to be rejected in favour of the average weight character on the same attributes as the choice questions. However, the mean ratings were actually neutral or positive, not negative. Therefore the overweight character was not negatively evaluated. The character's peer group weight status was found to negatively impact upon perceptions of the main character but self-perceived body size did not impact upon anti-fat attitudes.

This section will discuss these findings in relation to previous research. The clinical implications of these findings will then be outlined. The methodological strengths and limitations of this study and their impact upon the findings will be examined before recommendations for future research and final conclusions will be drawn.

Perceptions of overweight

Attitudes to overweight compared to average weight

Attributes

When children were required to make a direct choice, the overweight character was rejected in favour of the average weight character on several attributes. The overweight character was also evaluated less positively than the average weight character. However, this study did not find the negative evaluations reported by previous research (Staffieri, 1967; Brylinsky & Moore, 1994; Cramer & Steinwert, 1998; Musher-Eizenman et al., 2004). This is comparable to Harrison's (2009) findings.

The forced-choice method was used to determine the proportion of children who chose overweight Alfina over Holly in relation to those who chose average weight Alfina over Holly. Significant differences were found for several attributes. Overweight Alfina was seen as less happy with her looks, likely to have fewer friends, to receive fewer party invites, to do less well with her school work and be less likely to win a race (Table 3). The attributes relate to appearance satisfaction and social, academic and activity achievements. However, no difference was found in the likelihood of her being called names about the way she looks or being naughty at school, or in the amount of time she was thought to spend watching television or the amount of food she may eat. Therefore stigma is not universal across all attributes.

Looking at rating scale scores for attributes, overweight Alfina was rejected in favour of Holly on the same attributes as found by the forced choice methodology. However, ratings scales provided more information than choice questions. Where the overweight character received significantly different mean scores to the average weight character, these scores were lower but did not fall below the midpoint of 3. For example, overweight Alfina scored a mean of 3.47 for happiness with her looks, 3.67 for how often she would get invited to parties and 3.03 for her likelihood of winning a race.

Therefore overweight Alfina can not be described as negatively evaluated. The differences elicited by these different methodologies will be examined later in this section. First, these findings will be compared to previous early childhood obesity stigma research findings.

These findings support those found by Harrison (2009) who concluded that the degree of negativity towards an overweight character was dependent upon the methodology used and was to a lesser degree than that previously reported. Here the forced choice methodology also found the overweight male character be to less likely to be chosen over the normal weight comparison for being happy with his looks, receiving party invites, being good at his school work and his likelihood of winning a race. In addition the male character was seen as more likely to be naughty. With this one exception, these findings are comparable to the current study. Again, when the ratings scales are analysed the male character's mean scores remained above the midpoint of 3 for all attributes showing a significant difference, bar one, the likelihood of winning a race. However, this mean score of 2.93 remains at the midpoint. These results will be discussed again in relation to gender difference in obesity stigma. As the findings in this study replicate those found by Harrison (2009) these results appear to be robust.

In contrast, previous research has found the overweight character to be negatively evaluated. Cramer and Steinwert (1998) found 5 year old children to select more negative and fewer positive adjectives for an overweight figure than for either average or thin figures. An extension of this study using ratings on a seven point scale between bi-polar adjectives found the overweight figure to be rated negatively on all attributes (Musher-Eizenman et al., 2004). The thin and average weight figure mean scores were above the midpoint on all adjectives whilst the overweight character received mean ratings below the midpoint. The authors report significant differences between the aggregate mean scores for the three body sizes, with the overweight figure clearly being evaluated negatively. The proposed reason for the difference between these

findings and those of the current study are linked to methodological differences and are discussed in depth later in the discussion.

Friendship choice

This methodology incorporated a friendship choice which found overweight Alfina to be rejected by children. Only 2 of 29 children chose overweight Alfina rather than Holly. When Alfina was at an average weight 14 children chose her as a friend. This result must be interpreted in light of the forced-choice methodology used but nevertheless shows a clear rejection of the overweight character. In both this study and Harrison (2009) the friendship choice showed a stronger rejection of the overweight character than any of the attribute choices. This social rejection is consistent with previous findings (Cramer & Steinwert, 1998; Staffieri, 1967), even when a more open selection procedure was used (Musher-Eizenman et al., 2004). Although research has examined weight related victimisation in nine year old children (Waterston, 2001) and peer nominations in adolescents (Phillips & Hill, 1998), the friendship rejection found in this study and consistency with previous research suggests that the impact of obesity upon peer relationships is a key area for further research. It is particularly important to incorporate observational studies in light of findings that suggest attitudes and beliefs may not be linked to behaviours in young children (Musher-Eizenman et al., 1994).

Obesity in relation to other visible physical difference

In accordance with previous research, obesity was perceived more negatively than another visible physical difference (Harrison, 2009). Using the forced choice format, significant differences between Alfina in a wheelchair and Holly were found on the questions relating to happiness with her looks and her school work. On the rating scale questions significant differences were found in perceptions of her school work and her likelihood of winning a race. However the mean scores on all these attributes were neutral or positive, not negative. As with overweight Alfina, this suggests children favour the average weight/no visible difference character, but the wheelchair character

was not negatively evaluated. On the friendship choice Alfina in a wheelchair was not rejected. Therefore findings support the hypothesis that the character in the wheelchair will also be perceived negatively in relation to the average weight/no physical difference character, but to a lesser extent than the overweight character.

However, differences between evaluations of the female character in this study and the male character in Harrison's (2009) study were found. The male character was both rejected as a friend and evaluated less positively than the comparison figure on attributes specifically relating to physical abilities. These findings for the male character were consistent with previous findings that negative evaluations were linked to functional abilities (Nabors & Keyes, 1995). However, the female character in this study was evaluated less positively than the average weight/no physical difference character for attributes relating to appearance satisfaction and educational achievements as well as physical abilities. Nabors and Keyes (1995) did however highlight the complexities in attitudes towards physical difference and the importance of context. It may be that the differences found here are due to the context. In this story the wheelchair character was seen engaging in physical activities, such as spinning and throwing a ball. However, Harrison (2009) used a similar aged sample and reported a male character in a wheelchair to be negatively evaluated primarily on physical attributes. The difference in attitudes towards male and female wheelchair using characters cannot be fully accounted for here but this difference is somewhat consistent with early suggestions that girls value physical appearance whilst boys value physical capacity (Richardson, 1971). It may also be that attitudes differ towards male and female characters in wheelchairs at this young age. This is an area worthy of further research, particularly into the impact of gender and age upon attitudes towards wheelchair users.

Methodological differences

A central finding of this study is the importance of how children are asked their opinions. The use of choice methodologies was criticised almost 20 years ago (Jarvie et al., 1983) and in the interim many alterations have been made. However, the findings of this study suggest that methodological limitations may still be leading to the overemphasis of anti-fat attitudes. The use of choice questions alone in this study would have led to the overweight character being reported as rejected on several attributes. However, the ratings scales provided more nuanced findings as children were allowed to express neutral to positive attitudes towards the overweight character. The current study did not find negative evaluations of the overweight character. This appears to be robust as it replicates Harrison's (2009) findings.

As outlined previously, these findings contrast with past research which has reported negative evaluations of overweight. Cramer and Steinwert (1998) found five year old children to select more negative and fewer positive adjectives for an overweight figure than either average or thin figures. However, methodological limitations may have influenced these findings. Cramer and Steinwert (1998) asked participants to allocate both positive and negative attributes to overweight, average weight and thin figure drawings. Therefore the overweight character may have been negatively evaluated in order to avoid assigning the negative adjectives to the preferred character. A preference for thinness may be more salient than the rejection of obesity. As with the current study, these findings may actually reflect a preference for the average weight character, but they were reported as negative evaluations. It appears that forced choice methodologies have led to erroneous negative attribute evaluations in this age group.

An extension of Cramer and Steinwert's (1998) study using ratings on a seven point scale between bi-polar adjectives, such as has friends/has no friends and smart/stupid, found the overweight figure to be rated negatively on all attributes (Musher-Eizenman

et al., 2004). A similar semantic differentiation method was used by Brylinsky and Moore (1994) which found an overweight character to be negatively rated on bi-polar adjectives relating to social and interpersonal attributes, and to a lesser extent physical attributes. Again methodological limitations of this research may have led to the inaccurate reporting of negative evaluations of obesity. In both these studies children rated all three body size characters and both negative and positive adjectives were incorporated on the same scale. Social desirability affects may be important here as young children often try to provide the answers they believe adults are expecting of them. Therefore asking the child to rate all three body sizes may have prompted the child to make the weight related stereotypical judgements perceived to be expected of them. This may have been compounded by the inclusion of a negative adjective on each rating scale. In contrast to this, both Harrison (2009) and the current study presented children with only one body size variation and asked them to rate only one attribute at a time. Therefore this study reduced both the cues to weight difference and expectations for negative evaluations, so is likely to have reduced social desirability effects. These methodological differences may account for the disparity in findings between the current study and previous research.

Research also needs to be more aware of whether children reject or just less prefer the overweight to the average body size. Developmental theory suggests that children between four and six years of age will only be beginning to make subtle distinctions. A propensity for all-or-nothing thinking dominates and children are only beginning to understand the middle or grey areas (Miller, 2011; Piaget, 1983). It is therefore vital to avoid using response formats that guide children to make these familiar either/or decisions. As found by using the rating scales in the current study, four to six year old children are able to communicate subtle distinctions in attitudes towards different characters without resorting to either/or evaluations of the characters. Research which asks or prompts children to make a choice between characters will find that children

report a preference. It is therefore important that future research methodologies scaffold children in making these fine distinctions.

The current study also took particular care in creating materials and tasks that are engaging and easily understood by young children. The story versions in the current study were designed to engage the child with the task. By using the familiar task of reading a story which was written and illustrated in a format similar to books commonly read by children of this age, the child was given time to become familiar with both the researcher and the story characters. The latter is particularly important as it has been suggested that familiarisation may be a factor in children's evaluations of others (Morgan & Wisely, 1996; Zajonc, 1968). The current research has used bright, modern materials designed to be attractive to young children. Harrison (2009) and the current study also presented attributes in a form that was developmentally tailored to young children. Previous research using adjectives ratings or selections (Cramer and Steinwert's, 1998, Musher-Eizenman et al., 2004; Brylinsky and Moore, 1994) may have been cognitively challenging for four to five year old children. As highlighted by Harter and Pike (1984), it is less demanding to provide a concrete example than to ask children to rate adjectives. The current study evaluated attributes by asking questions such as 'if Alfina was at your school, how good do you think her school work would be?' rather than asking the child to allocate or rate 'smart/stupid' adjectives. A lack of understanding of tasks has been suggested by past research (Richardson, 1970). Therefore reducing the cognitive demands of the tasks may have resulted in more reliable findings in this study compared to previous research.

This study provides support for criticism that previous research may have reported exaggerated anti-fat attitudes due to methodological limitations. It also highlights important factors and potential directions for consideration in the refinement of research into young children's perceptions of difference.

Moderators of obesity stigma

Gender

The current study, using a female character, replicated many of Harrison's (2009) findings for a male character. This is supportive of previous research that has found comparable attitudes towards males and females (Hill & Silver, 1995; Cramer & Steinwert, 1998; Brylinsky & Moore, 1994; Kraig & Keel, 2001).

Neither study found any effect for the rater's gender upon the evaluations of characters. This is an area with mixed research findings, so contrasts with findings that girls were less stigmatising than boys towards a neutral gender character (LeBow, 1988) but is comparable to other research that did not find gender to be an influential factor (Hill & Silver, 1995). In this study, group sample sizes may have been too small to detect differences relating to the rater's gender. The sample of 150 participants was split over 5 research groups therefore each gender analysis was between the male and female responders in each group of 30 children. This may not have allowed differences between male and female responses to be detected.

Gender interactions have been studied by previous research (Kraig & Keel, 2001; Turnbull Heaslip & McLeod, 2000) but as the study rated a female character only, these comparisons are not possible. However, due to the use of comparable methodologies the findings for the male character in the Harrison (2009) study can be compared with the female character in the current study.

Comparing the attribute evaluations for the female character with the male character (Harrison, 2009) shows both to be rated significantly different to an average weight peer on several attributes. Therefore obesity stigma appears to be directed towards both girls and boys. Both Alfie and Alfina were differentiated from their normal weight peer for the attributes relating to appearance, peer acceptance, cognitive competence

and physical competence. The children's friendship choice question also showed the clearest rejection of the overweight character for both genders. Therefore overweight, and its impact on friendships, appears to be salient for both overweight boys and girls at this age. It is likely that the young age group used in the current study may be an important factor in these findings. Gender differences may only develop at an older age. Examining gender differences and interactions at different ages is an area that warrants further research.

Influence of the social context

Ratings for the comparison character when presented with an overweight or wheelchair using character

During the analysis of the findings it was also observed that the ratings for Holly, the comparison figure, differed depending upon how Alfina was presented. These differences are comparable to the differences found in the Harrison (2009) study, with Thomas or Holly being rated more positively when presented with Alfie or Alfina as overweight or using a wheelchair. This suggests that a child's peer group has an influence on how they are perceived. Holly was rated more positively when paired with either Alfina as overweight or, in a wheelchair, than as average weight for her perceived happiness with her looks, likelihood of receiving party invites and chance of winning a race. The impact of Alfie's scores upon Thomas was comparable for the latter two attributes which suggests these findings are robust.

These findings are supportive of the premise that social context is an important factor and highlights the impact of an overweight individual upon perceptions of an average weight peer. However, the current study suggests the average weight peer is preferentially evaluated in comparison to the overweight character. This contrasts with previous findings that average weight men with an overweight prom date were evaluated more negatively than when with an average weight date (Gallagher, Tait,

McCologan, Dovey & Halford, 2003). Helb and Mannix (2003) also found ratings of an average weight individual to be derogated when viewed with overweight background individuals, rather than average weight individuals. Comparable findings were also reported towards a female character by a sample of five to ten year old children (Penny & Haddock, 2007). However, as Penny and Haddock only found this effect for female characters, Harrison (2009) considered whether gender was an important factor here. The current study suggests this is not the case. It appears that male and female characters are compared to the overweight character rather than being associated with them.

Methodological differences may be influential here. The current study presented the average weight character in a story with either one character as overweight or in a wheelchair, and the other as normal weight. Therefore the normal character was always presented with one other character with no physical difference. The characters were also rated individually in the current study, which contrast with Penny and Haddock's (2007) rating of the character surrounded by four peers. These peers were all overweight or average weight. Whether an individual is associated with the character with a difference or contrasted to them may depend upon perceived group membership (Tajfel & Turner, 1986; About, 1988). Penny and Haddock (2007) presented the single character amongst a peer group with a defined group identity, either overweight or average weight. In this case the character may have been perceived as a member of the peer group and rated as such. In contrast the current study presented the character individually and the character with a physical difference was in the minority rather than typical of the group. Differences in this study may not have been dominant enough to create an in-group for the character to be associated with. Therefore they may be compared to, rather than associated with, the physical difference.

Peer group weight status

The impact of peer group membership was incorporated in the second strand of this study. Variation in the peer group's body size was specifically incorporated into the study design. The weight status of the peer group was found to have a significant effect upon how Alfina was rated on two attributes. ANOVA's were used to examine the ratings of Alfina depending upon whether she was presented with average weight or overweight peers in the story.

In comparison to Haddock and Penny's (2007) research this study did not find the overweight character to be perceived significantly less negatively when presented with overweight peers than with average weight peers. Alfina was seen as significantly more likely to do well at her school work and watch more television when with overweight, rather than average weight peers. Although it did not reach significance, a trend was found for Alfina to be most negatively rated when overweight with overweight peers. Therefore this research did find the weight status of the peer group to impact upon ratings of the main character but it did not support the mere proximity effect theory (Haddock, 2007; Helb & Mannix, 2003). This may be due to methodological differences in the examination of the impact of social context and relationships upon evaluations of a main character. As highlighted above, the presentation of background characters unanimously as average weight or overweight was considered as a potential factor affecting ratings of Holly when with overweight Alfina. However, this theory has been addressed here and continues to contradict the mere proximity effect. This study does however still present the peer group in the story but not on the ratings materials. Therefore the inclusion of the peer group members in the rating materials may still influence whether the character is seen as part of the group or compared to it.

A difference in the focus of the evaluation is a central and potentially influential difference between Penny & Haddock (2007) and the current study's methodology. Penny and Haddock asked participants to rate how much they would like to be friends

with the character. The current study asked children to rate attributes intended to examine obesity stereotypes rather than making a friendship choice. The difference between deciding how much they would like to be friends with the character and rating the character on perceived attributes and behaviours may be very different concepts particularly for this young age groups stage of development.

The weight status of the peer group was found to have a significant effect on the scores given to Alfina for the expected quality of her school work and the amount of time she was thought to spend watching television. Having an overweight peer group was detrimental to expected academic performance. Although no character by condition effect was found, the outstanding condition was for average weight Alfina to be rated most positively when with overweight peers. When her peer group were overweight Alfina was perceived to watch more television than when her peers were average weight. The impact of peer group weight status also approached significance for the amount of food Alfina was perceived to eat. Ratings were higher when Alfina was with overweight peers.

These findings are interesting for two reasons. Firstly, watching more television and eating more food is central to the widely held view of the cause of obesity, greed and laziness (Puhl & Brownell, 2001; Puhl & Brownell, 2003; Teachman et al., 2003). This reflects the adult obesity stereotypes relating to attributions of control and personal responsibility for obesity (Weiner, Perry & Magnusson, 1988; Crandall, 1994). Secondly, no significant difference between overweight Alfina and average weight Holly were found for these two attributes on the main analysis of anti-fat attitudes (Table 2).

When these main findings are looked at there was no significant difference between overweight Alfina's mean score of 2.83 and average weight Holly's score of 3.50 for the amount of time watching television. When looking at the mean scores for this attribute across conditions, although significant differences were not found, overweight Alfina

was rated lower than Holly on the amount of time watching television. Similar results are found for the amount of food she was thought to eat. Alone these findings would suggest that children either do not link watching television to either sedentary behaviour or do not link sedentary behaviour to obesity. It is unlikely that children did not understand the task as this was one of the simpler concepts to understand and rate. Alternatively, it is possible that children found these two attributes more difficult to identify the positive and the negative position on. For example, did children think it was preferable to watch more or less television or to eat more or less food? The attributes with clear preferred and non-preferred polarities, such as party invites and likelihood of winning a race, were the questions that produced significantly different mean scores on all methodologies.

This raises the question of, are children forming an alliance with one character over another and rating the preferred character more positively? The other character then receives a more neutral rating. This would suggest that children were stating a preference for the average weight over the overweight character, as was found on the forced choice friendship question, rather than stereotyping the overweight character. This suggestion is in line with Jarvie et al.'s (1983) contention that research findings provide evidence for the positive stereotype towards average build without convincingly showing evidence for a negative obesity stereotype. Although the interaction between pro-thin and anti-fat attitudes has been suggested in adulthood it should not be assumed that these attitudes are linked, particularly in children. As with the assertion that in-group and out-group attitudes are not by necessity reciprocal (Brewer, 1999), it may be possible to hold pro-thin without anti-fat attitudes (Carel & Musher-Eizenman, 2010). From these findings it is only possible to postulate this idea but the power of pro-thin attitudes is an important area for future research.

Overall, the impact of a character's social group has been found to impact upon how they are evaluated in this age group. The contrast of the findings with previous

research has allowed further potentially influential factors to be identified. It may be that the current project does not contradict previous research but examines different factors. Therefore further research into children's evaluations in relation to different social contexts as a key area for further research.

Self-perceived body size effects

Children's self-rated body-size was not found to have a significant effect upon character ratings. This contrasts with Holub's (2008) findings that a larger self-perceived body-size is related to less anti-fat attitudes. The current findings appear to support previous suggestions that body size, actual or perceived, does not affect anti-fat attitudes. With respect to adults, it has been suggested that society's anti-fat attitudes are internalised (Friedman et al., 2005). It has also been suggested that for adults it may be self-protective not to perceive oneself as a member of a stigmatised group (Quinn & Crocker, 1998). However, in young children developmental considerations may be important. It has been suggested that children are able to imagine their own body shape before the age of 3 years (Brownell, Nichols, Svetlova, Zerwas & Ramani, 2010). Children younger than 6 years old have also been found to be able to identify with, and to adopt the persona of attractive characters rather than compare themselves (Hayes & Tantleff, 2010). Therefore a young child's body size, whether actual or perceived, may be irrelevant in how they evaluate others or themselves.

Limitations to the current study design may have affected the results. The study may not have been powerful enough to detect significant effects of self-perceived body size due to the relatively small sample sizes. Also, one third of the sample chose the thinnest figure to represent their perceived body size. However, 30% of the sample chose the thinnest figure in Holub's (2008) study.

In light of earlier methodological criticisms outlined in this report, Holub's (2008) use of bi-polar adjective scales may have led to overestimations of the negative evaluations of the overweight figure. Holub (2008) may have found that self-perceived body size may have influenced a child's awareness of body size stereotypes. This may be particularly true if the child does see him or herself as overweight and has experienced weight related bullying or stigmatisation. The lack of an association between self-perceived body size and anti-fat attitudes may be because children of this age hold a body size preference rather than anti-fat attitudes. There is a clear need for research methods to be refined in order to further examine how young children see themselves in relation to others.

Clinical implications

There are many potential consequences of obesity stigma. The short and long term mental health consequences of obesity stigma are pertinent to clinical psychology. Experiences of stigmatisation may also impact upon an overweight individual's likelihood of accessing resources or facilities designed to manage weight or tackle obesity, such as leisure centres. It is also vitally important that obesity prevention schemes promote healthy lifestyle choices without judging and stigmatising those already overweight. This is the critical balance that needs to be achieved when tackling the problem of childhood obesity.

Experiences of stigmatisation during childhood have been found to impact upon both peer relationships and emotional wellbeing in the short term (Puhl & Latner, 2007). However, the long-term consequences must also be considered. If a child internalises these views at an early age they may remain with them throughout childhood and into adult life. This may be problematic as their individual body shape will naturally change through future growth spurts, especially if they already are, or become overweight. Given that physical changes are experienced by girls more than boys due to puberty and differences in body fat deposition, and that weight and appearance are important for girls in current society, research into obesity stigma towards girls at a young age is

of great importance. If obesity stigma is tackled in childhood it may prevent the development of mental health difficulties in both the child and adult population.

It is also important for clinical psychology to have an understanding of how and why these negative evaluations may have developed. Overcoming mental health difficulties faced by individuals who perceive themselves to be overweight might be aided by an awareness that society's pro-thin and anti-fat attitudes, or obesity stereotypes, may have been internalised.

It is also important to understand the impact obesity stigmatisation has on an overweight individual's engagement with obesity initiatives. The strength of society's pro-thin bias may be influencing why obesity stigma remains largely unchallenged. In addition, it is a commonly held misconception that stigma may be an effective motivator for lifestyle change.

Obesity prevention schemes have been criticised for not reducing the prevalence of obesity sufficiently (Kamath, Vickers, Ehrlich, McGovern, Johnson, Singhal, Paulo, Hettinger, Erwin & Montori, 2008) however many schemes are still in their infancy and the complexity of factors affecting the development of obesity are only just being widely realised (Harrison et al., 2011). It may therefore be beneficial to tackle weight-based stigma as a central strand in tackling obesity. As this study has not found a clear obesity stereotype in this young age group, schemes must be careful not to inadvertently introduce children to obesity stereotypes. For children it may be more beneficial to reduce the values placed on thinness by promoting the value of difference and diversity as has happened in relation to race and ethnicity differences. Initiatives that tackle obesity stigmatisation by challenging stereotypical beliefs around the personal responsibility and blame may be better suited to the adult population.

The use of models such as the Six-C's model (Harrison et al 2011) may help highlight the range of points at which interventions can be targeted. Nutritional and activity practices at more distal spheres such as Community and Cultural levels may help move the focus from personal responsibility and blame which comes from looking at factors within the Child sphere. Particularly as these distal spheres have more influence over the proximal spheres so may potentially provide more opportunity for change than initiatives influencing proximal spheres. For example, creating cycle routes whilst reducing local crime rates may encourage people to undertake more exercise outdoors. Likewise, legislation preventing the aggressive marketing of high-energy foods for children whilst increasing the access of low income families to affordable fruit and vegetables may improve children's diets. Strategies aimed at these cultural, country or community spheres may tackle obesity whilst also avoiding stereotypes by moving the emphasis away from strategies aimed at the child or clan sphere, such as self-regulation of eating and exercising behaviours. A widening of research into the potential factors influencing the energy imbalance and the creative application of these findings may help tackle obesity and reduce obesity stigma.

Strengths and limitations

A strength of this study is its examination of attitudes in this young age group. The finding that obesity is perceived differently to other physical differences in four to six year old children makes an important contribution to obesity stigma research. The lack of a clear overweight stereotype but a preference for the average weight character in both this study and Harrison (2009) contrasts with previous findings and shows that attitudes to male and female characters are comparable at this age. The design of this study has also allowed the incorporation of hypotheses relating to factors affecting obesity stigma. A strength of this study is its efficient use of data in examining several hypotheses. There is further potential for this to be extended further. This study has added to the literature on obesity stigma and has suggested methodological improvements.

Despite the identification of stigmatising beliefs first emerging at this age, relatively little research into the anti-fat attitudes held by young children has been conducted. In particular, this project has incorporated previous research recommendation to use materials and a methodology designed to actively engage 4 to 6 year old children. Previous research has used relatively crude materials in comparison to the current study. Creating brightly illustrated characters of children around the same age as the participant were designed to appeal to this age group. The use of the familiar task of reading a story allowed the child to be presented with characters with different visible physical differences in a natural way. It is likely to have helped children relax and enjoy participating in the task. The use of single attributes presented in a concrete example reduced the cognitive demands of the task and is likely to have minimised the impact of social desirability effects. These materials made the task both enjoyable and more accessible to this young age group sample so are a particular strength of the study.

Limitations to this study include the lack of data collected regarding ethnicity, socioeconomic status and the child's actual bodyweight which have been proposed to influence obesity stigma. The reason for this omission is two-fold. Primarily, these were factors the study was not directly examining and the collection of this personal information may cause reluctance of both schools and parents to participate. The power calculation suggested that a total of 150 participants were needed so recruitment was a priority in examining the research hypotheses. In addition, information regarding ethnicity would need to include more than a simple categorisation of the child's ethnicity. The study took place in the North East of England so if a child was not British, factors such as the length of time spent in the United Kingdom, parent's ethnicities and the level of integration into the local community are important factors to consider. Ethnicity is an important factor to examine but for this to be done meaningfully it would need to be a central aim of the project. This was beyond the scope of this study. Collecting data regarding the child's actual body size required

ethical consideration as weighing each child would have been intrusive for the child and may have drawn attention to the child's own body size. In light of findings that a child's actual body size is not related to anti-fat attitudes it was decided that body mass index was too intrusive for the child and likely to dissuade parents from consenting so was not collected. Research into factors influencing obesity stigma are worthwhile but designs need to be thorough and systematic in order to provide valid results.

The use of parametric tests may be a limitation in this study due to the detection of skewness using the Kolmogorov-Smirnov test. However, as this was not the case for all data distributions and because when it was skewed both samples exhibited a similar skewness the decision was made to use the more powerful parametric tests. This also allowed a direct comparison to previous research using similar rating scales.

The examination of potentially influential factors upon anti-fat attitudes, such as self-perceived body size, gender and age is limited due to the sample sizes analysed. As already outlined, the lack of significant findings may be due to the small sample sizes resulting in underpowered analyses. Despite a large overall sample, the linear regressions were carried out for each experimental condition, made up of only 30 participants. In this study, these factors were incorporated as an additional strand rather than the central aim so the lack of findings may reflect the experimental design. The examination of factors which may influence attitudes to overweight individuals is an important area for future research but it is important that experiments are designed with adequate sample sizes to avoid type two errors and detect significant differences.

A limitation in regard to the materials was the use of the Collins (1991) body size ratings scale. It has been argued that this scale is not valid for use with children less than eight years of age (Smolak, 2004). The intention of this project was to create scales using the characters presented in the stories graduated from very thin to very

fat, however the research budget did not allow for this. As the Collins (1991) figures have been used by previous research in this area the decision was made to use these scales rather than omit self-perceived body size ratings.

This project has also allowed the comparison of forced choice with rating scale methodologies. Criticism that forced choice methodologies result in the reporting of exaggerated negative perceptions of obese individuals has been directly addressed and evidence has been found that rating scales provide more nuanced perceptions of obese or overweight characters. A central outcome of this study is the clear recommendation it can make for the use of single attribute rating scales in the examination of attitudes to difference in others.

A limitation in this study was its emphasis on attributes rather than friendship choices. Children were asked to choose which character they would be friends with but all other questions asked the child to rate or choose a character thought to possess a specific attribute. The friendship choice was also only asked as a forced choice question and not on a ratings scale. Penny and Haddock (2007) asked five to ten year old children to rate how much they would like to be friends with the character on a four point scale. Possible answers were: no, probably not, maybe and yes. This however may have been a developmentally difficult question for the younger age group of the current study to answer. The development of more sophisticated friendship selection tasks would have been useful, especially as more children rejected the overweight child on the friendship selection than any of the attribute questions.

A related limitation is the use of illustrated characters in evaluating attitudes towards difference. It remains to be seen whether attitudes towards characters relates to attitudes towards overweight children. The presentation of questions as a personal choice, such as “how often would you invite Alfina home for a play-date?” or “how

often would you pick Alfina to be in your netball team?" is an adaptation that could be made to the methodology in further research of attitudes held by young children.

Recommendations for future research

A strength of this research is its potential adaptability. The current study built on previous research by altering the gender of the main character and incorporating two factors thought to influence obesity stigma. It would be possible to alter many other factors to examine pertinent research questions.

As suggested in the limitations above, a shift in focus from examining perceived attributes of overweight characters to children's friendship selections and the factors which influence these may be important. It may also be of interest to explore the impact of social context further. Formative research looking at physical difference more widely (Richardson et al., 1961; Nabors & Keyes, 1995) found the functional requirements of the task to influence children's decision making. The disparity between the effect of the peer group in this and Penny and Haddock's (2007) study suggest a character's peer group are also influential for this age group. Therefore factors relating to both the peer group and the demands of the activity are areas of interest for future research.

Blame is a key factor in obesity stigma in adulthood and remains to be fully explored in children (Musher-Eizenman et al., 2004; Lobst, et al., 2009). The inconsistent findings for the impact of young children's attributions of personal responsibility and blame for one's body size upon peer relationships is an area for further examination. It has also been suggested that overweight individuals are unfairly blamed for negative events that occur in their presence. The attribution of blame for events beyond the individual's control could be examined by altering the ending to the story. Cramer and Steinwert (1998) examined stories with an overweight and thin character and asked

children to choose who was mean and nice. The current study had a happy ending. It would be possible to create alternative endings, where the children were chastised or the cat required a trip to the vet, alongside questions examining the perceived roles and responsibilities of each character. This would allow hypotheses regarding the overweight character being excessively and unjustifiably blamed for events to be tested.

Using the same materials for slightly older children would also be of interest to determine differences in anti-fat attitudes at different ages. In addition, longitudinal studies would allow the examination of whether a child's attitudes change as they grow older rather than just being different amongst individual age group samples. Research with children may benefit from the inclusion of developmental assessments in order to determine the impact of the child's cognitive or social factors upon the responses given.

The exploration of the reasons children give for their choices and decisions may provide valuable information. It was beyond the scope of this study to incorporate this but it would be interesting to extend this study to explore decision making-processes at this age. Although research has looked at the reasons children give for the choices they make (Cramer & Steinwert, 1998) this needs to be repeated with research designs that minimise the likelihood of children communicating their awareness of stereotypes. This may also allow the impact of pro-thin attitudes, which may not be reciprocated by anti-fat attitudes at this age (Brewer, 1999), to be explored. It has been suggested that children are able to make decisions before they are able to justify them. Cramer and Steinwert (1998) found 3 year old children were unable to identify body size as the reason for their choices but still produced results suggesting the presence of anti-fat attitudes; children's reasoning is an under-researched area. Understanding the reasons children give for the decisions they make may aid our understanding of how children perceive others.

Ensuring the materials are engaging and the tasks enjoyable are central elements to build upon, as is the use of ratings scales for single attributes rather than bi-polar adjectives and the presentation of only one body size comparison for each participant. The extension of research using the methodologies brought together by Harrison (2009) and built upon by the current study will allow for the re-examination and exploration of further factors relating to childhood obesity stigma, particularly at this crucial age.

Conclusions

Childhood obesity has risen to an unprecedented level in recent years. The associated health consequences have led to initiatives that monitor children's weight and encourage families to engage in healthy lifestyle choices. Despite this increased prevalence of obesity, obesity stigma remains both widespread and socially acceptable in Western society. In adults, beliefs around controllability and personal responsibility for one's body size remain common, with resultant stereotypes that overweight people are lazy, lack self-discipline and are less competent than average weight individuals. Although the links between obesity and mental health difficulties are not clear, it has been suggested that stigmatisation acts as a mediating factor between obesity and depression. Furthermore stigmatisation may further isolate and prevent overweight individuals from accessing weight reduction programmes. Therefore tackling obesity stigma is an important element of obesity prevention and treatment.

This research has found that four to six year old children do perceive overweight differently to other visible difference. However, children preferred the average weight character but did not negatively evaluate the overweight character. The way children are asked their opinion about characters has also been found to be important in this study. The use of simple, engaging tasks that are easy for the child to understand and

free of cues that may increase social desirability effects, may be a key factor in the differences found here in relation to previous research. In this study an obesity stereotype was not found but the impact of being overweight upon children's choice of friends may be important. Equally, a child's peer group appears to affect how they are perceived. Therefore social contexts may provide a valuable component of obesity reduction initiatives. The treatment and prevention of obesity is a huge challenge being faced by current society and must include the tackling of obesity stigma. For young children, initiatives tackling obesity stigma by focusing on personal factors such as attributes or personal responsibility may actually teach children the obesity stereotypes they are aiming to challenge. Factors at a peer, community or cultural level may be more important and influential for children. As a preference for the average weight character was found, it may be beneficial to address the high value placed on thinness in western society by teaching children the value of diversity and difference as has occurred for ethnic and racial difference in recent years. This may meet the aim of promoting healthy lifestyles without further stigmatising overweight individuals, both adults and children.

REFERENCES

- About, F.E., (1988). *Children and prejudice*. New York: Blackwell.
- Adams, G.R., Hicken, M., & Salehi, M. (1988). Socialisation of the physical attractiveness stereotype: Parental expectations and verbal behaviours. *International Journal of Psychology, 23*, 137-149.
- Adler, N.E., & Stewart, J. (2009) Reducing obesity: motivating action while not blaming the victim. *The Milbank Quarterly, 87*, 49-70.
- Andreyeva, T., Puhl, R., & Brownell, K.D. (2008). Changes in perceived weight discrimination among Americans: 1995-1996 through 2004-2006. *Obesity, 16*, 1129-1134.
- Anesbury, T., & Tiggemann, M. (2000). An attempt to reduce negative stereotyping of obesity in children by changing controllability beliefs. *Health Education Research, 15*, 145-152.
- Annis, N.M., Cash, T.F., & Hrabosky, J.I. (2004). Body image and psychosocial difference among stable average weight, currently overweight and, formally overweight women: the role of stigmatizing experiences. *Body Image, 1*, 155-167.
- Atlantis, E., & Baker, M. (2008). Obesity effects on depression: Systematic review of epidemiological studies. *International Journal of Obesity, 32*, 881-891.
- Baker, J.L., Olsen, L.W., & Sorensen, T.I.A. (2007). Childhood body mass index and the risk of coronary heart disease in adulthood. *New England Journal of Medicine, 357*, 2329-2337.
- Ball, K., Crawford, D., & Kenardy, J. (2004). Longitudinal relationships among overweight, life satisfaction, and aspirations in young women. *Obesity Research, 12*, 1019-1030.
- Baum, C.L., & Ford, W.F. (2004). The wage effects of obesity: a longitudinal study. *Health Economics, 13*, 885-899.

- Bell, S.K., & Morgan, S.B. (2000). Children's attitudes and behavioural intentions towards a peer presented as obese: does a medical explanation for the obesity make a difference? *Journal of Pediatric Psychology, 25*, 137-145.
- Bordini, B., Littlejohn, E., & Rosenfield, R.L. (2009). Blunted sleep related luteinizing hormone rise in healthy premenarcheal pubertal girls with elevated BMI. *Journal of Clinical Endocrinology and Metabolism, 94*, 1168-1175.
- Brownell, C.A., Nichols, S.R., Svetlova, M., Zerwas, S., & Ramani, G. (2010). The head bone's connected to the neck bone: when do toddlers represent their own body topography? *Child Development, 81*, 797-810.
- Brylinsky, J.A., & Moore, J.C. (1994). The identification of body build stereotypes in young children. *Journal of Research in Personality, 28*, 170-181.
- Carels, R.A., & Musher-Eizenman, D.R. (2010). Individual differences and weight bias: Do people with an anti-fat bias have a pro-thin bias? *Body Image, 7*, 143-148.
- Carpenter, K.M., Hasin, D.S., Allison, D.B., & Faith, M.S. (2000). Relationships between obesity and DSM-IV major depressive disorder, suicidal ideation, and suicide attempts: results from a general population study. *American Journal of Public Health, 90*, 251-257.
- Carr, D., & Friedman, M.A. (2005). Is obesity stigmatizing? Body weight, perceived discrimination, and psychological well-being in the United States. *Journal of Health and Social Behavior, 46*, 244-259.
- Centers for Disease Control and Prevention (2009). Childhood overweight and obesity. Retrieved May 28, 2011, from <http://www.cdc.gov/obesity/childhood/index.html>
- Chen, E.Y., & Brown, M. (2005). Obesity stigma in sexual relationships. *Obesity Research, 13*, 1393-1397.
- Collins, M.E. (1991). Body figure perceptions and preferences among preadolescent children. *International Journal of Eating Disorders, 10*, 199-208.

- Corrigan, P.W. (2000). Mental health stigma as a social attribution: implications for research methods and attitude change. *Clinical Psychology - Science and Practice, 7*, 48-67.
- Counts, C.R., Jones, C., Frame, C.L., Jarvie, G.J., & Strauss, C.C. (1986). The perception of obesity by normal-weight versus obese school-age children. *Child Psychiatry and Human Development, 17* (2), 113-120.
- Cramer, P., & Steinwert, T. (1998). Thin is good, fat is bad: how early does it begin? *Journal of Applied Developmental Psychology, 19*, 429-451.
- Crandall, C.S. (1994). Prejudice against fat people: ideology and self-interest. *Journal of Personality and Social Psychology, 66*, 882-894.
- Crandall, C.S. (1995). Do parents discriminate against their heavyweight daughters? *Personality and Social Psychology Bulletin, 21*, 724-735.
- Crawford, D., Ball, K., Jeffery, R.W., & Brug, J. (2010). Conclusion: Obesity and its prevention in the 21st century. In D. Crawford, R. W. Jeffery, K. Ball & Brug, J. (Eds.) *Obesity epidemiology: From aetiology to public health*. Oxford: Oxford University Press.
- Crocker, J., Major, B., & Steele, C. (1998). Social stigma. In D.T. Gilbert, S.T. Fiske, & G. Lindzey (Eds.). *Handbook of social psychology* (4th ed., Vol. 2, pp.504-553). Boston: McGraw-Hill.
- Datar, A., & Sturm, R. (2006). Childhood overweight and elementary school outcomes. *International Journal of Obesity, 30*, 1449-1460.
- DeJong, W. (1980). The stigma of obesity: the consequences of naïve assumptions concerning the causes of physical deviance. *Journal of Health and Social Behaviour, 21*, 75-87.
- DeJong, W., & Kleck, R.E. (1986). The social psychological effects of overweight. In C.P. Herman, M.P. Zanna, E.T. Higgins (Eds.), *Physical Appearance, Stigma, and Social Behavior: The Ontario Symposium, 3*, (pp.65-87). Lawrence Erlbaum: Hillsdale.

- Doll, H.A., Petersen, S.E.K., & Stewart-Brown, S.L. (2000). Obesity and physical and emotional well-being: Associations between body mass index, chronic illness, and the physical and mental components of the SF-36 questionnaire. *Obesity Research, 8*, 160-170.
- Eagly, A.H., Ashmore, D.R., Makhijani, M.G., & Longo, L.C. (1991). What is beautiful is good, but: A meta-analytic review of research on the physical attractiveness stereotype. *Psychological Bulletin, 110*, 109-128.
- Fairburn, C.G., Doll, H.A., Welsh, S.L., Hay, P.J., Davies, B.A., & O'Connor, M.E. (1998). Risk factors for binge eating disorders: A community-based, case-control study. *Archives of General Psychiatry, 55*, 425-432.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191.
- Fishbein, M., & Ajzen, I. (1974). Attitudes towards objects as predictive of single and multiple behavioural criteria. *Psychological Review, 81*, 59-74.
- Franklin, J., Denyer, G., Steinbeck, K.S., Caterson, I.D., & Hill, A.J. (2006). Obesity and risk of low self-esteem: A state-wide survey of Australian children. *Pediatrics, 118*, 2481-2487.
- Friedman, K.E., Reichmann, S.K., Constanzo, P.R., Zelli, A., Ashmore, J.A., & Musante, G.J. (2005). Weight stigmatization and ideological beliefs: relation to psychological functioning in obese adults. *Obesity Research, 13*, 907-916.
- Gallagher, S., Tait, T.T., McGologan, B., Dovey, T.M., & Halford, J.C.G. (2003). Negative judgements about male associates of obese females. *Obesity Research, 11*, A118-A119.
- Goffman, E. (1963). *Stigma: Notes on the management of spoiled identity*. Englewood Cliffs, New Jersey: Prentice Hall.
- Goulding, A., Taylor, R.W., Jones, I.E., Manning, P.J., & Williams, S.M. (2002). Spinal overload: a concern for obese children and adolescents. *Osteoporosis International, 13*, 835-840.

- Griffiths, L.J., Wolke, D., Page, A.S., & Horwood, J.P. (2006). Obesity and bullying: Different effects for boys and girls. *Archives of Disease in Childhood, 91*, 121-125.
- Gunnell, D.J., Frankel, S.J., Nanchahal, K., Peters, T.J., & Davey-Smith, G. (1998). Childhood obesity and adult cardiovascular mortality: a 57 year follow up study based on the Boyd-Orr cohort. *American Journal of Clinical Nutrition, 67*, 1111-1118.
- Hansson, L.M., & Rasmussen, F. (2010). Predictors of 10-year olds' obesity stereotypes: a population based study. *International Journal of Pediatric Obesity, 5*, 25-33.
- Harper, D.C., Wacker, D.P., & Cobb., L.S. (1986). Children's social preferences toward peers with visible physical differences. *Journal of Pediatric Psychology, 11*, 323-342.
- Harter, S. (1998). The development of self-representations. In W. Damon (Gen. Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of Child Psychology: Vol. 3. Social, emotional and personality development* (pp. 177-235). New York: Wiley.
- Harter, S., & Pike, R., (1984). The pictorial scale of perceived competence and social acceptance for young children. *Child Development, 55*, 1969-1982.
- Harrison, K., Bost, K.K., McBride, B.A., Donovan, S.M., Gigsby-Toussaint, D.S., Kim, J., Liechty, J.M., Wiley, A., Teran-Garcia, M. & Jacobsohn, G.C. (2011). Towards a developmental conceptualization of contributors to overweight and obesity in childhood: the six-C's model. *Child Development Perspectives, 5*, 50-58.
- Harrison, S. (2009). *Stereotyping and stigmatizing of obesity in young children*. Unpublished doctoral thesis. University of Leeds.
- Hastings, J.F., & Snowden, L.R., (2009). Increasing body weight and the transition from welfare to work: Findings from the national survey of American life. *Ethnicity and Disease, 19*, 13-17.
- Hebl, M.R., & Mannix, L.M. (2003). The weight of obesity in evaluating others: A mere proximity effect. *Personality & Social Psychology Bulletin, 29*, 28-38.

- Hill, A.J. (2007). The development of children's shape and weight concerns. In T. Jaffa, & B. McDermott. (Eds.), *Eating Disorders in Children and Adolescents* (pp.32-44). Cambridge: Cambridge University Press.
- Hill, A.J. (2011). Psychosocial issues in obese children and adults. In D. Crawford, R. W. Jeffery, K. Ball & Brug, J. (Eds.) *Obesity epidemiology: From aetiology to public health*. Oxford: Oxford University Press.
- Hill, A.J., Draper, E., & Stack, J. (1994). A weight on children's minds: body shape dissatisfactions at 9-years old. *International Journal of Obesity*, *18*, 383-389.
- Hill, A.J., & Silver, E.K. (1995). Fat, friendless and unhealthy: 9-year old children's perception of body shape stereotypes. *International Journal of Obesity*, *19*, 423-430.
- Hiller, D.V. (1981). The salience of overweight in personality characterization. *Journal of Psychology*, *108*, 233-240.
- Holub, S.C. (2008). Individual differences in the anti-fat attitudes of preschool-children: The importance of perceived body size. *Body Image*, *5*, 317-321.
- Iobst, E.A., Ritchey, P.N., Nabors, L.A., Stutz, R., Ghee, K., & Smith, D.T. (2009). Children's acceptance of a peer who is overweight: relations among gender, age and blame for weight status. *International Journal of Obesity*, *33*, 736-742.
- Jarvie, G.L., Lahey, B., Graziano, W., & Framer, E. (1983). Childhood obesity and social stigma: What we know and what we don't know. *Developmental Review*, *3*, 237-273.
- Jeffrey, A.N., Voss, L.D., Metcalf, B.S., Alba, S., & Wilkin, T.J. (2005). Parents' awareness of overweight in themselves and their children: Cross sectional study within a cohort (EarlyBird 21). *British Medical Journal*, *330*, 23-24.
- Jeffreys, M., Davey-Smith, G., Martin, R.M., Frankel, S., & Gunnell, D. (2004). Childhood body mass index and later cancer risk: a 50 year follow up of the Boyd Orr Study. *International Journal of Cancer*, *112*, 348-351.
- Kamath, C.C., Vickers, K.J., Ehrlich, A., McGovern, L., Johnson, J., Singhal, V., Paulo, R., Hettinger, A., Erwin, P.J., & Montori, V.M. (2008). Behavioural interventions to

- prevent childhood obesity: A systematic review and meta-analyses of randomised control trials. *Journal of Clinical Endocrinology and Metabolism*, *93*, 4606-4615.
- Karnehed, N., Rasmussen, F., Hemmingsson T., & Tynelius, P. (2006). Obesity and attained education: Cohort study of more than 700,000 Swedish men. *Obesity*, *14*, 1421-1428.
- Keenan, T., & Evan, S. (2009). *An introduction to child development*. Sage, London.
- Klarenbach, S., Padwal, R., Chuck, A., & Jacobs, P. (2006). Population-based analysis of obesity and workforce participation. *Obesity*, *14*, 920-927.
- Kraig, K.A., & Keel, P.K. (2001). Weight-based stigmatization in children. *International Journal of Obesity*, *25*, 1661-1666.
- LaLonde, C. E., & Chandler, M. (1995). False belief understanding goes to school: on socio-emotional consequences of coming early or late to a first theory of mind. *Cognition and emotion*, *9*, 167-185.
- Latner, J.D., O'Brien, K.S., Durso, L.E., Brinkman, L.A., & MacDonald, T. (2008). Weighing obesity stigma: the relative strength of different forms of bias. *International Journal of Obesity*, *32*, 1145-1152.
- Latner, J.D., Simmonds, M., Rosewall, J.K., & Stunkard, A.J. (2007). Assessment of obesity stigmatization in children and adolescents: modernizing a standard measure. *Obesity*, *15*, 3078-3085.
- Latner, J.D., & Stunkard, A.J. (2003). Getting worse: the stigmatization of obese children. *Obesity Research*, *11*, 452-456.
- Latner, J.D., Stunkard, A.J., & Wilson, G.T. (2005). Stigmatized students: Age, sex, and ethnicity effects in the stigmatization of obesity. *Obesity Research*, *13*, 1226-1231.
- Lawlor, D.A., & Leon, D.A. (2005). Association of BMI and obesity measured in early childhood with risk of coronary heart disease and stroke in middle age: findings from the Aberdeen Children of the 1950's prospective Cohort Study. *Circulation*, *111*, 1891-1896.

- Lean, M. (2010). Health consequences of overweight and obesity in adults. In D. Crawford, R. W. Jeffery, K. Ball & Brug, J. (Eds.) *Obesity epidemiology: From aetiology to public health*. Oxford: Oxford University Press.
- LeBow, M. (1988). Attitudes, perceptions and practices of Canadian school children towards obesity. *Journal of Obesity and Weight Regulation*, 7, 43-55.
- Lerner, R.M., & Schroeder, C. (1971). Kindergarten children's active vocabulary about body build. *Developmental Psychology*, 5, 179.
- Linde, J.A., & Jeffery, R.W. (2011). Population approaches to obesity prevention. In D. Crawford, R. W. Jeffery, K. Ball & Brug, J. (Eds.) *Obesity epidemiology: From aetiology to public health*. Oxford: Oxford University Press.
- Link, B.G., & Phelan, J.C. (2001). Conceptualising stigma. *Annual Review of Sociology*, 27, 363-385.
- Liversley, W. J., & Bromley, D.B. (1973). *Person perception in childhood and adolescence*. London: Wiley.
- Lobstein, T. (2010). Prevalence and trends in childhood obesity. In D. Crawford, R. W. Jeffery, K. Ball & Brug, J. (Eds.) *Obesity epidemiology: From aetiology to public health*. Oxford: Oxford University Press.
- Markowitz, S., Friedman, M.A., & Arent, S.M. (2008). Understanding the relationship between obesity and depression: causal mechanisms and implications for treatment. *Clinical Psychology: Science and Practice*, 15, 1-20.
- Myers, A., & Rosen, J.C. (1999). Obesity stigmatisation and coping: relation to mental health symptoms, body image, and self-esteem. *International Journal of Obesity*, 23, 221-230.
- McCarthy, A., Hughes, R., Tilling, K., Davies, D., Smith, G.D., & Ben-Shlomo, Y. (2007) Birth weight; postnatal, infant, and childhood growth; and obesity in young adulthood: Evidence from the Barry Caerphilly Growth Study. *American Journal of Clinical Nutrition*, 86, 907-913.
- Miller, P. H. (2011). *Theories of developmental psychology*. Second Edition. New York: Worth.

- Morgan, S.B., & Wisely, D.W. (1996). Children's attitudes and behavioral intentions toward a peer presented as physically handicapped: a more positive view. *Journal of Developmental & Physical Disabilities, 8*, 9-42.
- Muller-Riemenschneider, F., Reinhold, T., von Schulzendorff, A., & Willich, S.N. (2001). Health economic burden of obesity – an international perspective. In D. Crawford, R. W. Jeffery, K. Ball & Brug, J. (Eds.) *Obesity epidemiology: From aetiology to public health*. Oxford: Oxford University Press.
- Musher-Eizenman, D.R., Holub, S.C., Miller, A.B., Goldstein, S.E., Edwards-Leeper, L. (2004). Body size stigmatization in preschool children: The role of control attributions. *Journal of Pediatric Psychology, 29*, 613-620.
- Nabors, L., & Keyes, L. (1995). Preschoolers' reasons for accepting peers with and without disabilities. *Journal of Developmental and Physical Disabilities, 7*, 335-355.
- Napolitano, M.A., & Foster, G.D. (2008). Depression and obesity: Implications for assessment, treatment, and research. *Clinical Psychology: Science and Practice, 15*, 21-27.
- Neumark-Sztainer, D., Faulkner, N., Story, M., Perry, C., Hannan, P.J. & Mulert, S. (2002). Weight-teasing amongst adolescents: correlations with weight status and disordered eating behaviours. *International Journal of Obesity, 26*, 123-131.
- Neumark-Sztainer, D., Story, M., & Harris, T. (1999). Beliefs and attitudes about obesity among teachers and school health care providers working with adolescents. *Journal of Nutrition Education, 31*, 3-9.
- Penny, H., & Haddock, G. (2007). Anti-fat prejudice among children: The 'mere proximity' effect in 5-10 year olds. *Journal of Experimental Social Psychology, 43*, 678-683.
- Phillips, R.G., & Hill, A.J. (1998). Fat plain, but not friendless: Self-esteem and peer acceptance of obese pre-adolescent girls. *International Journal of Obesity, 22*, 287-293.

- Piaget, J. (1983). Piaget's theory. In P. Mussen (ed.). *Handbook of Child Psychology*. 4th edition. Vol. 1. New York: Wiley.
- Pierce, J.W., & Wardle, J. (1997). Cause and effect beliefs and self-esteem of overweight children. *Journal of Child Psychology and Psychiatry*, *38*, 645-650.
- Potter, P.C., & Roberts, M.C. (1984). Children's perceptions of chronic illness: The roles of disease symptoms, cognitive development, and information. *Journal of Pediatric Psychology*, *9*, 13-27.
- Powlisha, K.K., Serbin, L.A., Doyle, A.B., & White, D.R. (1994). Gender, ethnic, and body type biases: The generality of prejudice in childhood. *Developmental Psychology*, *30*, 526-536.
- Puhl, R.M., & Brownell, K.D. (2001). Bias, discrimination, and obesity. *Obesity Research*, *9*, 788-905.
- Puhl, R.M., & Brownell, K.D. (2003). Ways of coping with obesity stigma: conceptual review and analysis. *Eating Behaviors*, *4*, 53-78.
- Puhl, R.M., & Brownell, K.D. (2006). Confronting and coping with weight stigma: an investigation of overweight and obese adults. *Obesity*, *14*, 1802-1815.
- Puhl, R.M., & Heuer, C.A. (2009). The stigma of obesity: a review and update. *Obesity*, *17* (5), 941-964.
- Puhl, R.M., & Latner, J.D. (2007). Stigma, obesity, and the health of the nation's children. *Psychological Bulletin*, *133*, 557-580.
- Quinn, D.M., & Crocker, J. (1998). Vulnerability to the affective consequences of the stigma of overweight. In: J.K. Swim, Strangor, C. (Eds.). *Prejudice: the targets perspective*. San Diego, CA. Academic Press.
- Rapier, J., Adelson, R., Carey, R., & Croke, K. (1972). Changes in children's attitudes toward the physically handicapped. *Exceptional Child*, *39*, 219-223.
- Reilly, J.J., Houston-Callaghan, K-A., Donaghey, Z., & Hammed, S. (2010). Physical health consequences of child and adolescent obesity. In D. Crawford, R. W. Jeffery, K. Ball & Brug, J. (Eds.) *Obesity epidemiology: From aetiology to public health*. Oxford: Oxford University Press.

- Reilly, J.J., Kelnar, C.J., Alexander D.W., Hacking, B., & Methven, E. (2003). Health consequences of obesity: systematic review. *Archives of Disease in Childhood*, 88, 748-752.
- Reinehr, T., Hinney, A., de Sousa, G., Austrup, F., Hebebrand, J., & Andler, W. (2007). Definable somatic disorders in overweight children and adolescents. *Journal of Pediatrics*, 150, 613-617.
- Richardson, S.A. (1970). Age and sex differences in values toward the physically handicapped. *Journal of Health & Social Behavior*, 11, 207-214.
- Richardson, S.A., Goodman, N., Hastorf, A.H., & Dornbusch, S.M. (1961). Cultural uniformity in reaction to physical disabilities. *American Sociological Review*, 26, 241-247.
- Rush, L.L. (1998). Affective reactions to multiple social stigmas. *Journal of Social Psychology*, 138, 421-430.
- Schwimmer, J.B., Burwinkle, T.M., & Varni, J.W. (2003). Health-related quality of life of severely obese children and adolescents. *Journal of the American Medical Association*, 289, 1813-1819.
- Sjoberg, R.L., Nilsson, K.W., & Leppert, J. (2005). Obesity, shame, and depression in school-aged children: A population-based study. *Pediatrics*, 116, e389-e392.
- Sigelman, C.K. (1991). The effect of causal information on peer perceptions of children with physical problems. *Journal of Applied Developmental Psychology*, 12, 237-253.
- Sigelman, C.K., Miller, T.E., & Whitworth, L.A. (1986). The early development of stigmatizing reactions to physical differences. *Journal of Applied Developmental Psychology*, 7, 17-32.
- Smolak, L. (2004). Body image in children and adolescents: where do we go from here? *Body Image*, 1, 15-28.
- Speakman, J.R. (2006). The genetics of obesity: five fundamental problems with the famine hypothesis. In G. Fantuzzi, & T. Mazzone (Eds.) *Adipose tissue and adipokines in health and disease*. Totowa, New Jersey, USA; Humana Press.

- Staffieri, J.R. (1967). A study of social stereotype of body image in children. *Journal of Personality & Social Psychology*, 7, 101-104.
- Striegel-Moore, R.H., & Franko, D.L. (2008). Should binge eating disorder be included in the DSM-V? A critical review of the state of the evidence. *Annual Review of Clinical Psychology*, 4, 305-324.
- Tajfel, H. (1981). *Human groups and social categories: studies in social psychology*. Cambridge: Cambridge University Press.
- Tajfel, H., & Turner, J.C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. Austin (Eds.), *Psychology of intergroup relations* (pp. 7-24). Chicago: Nelson-Hall.
- Teachman, B.A., & Brownell, K. (2001). Implicit anti-fat bias among health professionals: is anyone immune? *International Journal of Obesity*, 25, 1525-1531.
- Teachman, B.A., Gapinski, K.D., Brownell, K.D., Rawlins, M., & Jeyaram, S. (2003). Demonstrations of implicit anti-fat bias: the impact of providing causal information and evoking empathy. *Health Psychology*, 22, 68-78.
- The Information Centre for Health and Social Care. (2008). *National Child Measurement Programme: 2007/08 School Year Headline Results*. Leeds, UK. Retrieved November 2nd 2009, from <http://www.ic.nhs.uk/webfiles/publications/ncmp/ncmp0708/NCMP%202007-08%20Report.pdf>
- Thompson, J. K., Covert, M. D., Richards, K. J., Johnson, S. & Cattarin, J. (1995). Development of body image, eating disturbance, and general psychological functioning in female adolescents: covariance structure modelling and longitudinal investigations. *International Journal of Eating Disorders*, 18, 221-236.
- Turnbull, J.D., Heaslip, S., & McLeod, H.A. (2000). Pre-school children's attitudes to fat and normal male and female stimulus figures. *International Journal of Obesity*, 24, 1705-1706.

- Wadden, T.A., Brownell, K.D., & Foster, G.D. (2002). Obesity: responding to the global epidemic. *Journal of Consulting and Clinical Psychology, 70*, 510-525.
- Wang, S.S., Brownell, K.D., & Wadden, T.A. (2004). The influence of the stigma of obesity on overweight individuals. *International Journal of Obesity, 28*, 1333-1337.
- Wang, Y., & Lobstein, T. (2006). Worldwide trends in childhood overweight and obesity. *International Journal of Pediatric Obesity, 1*, 11-25.
- Wardle, J. & Cooke, L. (2005). The impact of obesity on psychological well-being. *Best Practice Research in Clinical Endocrinology and Metabolism, 19*, 421-440.
- Wardle, J., Volz, C., & Golding, C. (1995). Social variation in attitudes to obesity children. *International Journal of Obesity, 19*, 562-569.
- Waterston, C. L. (2001). *Weight-related victimisation in preadolescent boys and girls*. Unpublished doctoral thesis. University of Leeds.
- Weiner, B., Perry, R.P., & Magnusson, J. (1988). An attributional analysis of reactions to stigmas. *Journal of Personality and Social Psychology, 55*, 738-748.
- Wilkin, T.J. (2008). Diabetes 1 and 2, or one and the same? *Pediatric Diabetes, 9*, 23-32.
- Williams, J., Wake, M., Hesketh, K., Maher, E., & Waters, E. (2005). Health-related quality of life of overweight and obese children and adolescents. *Journal of the American Medical Association, 293*, 70-76.
- World Health Organisation (1998). *Obesity: Preventing and managing the global epidemic*. Geneva, Switzerland: World Health Organization.
- World Health Organisation (2000). *Consultation on obesity. Obesity: preventing and managing the global epidemic*. WHO Technical Report Series 894. Geneva, Switzerland: World Health Organization.
- World Health Organisation (2011). Obesity and overweight. Fact sheet no. 311. *World Health Organisation Media Centre*. Retrieved 20th May, 2011 from www.who.int/mediacentre/factsheets/fs311/en/

- Wyatt, S.B., Winters, K.P., & Dubbert, P.M. (2006). Overweight and obesity: Prevalence, consequences, and causes of a growing public health problem. *American Journal of the Medical Sciences, 33*, 166-174.
- Yee, M.D., & Brown, R. (1992). Self-evaluations and intergroup attitudes in children aged three to nine. *Child Development, 63*, 619-629.
- Zajonc, R.B. (1968). Attitudinal effects of mere exposure. *Journal of Personality & Social Psychology, 9*, 1-27.
- Zeller, M. H. & Modi, A.C. (2006). Predictors of health related quality of life in obese youth. *Obesity Research, 14*, 122-130.

APPENDICES**Appendix 1 – Ethical approval confirmation**

Madaleine Rowlinson
Academic Unit of Psychiatry & Behavioural Sciences,
Leeds Institute of Health Sciences
Charles Thackrah Building.
University of Leeds.
101 Clarendon Road.
Leeds LS2 9LJ

23 November 2011

Dear Madaleine

Re ref no: HSLT/09/021

Title: Children's perceptions of physical difference

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 (LIHS/LIGHT) 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 letter prior to implementing any of the intended changes.

I wish you every success with the project.

Yours sincerely



**Professor Alastair Hay/Mrs Laura Stroud
Chairs, LIHS/LIGHT REC**

Appendix 2 – Illustrated stories

Story version 1: Normal weight Alfina and normal weight peers. Full story. Pages 81 to 84.

Story version 2: Overweight Alfina with average weight peers. Full story. Pages 85 to 88.

Story version 3: Alfina in a wheelchair with average weight peers. Example page. Page 89.

Story version 4: Average weight Alfina with overweight peers. Example page. Page 90.

Story version 5: Overweight Alfina with overweight peers. Example page. Page 91.

Replace with illustration. V1. 1/4

Replace with illustration. V1. 2/4

Replace with illustration. V1. 3/4

Replace with illustration. V1. 4/4

Replace with illustration. V2. 1/4

Replace with illustration. V2. 2/4

Replace with illustration. V2. 3/4

Replace with illustration. V2. 4/4

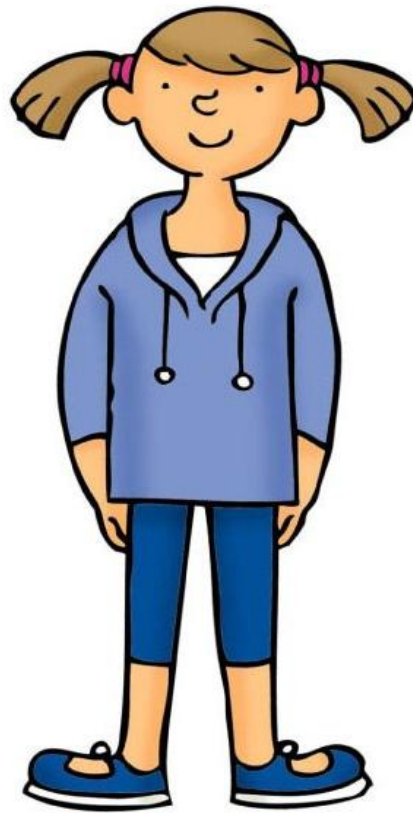
Replace with illustration. V3. 1/1

Replace with illustration. V4. 1/1

Replace with illustration. V5. 1/1

Appendix 3 - Examples of the ratings scale questions

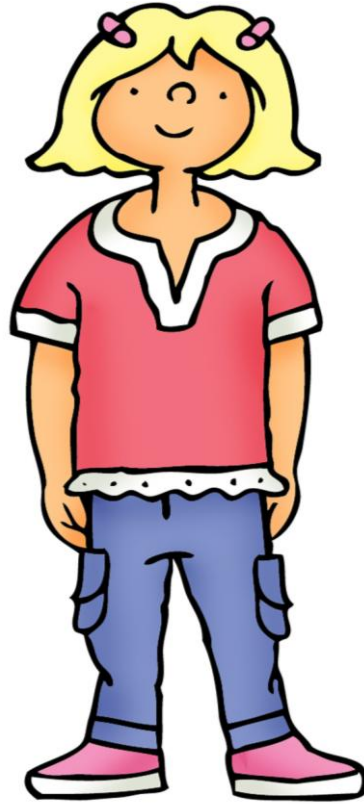
Some children are happy with the way they look while others are not so happy. How happy do you think Alfina is with the way she looks?



Alfina



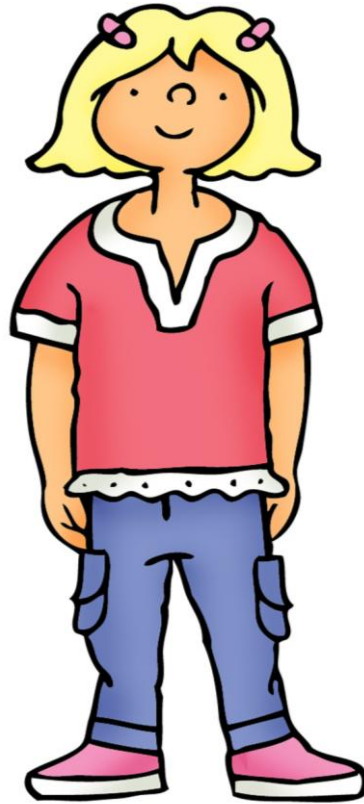
How happy do you think Holly is with the way she looks?



Holly



Some children have lots of friends to play with while others have far fewer friends. If Holly was at your school, do you think she would have lots of friends to play with?



Holly

1

2

3

4

5

If Alfina was at your school, do you think she would have lots of friends to play with?



Alfina



Some children get invited to lots of parties while others don't get any party invites. How often do you think Alfina would get invited to parties?



Alfina

1

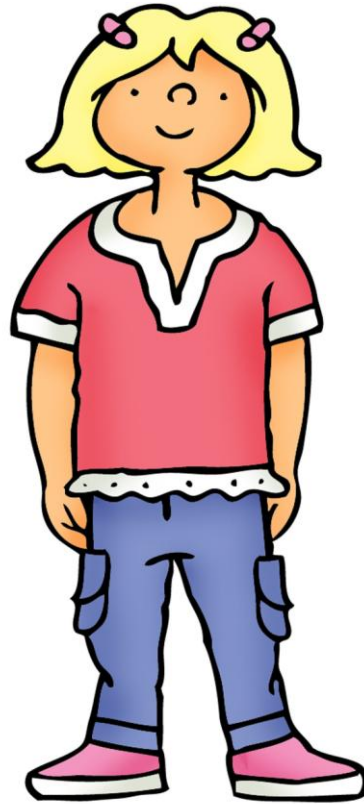
2

3

4

5

How often do you think Holly would get invited to parties?



Holly

1

2

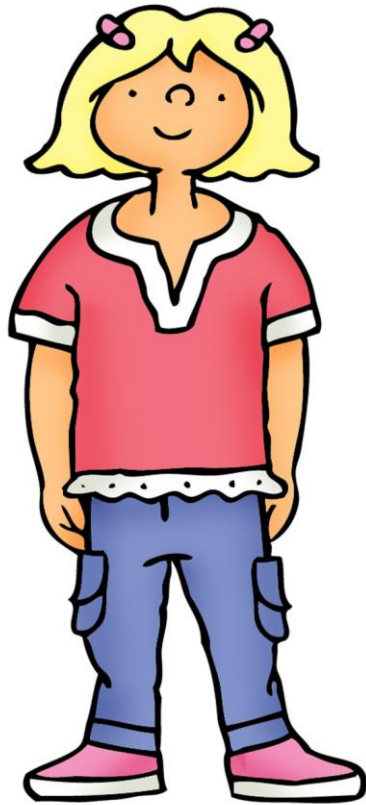
3

4

5

Appendix 4 – Examples of the forced choice questions

Who do you think does best at their school work?



Holly

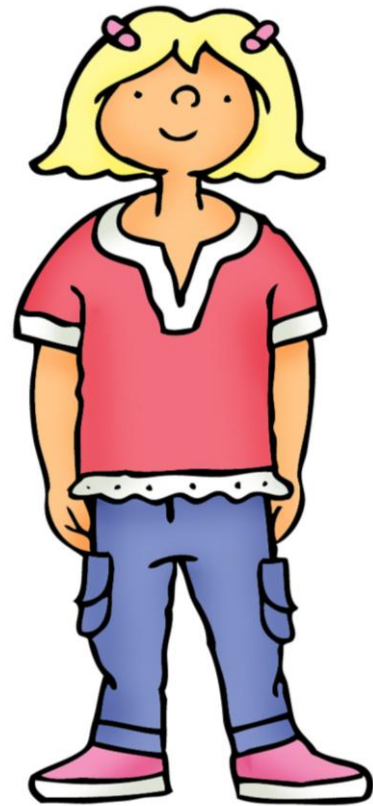


Alfina

Who do you think would win in a race?



Alfina



Holly

Appendix 5 – Example of the friendship choice question

Who would you chose to be friends with? Alfina or Holly?



Holly



Alfina

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 *how young children, aged 4-6 years old, perceive visible physical difference in other children*. In particular, this will look at how children respond to overweight and disability. 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 15 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, I would ask the child a few questions about some of the central characters in the story. 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 6 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 on 07739 515595 (mobile) or my supervisor Andrew Hill on the above telephone number or address.

Many thanks,

Yours sincerely,

Madaleine Rowlinson
Psychologist in Clinical Training

Professor Andrew J Hill
Professor of Medical Psychology

Version 2. Date: 29.04.10

Appendix 7 – Parental consent letter

0113 3430815

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 **how young children view physical difference in other children**. 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.

Five stories have been prepared and printed. The difference between the stories is that one or more of the children whom the story is about is drawn differently e.g. in a wheelchair or overweight. The study involves your child reading one of these stories with the researcher, followed by a few questions about some of the characters in the story. This should take around 10- 15 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. 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, or leave a message for myself at the address/ number above.

With many thanks

Madaleine Rowlinson
Psychologist in Clinical Training

Supervised by

Professor Andrew Hill
Professor of Medical
Psychology

Version 2. 29.04.10

How young children view physical difference in other children

Permission to participate form

- I have received and understood the information provided
- I understand that my child's participation is voluntary
- I understand that I am free to withdraw my child at any time, without giving any reason.
- I agree to my child taking part in the above study.

Name of Child

Name of Parent / Guardian

Signed by Date

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

Appendix 8 – Protocol for gaining the child’s agreement to participate.

Gaining assent from children

The class teacher will introduce me to the class first. They will be asked to explain that:

- My name is Madaleine Rowlinson
- I am from Leeds University
- I would like to read a story with them then talk about some of the children in the story, with each of them individually.
- They may have spoken to their parent or guardian about taking part and those children whose parents have given permission will be allowed to take part.
- If permission slips have not been returned, and they want to take part, then to do so before my next visit (please see below).
- The teacher will explain where we will sit in the classroom and he/she will ask each child whether they would like to take part when their turn comes.
- The teacher will organise the ordering of participation to minimise class interruption.
- The teacher will be available throughout and the child does not have to take part or can stop taking part at anytime.

I will also introduce myself to each child individually and ask if they would like to read and talk about the story with me prior to starting:

“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. Are you happy to carry on?”

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!”

If parental consent has not been returned by the first visit it is likely that a second opportunity to take part will be offered. Due to the anticipated large class sizes, participation from each school may involve more than one visit so if any child wants to take part but parental consent has not been received they will be provided with another form to take home. If this is returned before the end of their schools participation, then they will be allowed to take part. If not, and they are upset, sympathy will be given and if possible additional equivalent reading time by the teacher or teaching assistant will be negotiated.

Version 2. Date: 29.04.10

Appendix 9 – Summary of regression analysis for perceived body size

Example analysis predicting measures of Alfina’s ratings for ‘how happy do you think Alfina is with the way she looks?’.

Story version	Variable	<i>B</i>	<i>SE B</i>	β
1. Alfina ‘average weight’, Holly ‘average weight’	<i>DV: Alfina ratings</i>			
	Participant age	0.325	0.260	0.231
	Participant gender	-0.854	0.349	-0.444
	Self-perceived body size	0.049	0.113	0.080
2. Alfina ‘overweight’ Holly ‘average weight’	<i>DV: Alfina ratings</i>			
	Participant age	0.233	0.462	0.097
	Participant gender	0.337	0.650	0.099
	Self-perceived body size	0.326	0.240	0.257
3. Alfina in a wheelchair Holly ‘average weight’	<i>DV: Alfina ratings</i>			
	Participant age	-0.374	0.438	-0.159
	Participant gender	-1.171	0.586	-0.371
	Self-perceived body size	-0.032	0.208	-0.029
4. Alfina ‘average weight’ Holly ‘overweight’	<i>DV: Alfina ratings</i>			
	Participant age	0.087	0.153	0.097
	Participant gender	-0.414	0.208	-0.336
	Self-perceived body size	-0.144	0.065	-0.385*
5. Alfina ‘overweight’ Holly ‘overweight’	<i>DV: Alfina ratings</i>			
	Participant age	0.014	0.466	0.006
	Participant gender	-0.443	0.615	-0.135
	Self-perceived body size	0.260	0.183	0.267

*p<0.05. DV=dependent variable