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"No fat friend of mine": Young children's responses to overweight and disability

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Running title: Young children's responses to overweight

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Abstract

Two studies investigated 4- to 6-year-old children's weight bias. In Study 1, 126 children read illustrated books where a main character ('Alfie') was healthy weight, in a wheelchair, or overweight. In Study 2, 150 children read the same stories where the character was female ('Alfina'), or stories where her friends were fat. Children rated 'Alfie'/'Alfina' and a comparison character on nine attributes/behaviours, and chose one that best represented each attribute. Fat and wheelchair 'Alfie'/'Alfina' were rated less likely to win a race, and fat 'Alfie'/'Alfina' as having fewer friends. When forced to choose between characters, fat 'Alfie'/'Alfina' was rejected on most constructs. Children's gender, self-perceived shape, and character's friends' size had no effect on judgements. These findings show children's preferences away from fatness rather than outright rejection, and mostly clearly in friendship choices. Understanding young children's weight bias is important given their increasing involvement in obesity surveillance, prevention, and management.

Keywords: Weight bias; Anti-fat attitudes; Stereotyping; Children; Disability; Social rejection

"No fat friend of mine": Young children's responses to overweight and disability

Bias against people with obesity is evident through well-documented inequities in key areas of people's lives such as employment, education, and healthcare (Puhl & Heuer, 2009). The unacceptability of fatness is reflected in media such as advertising and TV programming and in a portrayal of weight loss that is contingent on personal effort. Given that people with obesity are consequently blamed for their state of body it is unsurprising that experienced (and perceived) weight bias increases vulnerability to psychological and emotional distress.

Social marginalization is pivotal to weight bias and stems from the pervasive negative stereotypes regarding the character and behaviour of people with obesity (Puhl & Heuer, 2009). Research into children's obesity stereotyping has a long history and originated in studies of their perception of disability. Asking 10- to11-year-old children, "Which boy (girl) do you like best" from six drawings of children with different physical disabilities, no disability, or obesity, showed the obese child was generally the last to be selected (Richardson, Goodman, Hastorf, & Dornbusch, 1961). In a replication some 40 years later, pre-teen children were even less likely to choose the obese child drawing as being liked over any of the others (Latner & Stunkard, 2003). Increases in obesity prevalence over this period and children's presumed increased familiarity with obesity appear to have done little to ameliorate these negative views.

Reviewing the literature on weight stigma in children and adolescents, Puhl and Latner (2007) distinguish educators, parents, and peers as the primary sources of weight bias. The rejection of an obese target (usually a drawing or cartoon) as a friend, someone to play with, or to date, is common to many studies of teens and younger. This social rejection has been observed in 9-year-olds (Hill & Silver, 1995) and these stigmatizing attitudes found to consolidate during primary school years (Wardle, Voltz, & Golding, 1995). As to when

weight stigma emerges, for at least some children in the US it is apparent at pre-school age. Studies by Brylinsky and Moore (1994) and Cramer and Steinwert (1998) were the first to describe negative attitudes to overweight in American 3- to 5-year-olds, regardless of the child's gender or own body build.

However, there are several problems with the existing literature. For example, there are far fewer studies of young children relative to those of older primary and secondary school age. So we know much less about the nature of anti-fat attitudes expressed by young children, e.g., whether they are generalised or specific to particular traits. The quality of drawings and other research materials is generally poor, making them unrealistic and unfamiliar to young children, and so potentially fostering social desirability biases. In addition, comparisons with children's views of people with other visible differences (e.g., physical disability) are relatively rare. This makes it difficult to distinguish children's views on appearance difference more generally, from those specific to being fat. Investigating young children's responses to a character who was drawn as either healthy weight, fat, or in a wheelchair was a main aim of the present studies.

The methods used to gauge children's views have undoubtedly affected the determination of weight bias. For example, rank ordering simple line drawings may indicate preference but ranking reveals little about how negative attitudes are, and may even over-estimate negativity (Jarvie, Lahey, Graziano, & Framer, 1983). The same is true of studies that ask children to match adjectives (e.g., lazy, dirty, ugly) to fat or thin drawn figures (Dunkeld Turnbull, Heaslip, & McLeod, 2000; Staffieri, 1967). Children are forced to label one body shape negatively, regardless of how much they agree with this label. Consequently, researchers have developed alternative approaches such as rating thin and fat body shapes on semantic differential scales (Brylinski & Moore, 1994; Musher-Eizenman, Holub, Barnhart Miller, Goldstein, & Edwards-Leeper, 2004), matching these body shapes to the character (mean or nice) of a child in a story (Cramer & Steinwert, 1998), and even

asking children why they made these choices (Su & Aurelia, 2011). However, there have been few attempts to compare methodologies, particularly in their potential to favour negativity (Jarvie et al., 1983). A second feature of the present research was the concurrent collection of children's attribute ratings and their choices between body shapes, with the aim to compare these methods in their assessment of negativity.

There is conflicting evidence of gender differences (respondent and target character) in young children's negative stereotyping (Cramer & Steinwert, 1998; Dunkeld Turnbull et al., 2000), and uncertainty whether this is related to the trait or attitude assessed, e.g., the nature of being mean or victimizing differing between boys and girls (Puhl & Latner, 2007). This contrasts with much clearer evidence of gender differences in older children and adolescents (Rees, Oliver, Woodman, & Thomas, 2011). Accordingly, investigating young children's responses to a female character drawn identically to the male character above (healthy weight, fat, in a wheelchair) was the main aim of the second study. The possible impact of the body size of others in these stories was also investigated.

With increasing surveillance of overweight in very young children, and the focus on early prevention and obesity management interventions, more detailed knowledge about weight bias at this age would be extremely valuable. In England, for example, all children are involved in the National Child Measurement Programme which measures their weight and height at age 4 to 5 and again at 10 to 11, and feeds back their relative weight to parents (Health & Social Care Information Centre, 2015). Weight bias will affect how children respond to these programmes. It may impact on how they relate to their peers, and, as they get older, on their own self-perception and well-being.

Two studies were conducted that aimed to investigate young children's ratings of, and choices between, story characters who varied in weight and physical disability, were presented as male or female, and who had fat or healthy weight friends. The hypotheses tested in Study 1 were that a male story character would be rated more negatively when fat

than in a wheelchair, and that negative stereotyping would be clear in choices between characters but much less so in children's ratings. Checks were made for any effects of respondent's gender or age.

Study 1

Method

Design. The experiment was a 3 (between groups) story condition design. Children were presented with and read a story in which a central character ('Alfie') was drawn either as healthy weight (and non-disabled), as fat, or in a wheelchair.

Participants. One hundred and twenty six children, (63 girls, 63 boys, *M* age 5.3, range 4.4 to 6.3) from 4 primary schools in the North of England took part in the study. All participants were either in reception class (first year of primary school, $n = 79$) or Year 1 ($n = 47$) of the national curriculum in England and were those for whom parental consent was received and who attended school on the study day. Parental consent was obtained by returning a signed information and consent letter. This sample represented 54% of the school register for these classes. No information is available on the non-participants. Regarding ethnicity, 88% were white and 12% from black and minority ethnic groups. None of the children were in a wheelchair. The schools' catchment areas varied but were mostly low to middle class. Ethical approval for the study was from the Leeds University Institute of Psychological Sciences ethics committee.

Materials.

Story books. A story book was written and designed for the study with the assistance of a professional illustrator. There were four pages in the story book, each with text and an illustration showing all of the characters: two boys ('Alfie' and 'Thomas'), a girl ('Holly'), and a cat ('Toby'). The story was a simple narrative describing a cat that runs up into a tree chasing birds (Figure 1). The story was designed to be colourful, clear, and simple, with the

aim of being enjoyable for the child taking part. The presentation style was consistent with a popular reading scheme used in English schools with this age group of children.

Three versions of the books were produced. They were identical except that one of the main characters ('Alfie') appeared as healthy weight in one version of the book, in a wheelchair in a second, and as overweight in a third (Figure 2). All the other characters were identical in the 3 versions and always depicted as healthy weight. Each child saw one version of the book.

Ratings and choices. Following the story, children were shown a series of large laminated cards, each with a question written across the top, a story character in the middle (Figure 3), and a rating scale (5 circles of increasing size numbered 1 to 5) across the bottom. Each question was asked separately for 'Thomas' (always normal weight) and then for 'Alfie' (shown as healthy weight, in a wheelchair, or as fat, depending on the version of the story the child was read). The structure of questioning was based on Harter and Pike's (1984) Pictorial Scale of Perceived Competence and Social Acceptance for Young Children, designed to reduce the tendency to socially desirable responding. In this, the child is read two brief statements, one positive and one negative, that go with two illustrations: typically, they describe a child who is very good at a task and a child who is not very good at the task. For the present study, these were combined and the question relating to physical competence, for example, was, *"Some children are very good at sports while others are not so good. How likely do you think Thomas would be to win in a race?* The child was then asked to select the size of the circle from the scale to represent how well that character would do in a race (smallest circle = not at all likely, largest circle = extremely likely). The next card showed the character 'Alfie'. They were asked *"How likely do you think Alfie would win in a race?*", and made the rating as above. On the following card children were asked to choose between 'Thomas' and 'Alfie', shown side by side. For example, *"Who do you think would win in a race? Alfie or Thomas?"*

This cycle of questions was repeated until all nine attributes or behaviours were asked about (listed in Table 1). A final card was shown with both characters placed side by side that asked participants, *"Who would you chose to be friends with? Alfie or Thomas?"* If the child was unsure about any answer or could not provide an answer, this was noted and the next card was revealed.

Procedure. The researcher met with each child individually in the reading corner of the classroom, something that children were familiar with when reading with non-teaching assistants. Some time was spent at the beginning of the task to engage with the child. The researcher explained that they would read a story together and then look at cards to ask questions about some of the characters in the story. Children's assent to read the story and talk about it afterwards was obtained. All participants were told they were free to decline answering any of the questions at any time. Assignment of story type (healthy weight, wheelchair, or fat 'Alfie') was done in fixed order and separately for boy and girls. Whilst reading, the researcher interacted with the child to help them engage with story and characters, and feel comfortable with the activity.

Data analysis. Data were analysed using SPSS (version 18). Means of ratings were calculated for each story condition and character presented. MANOVA tested the difference in ratings of the two characters 'Alfie' and 'Thomas' (main effect of character) on all 9 attributes/behaviours (main effect of attribute) and between each story condition, with and without children's age and gender as covariates. Post hoc paired t-tests were used to test mean differences between the ratings of 'Alfie' and 'Thomas' on each attribute (α set at $p < .01$). Odds ratios described the likelihood of 'Alfie' being chosen over 'Thomas' in the choice tests (95% CI).

Results and Discussion

Eight children failed to give ratings on 5 or more of the attributes/behaviours and were excluded from the analysis (but retained for the choice data analysis). They were all from reception class and their mean age was lower than that of the rest of the sample (M = 4.67 (SD = 0.20) versus 5.30 (0.5)). There was no significant difference between the age of children in the 3 story groups, $F(2, 117) = 0.01$, *ns*.

Children's ratings are summarised in Table 1. MANOVA revealed no main effect of story condition on children's ratings $F(2, 115) = 0.42$, $p = .42$, but significant effects of character, $F(1, 115) = 7.88$, $p = .006$, $\eta^2 = .06$, and attribute, $F(8, 108) = 19.11$, $p < .001$, $\eta^2 = .59$. In addition, there were significant interactions between character and story condition, $F(2, 115) = 7.31$, $p = .001$, $\eta^2 = .11$, and character and attribute, $F(8, 108) = 4.85$, $p < .001$, $\eta^2 = .26$, showing that children's ratings of 'Alfie' and 'Thomas' differed according to the story read and the rated attribute. The ratings of the two characters showed no attribute differences when 'Alfie' was healthy weight, but wheelchair 'Alfie' was rated as less likely to win in a race, and fat 'Alfie' both less likely to win in a race and to have fewer friends (Table 1).

It is of note that the mean ratings for both characters on positive attributes (e.g., happy with the way they look, friends to play with) were all in the upper part of the scale, i.e., between 3 and 5. The one exception was very good at sports (win a race) in which being fat or in a wheelchair was scored just below the scale mid-point. Similarly, most of the characters were scored below the mid-point on naughty at school. When age was included as a covariate in the analyses all MANOVA main effects and interactions became non-significant except for the character by story condition interaction. Age was itself a significant variable, $F(1, 113) = 4.52$, $p = .04$, $\eta^2 = .04$, suggesting differences in ratings were more apparent in older children. Children's gender had no effect on analyses when added as a covariate.

Table 2 summarises the choices made between ‘Thomas’ and ‘Alfie’. Compared with healthy weight ‘Alfie’, fat ‘Alfie’ was less likely chosen as the character that was happy with the way they look, invited to lots of parties, good at their school work, or to win in a race. Fat ‘Alfie’ was also more likely chosen as naughty. Wheelchair ‘Alfie’ was less likely to get lots of party invites or do good school work. Common to both was being rejected as a personal friend. This is most clearly seen for fat ‘Alfie’ where only one out of 43 children chose fat ‘Alfie’ to be their friend over ‘Thomas’ (*OR* = 0.02, 95% CI [0.00, 0.18]).

As hypothesised, these young children rated and chose differently when the main male character (‘Alfie’) was visibly different. Being fat had a relatively small penalty in the ratings task but led to wide-scale rejection in the choice task in favour of the healthy weight contrast character (‘Thomas’). Furthermore, the negativity to fat ‘Alfie’ was greater than when he was portrayed in a wheelchair, at least in terms of range of attributes that fat ‘Alfie’ was rejected in favour of ‘Thomas’. In addition, children’s age influenced this stereotyping. While the age range of the study sample was narrow (less than 2 years), the results suggested stronger negative assessments by older children. It is a reminder that there is great variance in cognitive development and life experience in this age group of children, both of which will affect outcome. In contrast, respondent’s gender had no impact on their assessment of the male characters (‘Alfie’ and ‘Thomas’) in the story.

These findings show that the degree of negativity was dependent on the method used to gauge children’s views. Forcing choices between characters suggested children were more negative about fat (and wheelchair) ‘Alfie’ than would be concluded from their ratings. The attribute ratings placed fat ‘Alfie’ in the neutral to positive side of the scales. Consequently, while there was clear preference for the healthy weight (non-visibly different) character, all character versions were viewed positively.

Study 2

In addition to investigating young children's responses to a female character we recognised the opportunity afforded by a story book with multiple characters. Most drawings used in children's stereotyping research are normally simple line drawings presented singly. However, stereotyping is a process generalized to groups and social context is most certainly relevant. Research with adults has shown a mere proximity effect in that a healthy weight person sitting next to an overweight person is more negatively perceived than when sitting next to someone who is also healthy weight (Hebl & Mannix, 2003). This stigma by association or 'courtesy stigma' (Goffman, 1963) has also been demonstrated in children. Penny and Haddock (2007) asked 5- to 10-year-olds how much they would like to be friends with a cartoon drawing of a male or female character presented in the middle of four other background characters, all either healthy weight or overweight. Social context was important in that healthy weight characters were liked less if the background characters were overweight, and overweight main characters liked less if all the background ones were healthy weight. Interestingly, this applied only to female characters, a sex-specific finding also observed in older Chinese children (Chen, Yin, Tang, & Wang, 2014). Our second study therefore included two further versions of the storybooks in which all of the central character 'Alfina's' peers were fat. This enabled us to investigate possible peer proximity effects.

While most studies of average and over-weight children and adults show they are equally likely to have negative attitudes to and stereotypes of obesity (Puhl & Latner, 2007), there are examples where young children's perceived body size appears to affect their ratings of fat figures. Specifically, children (aged 4 to 6) who judged themselves as heavy made less negative ratings of heavy figures (Holub, 2008). In a further study, self-judged heavier 3- to 5-year-olds selected larger sized figures for positive characteristics (Spiel, Paxton, & Yager, 2012). To investigate the potential influence of children's perceived body size, these judgements were also collected in the second study.

Accordingly, this experiment aimed to repeat Study 1 but with a female central character and to investigate whether the body shape of the character's friends affected children's ratings of that central character. It was hypothesised that negative stereotyping would again be more apparent in a female character who was fat than a female character in a wheelchair, and that both would be negatively evaluated relative to a healthy weight, non-disabled character. Second, the fat character would be more negatively evaluated when in the company of healthy weight than fat peers. No hypothesis was made regarding the effects of self-perceived body size given the mixed nature of the existing literature.

Method

Design. This was a 5 story book condition design (between groups) that enabled two analyses. The first was a replication of the comparisons made in Study 1 (comparing books in which a main female character was either healthy weight, in a wheelchair, or fat). The second was a character shape (main female character as healthy weight or fat) by peer shape (peers in story book as healthy weight or fat) comparison.

Participants. One hundred and fifty three children were given parental consent for participation in the study. One child did not want to take part on the day of testing (i.e., did not give their assent to participation) and two failed to understand the task. The final sample was 150 children (79 girls, 71 boys, *M* age 5.7, range 4.4 to 6.9) from Reception and Year 1 classes at 4 primary schools in the North of England (different schools to those in Study 1). They represented 50% of the school register for these classes. Again, the schools' catchment areas were mainly low to middle class, and none of the children were in a wheelchair. Ethical approval for the study was from the Leeds Institute of Health Sciences and Leeds Institute of Genetics, Health and Therapeutics (LIHS/LIGHT) research ethics committee.

Materials.

Story books. Five versions of the story book were designed for the study. Three were identical to those in Study 1 except that the main character ('Alfie') was drawn as a girl ('Alfina'). Accordingly, 'Alfina' appeared as healthy weight in one version of the book, in a wheelchair in a second, and as overweight in a third. All the other characters appeared as they did in Study 1 (healthy weight), and were identical in all 3 books. In book 4 'Alfina' was drawn as healthy weight while all the other characters were drawn as fat. In story book 5, 'Alfina' and all her friends were drawn as fat. The story narrative was identical in all books.

Ratings and choices. These were the same as for Study 1 except that 'Alfina' was presented in contrast with 'Holly' (always healthy weight, Figure 3). In addition, children were only asked to choose between 'Alfina' and 'Holly' in books 1 to 3 (i.e., not in the books where all the other characters were fat).

Children were asked to indicate their perceived body shape using the gender-specific body figure scales of Collins (1991). Each child was asked, "Which child do you most look like?" from the 7 drawings of a child's body size ranging from very thin to obese. In addition, a sub-sample of children were asked to select the body shape from these scales that corresponded to 'Alfina', 'Alfie', 'Thomas', and 'Holly' in the healthy weight and fat representations.

Procedure. This was the same as in Study 1.

Data analysis. The analysis strategy for the first comparison followed that for Study 1. For the second comparison, MANOVA was conducted on the ratings of 'Alfina' on all 9 attributes/behaviours with 'Alfina's' shape (healthy weight, fat) and her peers' shape (healthy weight, fat) as between subjects main factors, with and without children's age, gender, and perceived body shape included as covariates. This analysis was repeated for children's ratings of 'Holly'.

Results

'Alfina' as healthy weight, in a wheelchair, or fat. Children's ratings are summarised in Table 3. There was no main effect of story condition on children's ratings, $F(2, 87) = 0.38$, $p = .68$, but there were significant effects of character, $F(1, 87) = 10.81$, $p < .001$, $\eta^2 = .11$, and attribute, $F(8,80) = 15.82$, $p < .001$, $\eta^2 = .61$. In addition, there was a significant interaction between character and story condition, $F(2, 87) = 3.04$, $p = .05$, $\eta^2 = .07$, and a significant interaction between character and attribute, $F(8, 80) = 3.27$, $p = .003$, $\eta^2 = .25$, showing that children's ratings of 'Alfina' and 'Holly' differed according to the story read and the rated attribute. Post hoc paired comparisons between the ratings of the two characters showed no attribute differences when 'Alfina' was healthy weight. In contrast, wheelchair and fat 'Alfina' were both rated as less likely to receive lots of party invites, less good at their school work, and as less likely to win in a race. In addition, fat 'Alfina' was less likely to be happy with the way she looked. Of the covariates, only age was significant, $F(1, 85) = 8.00$, $p = .006$, $\eta^2 = .09$, and all MANOVA main effects and interactions became non-significant. There was no effect of the children's gender.

Looking at the mean values in Table 3, and as was observed for 'Alfie' in Study 1, children rated 'Alfina' in the neutral to positive part of the scale (3 to 5) on nearly all judgements of her, regardless of her body shape or difference in mobility. However, when required to choose between the characters, fat 'Alfina' was rejected in favour of healthy weight 'Holly' on 5 of the 9 attributes (Table 4). Wheelchair 'Alfina' was rejected on only 2. Again, fat 'Alfina' was extremely unlikely to be chosen as the child's best friend with only 2 of 30 doing so (OR = 0.08, 95% CI [0.02-0.38]).

'Alfina' and her peers. MANOVA revealed main effects of 'Alfina's' shape, $F(9, 105) = 3.15$, $p = .002$, $\eta^2 = .21$, and of peer's shape, $F(9, 105) = 2.08$, $p = .04$, $\eta^2 = .15$, on children's ratings of 'Alfina', but no interaction (Table 5). Univariate analysis showed children to rate fat 'Alfina' as less happy with the way she looked, $F(1, 113) = 19.51$, $p < .001$, $\eta^2 =$

.15, have fewer friends to play with, $F(1, 113) = 5.71$, $p = .02$, $\eta^2 = .05$, to get less party invitations, $F(1, 113) = 4.20$, $p = .04$, $\eta^2 = .04$, to be less good at school work, $F(1, 113) = 5.92$, $p = .02$, $\eta^2 = .05$, be more naughty at school, $F(1, 113) = 5.62$, $p = .02$, $\eta^2 = .05$, and less likely to win a race, $F(1, 113) = 16.70$, $p < .001$, $\eta^2 = .13$. Children rated 'Alfina' when with a fat peer group as better at school work, $F(1, 113) = 4.20$, $p = .04$, $\eta^2 = .04$, and more likely to watch lots of TV, $F(1, 113) = 4.20$, $p = .04$, $\eta^2 = .04$. Including age and gender as covariates in these analyses had no impact on outcomes, neither did accounting for children's perceived body shape ratings ($M = 3.2$, range 1 to 7).

Analysis of ratings of 'Holly' also showed a main effect of her shape, $F(9, 105) = 3.73$, $p < .001$, $\eta^2 = .24$, but no effect of peers' shape, $F(9, 105) = 0.98$, *ns*. Univariate analysis showed children to rate fat 'Holly' as less happy with the way she looked, $F(1, 113) = 4.64$, $p = .03$, $\eta^2 = .04$, to get less party invitations, $F(1, 113) = 13.77$, $p < .001$, $\eta^2 = .11$, and less likely to win a race, $F(1, 113) = 13.36$, $p < .001$, $\eta^2 = .11$.

Finally, children's shape ratings of the characters in Figure 3 showed healthy weight 'Alfina', 'Holly', 'Alfie' and 'Thomas' to correspond to between figures 3 and 4 on the Collins scale (M ratings, 'Alfina' = 3.62 and 'Alfie' = 3.11) and fat 'Alfina' and 'Alfie' to between figures 6 and 7 ($M = 6.34$ and 6.67 respectively). Both fat characters were rated as significantly larger than the healthy weight characters, $t(57) = 6.91$ and 10.53, for 'Alfina' and 'Alfie' respectively, $p < .001$.

Discussion

As in Study 1, when forced to choose then young children rejected story characters who were visibly different, and especially if the character was fat. However, ratings of fat 'Alfina' were mainly on the positive side of the scale, indicating a difference in preference rather than outright rejection. In addition, the attributes on which fat 'Alfina' was judged as less competent

were similar to those for fat ‘Alfie’, although there was more consistency between attribute ratings and choice differences in children’s judgements of fat ‘Alfina’.

The body shape of ‘Alfina’s’ friends had a minor effect on children’s ratings but there was no convincing evidence of negative proximity effects. The differences in ratings of ‘Alfina’ when with a fat peer group suggested more TV viewing regardless of ‘Alfina’s’ body shape and good school work, especially by healthy weight ‘Alfina’ when in the company of fat peers. It may be that for these young children the negativity associated with fatness was not strong enough to mark ‘Alfina’s’ peer group and impact on their perception of healthy weight ‘Alfina’. This is consistent with the broadly positive scaling of attributes noted above. Nor were ratings of ‘Holly’, a member of the peer group represented as healthy weight or as fat, affected by ‘Alfina’s’ difference in body shape.

In addition, children’s self-rated body size did not influence their judgements, a finding consistent with the majority of stereotyping research in children and adults (Puhl & Latner, 2007). Relating self-perception to the judgement of others is especially challenging when working with very young children. While there are psychometrically appropriate body shape assessments for children aged 8 and older, such as the Collins (1991) scale used here, data on the scale’s performance are not available for younger children (Hill, 2011). Accordingly, there must be concern regarding the reliability of the body size choices made by these very young children.

General Discussion

These studies investigated young children’s ratings of, and choices between, story characters who varied in weight and physical disability. They further investigated whether character gender and the body size of the character’s friends impacted on these judgements. The main findings were as follows. The methodology used to collect children’s judgements affected the observed outcome. Forcing choices between characters suggested children

were more negative about fat (and wheelchair) ‘Alfie’ and ‘Alfina’ than would be concluded from children’s ratings. In general, there was more negativity to the fat than wheelchair bound character, and the attributes on which fat ‘Alfie’/’Alfina’ differed most from the other characters were related to appearance satisfaction and social acceptance. Neither the gender of the character, that of the children themselves, nor the character’s friends body size impacted on children’s judgements.

Considering these outcomes in more detail, finding that ranking-based approaches yield more negativity than ratings supports the caution of Jarvie et al. (1983) that certain approaches may foster, and possibly overestimate, the degree of negativity in stereotyping studies. Overall, while there was preference for the healthy weight (non-visibly different) character, all character versions were viewed positively. Similar findings were reported by Kraig and Keel (2001) in research with slightly older (7- to 9-year-old) children. But this contrasts with overall negative ratings in a study of US 4- to 6-year-olds that used the drawings from the Collins (1991) body figure scale as targets (Musher-Eizenman et al., 2004). The difference in outcome may be related to the figural stimuli used and to our presentation of the characters within a social story context prior to the ratings and choices.

The negative assessment of fat ‘Alfie’ and ‘Alfina’ was specific rather than generalised, i.e., apparent on some but not all attributes. Again, this contrasts with the study by Musher-Eizenman et al. (2004). Naughtiness, unhappiness with appearance, and social rejection (in ratings and the children’s own personal choices) were attributed characteristics of fat ‘Alfie’ and ‘Alfina’. But being teased, overeating, and TV watching were not, perhaps surprisingly given their likely endorsement by older children and adults as characterological features of obesity. It is likely that these attributes will become included as children get older and more aware of societal views.

By including a story book in which Alfie’ and ‘Alfina’ were in a wheelchair it was possible to contrast young children’s views of fatness with someone both visibly different and

limited in function. The situational challenges associated with racing others, being at school, and going to other's homes are apparent in these ratings. The fat character shared many of these but had the additional burden of not liking their appearance and social rejection (by peers and the children making these assessments). Weight bias appears stronger than wheelchair disability bias in this group of children at least.

These children's own friendship preferences for healthy weight or thin shaped characters over fat characters are in agreement with other studies in this age group (e.g., Musher-Eizenman et al., 2004) and in older children (Hill & Silver, 1995). The social rejection aspect of anti-fat bias is evident in the mere proximity literature above, in adolescent social network analyses (Strauss & Pollack, 2003), and evidence reviews of research with children of primary school age (Rees et al., 2011). Similarly, the co-occurrence of obesity and impaired social acceptance has been observed in the US Early Childhood Longitudinal Study when children were 9 to 11-years-old (Jackson & Cunningham, 2015).

Interestingly, peer relationship difficulties are apparent even younger, specifically in parental assessments of the well-being of 5-year-old children with obesity (Boneberger, von Kries, Milde-Busch et al., 2009; Griffiths, Dezateux & Hill, 2011). Studies also report more conduct and hyperactivity problems in boys with obesity (Griffiths et al., 2011; Sawyer, Miller-Lewis, Guy et al., 2006). The scale items used give clues about the behaviours these mothers are reporting on behalf of their 5-year-olds. The overall description is of boys with obesity who are more likely seen as unsettled, erratic, physical in some peer relationships, and excluded from others. Kindergarten-aged children with obesity are more likely to have poor gross motor skills (e.g., in locomotion and balance; Roberts, Veneri, Decker, & Gannotti, 2012). In addition, developmental coordination disorder is more likely in young children with obesity (Hendrix, Prins, & Dekkers, 2014). With children who are obese more likely to be erratic, physically clumsy, and tall for their age, young children's social cautions

may be based on actual experiences of being hurt, probably unintentionally. This could be in school time or at home, and involve the child directly or in observing this happening to others. In accord with this, interviews reveal that young children are fearful of overweight children because they treat others badly and hit them (Birbeck & Drummond, 2006; Su & Aurelia, 2011). The present assessment of fat 'Alfie' being naughty at school is consistent this depiction. But this characterization appears at odds with an important literature on the victimization experiences of older children with obesity (Puhl, Peterson, & Leudicke, 2013). This potential transition from perceived bully to victim is worthy of further research.

There is also the issue of how these choices and preferences relate to children's cognitive development. In another study with children of a similar age, we used the present character drawings to talk with children about their understanding of the motivations for, and consequences of, changing from fat to healthy weight and vice versa (Baxter, Collins, & Hill, 2015). These children were able to identify the change in character body weight or shape, readily related this to both eating and activity, and appeared sophisticated in their description of the consequent positives and negatives for the characters. Although 'pre-operational' thinkers by broad Piagetian cognitive stage definition (i.e., younger than 7), there are several cognitive achievements that occur prior to age 7 that are relevant to the present findings. For example, by the age of 4, normally developing children will have acquired a knowledge of intentional states, i.e., what another person might be thinking or might want, and that others have feelings and motivations that may be different to their own (Korkmaz, 2011). This acquisition of a theory of mind influences social interactions and their interpretation, in everyday life as well as in stories. It should not be surprising therefore that social and friendship issues are prominent in our young children's stereotyping of obesity.

The present research has a number of strengths. These two studies included large samples of young children and used well-crafted images in a story format familiar to English children. The framing of questions was designed to reduce social desirability effects and

children's perception of the characters as being different in body shape and function was purposively evaluated. The reading of story books and their discussion was conducted in a familiar and safe school setting. Clearly, there are limitations regarding generalizability from this group of English educated young children, especially to those in countries where childhood obesity prevalence and dialogue around obesity are different. Likewise, children's own weight or experience of disability (theirs or that of others) may impact on the study tasks. In addition, the characters in these stories were all portrayed as happy and as friends. Others have varied characterizations and crafted stories where the characters are mean (Cramer & Steinwert, 1998; Su & Aurelia, 2011; Tillman, Kehle, Bray, Chafouleas, & Grigerick, 2007). Finding that children are more likely to associate a drawing of a fat child with the mean character still begs the question of why, and whether this would generalise to other visibly different representations of a person. These are issues that could be investigated further. Furthermore, characters in stories are very different to real lived situations, regardless of the quality of materials used. Investigating children's willingness to help overweight peers (e.g., Patel & Holub, 2012) is one way of taking our understanding of children's negative stereotyping forward to investigate behavioural intentions or prejudice.

In conclusion, this research confirms young children's awareness of the enormous societal interest in body size. The present findings indicate children's preferences away from fatness rather than outright rejection, views that were in part common to a representation of disability. Social disfavour was prominent, especially among the older of these young children. In essence, these outcomes match those of Sigelman and others some 30 years ago (Sigelman, Miller, & Whitworth, 1986). These researchers noted a preference for 'like me' in children this age, a rejection of any deviation from the normal, but broad acceptance of fat and wheelchair bound characters in a free choice task. It is possible that the commonplace use of methods that force children into choices between characters or that demand the matching of attributes to body shapes (and without an obvious visibly different

character for comparison) have overestimated young children's negativity to fatness. We also share Sigelman et al.'s concerns regarding the fragile relationship between these task outcomes and real-life responses to children who are disabled or fat.

Whether research such as this justifies the development of interventions specifically to address the stigma of obesity in young children (Su & Aurelia, 2011) is open to debate. Positive story lines, such as used in the present study, may help mitigate anti-fat bias but have to do so in the face of public health campaigns to counter obesity, some of which emphasise the physical, social, and psychological negativity of obesity. The rationale for further research with young children remains strong. There is still a need to better understand young children's weight bias given the increasing focus on this age group for obesity surveillance, prevention, and management. We need to know the basis of children's social rejection that is directed at overweight people, the sources and stages of acquisition of these attitudes, when these attitudes are translated into behaviour, and their relationship to later episodes of victimization. This knowledge will help obesity interventions to limit the furtherance of anti-fat bias and possibly reveal opportunities for fostering children's tolerance towards people who look different.

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Conflict of Interest

The authors declare no conflict of interest.

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Table 1

Ratings of 'Thomas', and 'Alfie' as Healthy Weight, in a Wheelchair, or Fat (M, SD).

	Healthy weight		Wheelchair		Fat	
	'Alfie'	'Thomas'	'Alfie'	'Thomas'	'Alfie'	'Thomas'
	(*N*=36)		(*N*=41)		(*N*=41)	
Gets teased because of how they look	2.97 (1.68)	3.21 (1.55)	3.22 (1.62)	3.46 (1.45)	3.00 (1.59)	3.36 (1.55)
Very happy with the way they look	4.66 (0.91)	4.43 (0.85)	4.40 (1.13)	3.90 (1.46)	4.29 (1.33)	3.90 (1.32)
Has lots of friends to play with	4.14 (1.35)	3.83 (1.42)	4.10 (1.30)	3.73 (1.55)	4.35 (1.05)	3.38** (1.41)
Gets invited to lots of parties	3.81 (1.43)	4.06 (1.15)	4.18 (1.25)	3.69 (1.40)	4.07 (1.33)	3.49 (1.52)
Very good at their school work	3.78 (1.66)	4.17 (1.21)	3.83 (1.47)	3.68 (1.49)	4.22 (1.33)	3.73 (1.48)
Naughty at school	2.28 (1.65)	2.67 (1.66)	2.22 (1.77)	2.37 (1.66)	2.22 (1.67)	3.05 (1.69)
Very good at sports (win a race)	3.92 (1.50)	4.28 (1.06)	4.22 (1.46)	2.83** (1.82)	4.49 (1.14)	2.93** (1.57)
Watches lots of TV	3.36 (1.71)	3.97 (1.46)	3.76 (1.56)	3.46 (1.73)	4.07 (1.39)	3.32 (1.68)
Eats lots of food	3.61 (1.68)	3.72 (1.56)	4.10 (1.50)	3.71 (1.52)	4.34 (1.11)	3.41 (1.73)

Note. Significant difference between ratings of 'Thomas' and 'Alfie' ** p<.01. Ratings on a scale of 1 to 5.

Table 2

Odds [95% CI] of Wheelchair and Fat 'Alfie' Being Chosen over 'Thomas' in a Forced Choice Test Compared with Healthy Weight 'Alfie'.

	Healthy weight 'Alfie' (*N*=41)	Wheelchair 'Alfie' (*N*=42)	Fat 'Alfie' (*N*=43)
Gets teased because of how they look	1.00	1.01 [0.42, 2.43]	1.93 [0.78-4.74]
Very happy with the way they look	1.00	0.93 [0.38, 2.28]	**0.27 [0.09, 0.79]**
Has lots of friends to play with	1.00	0.96 [0.39, 2.40]	0.38 [0.13, 1.06]
Gets invited to lots of parties	1.00	**0.11 [0.16, 0.99]**	**0.34 [0.14, 0.87]**
Very good at their school work	1.00	**0.40 [0.04, 0.31]**	**0.28 [0.11, 0.68]**
Naughty at school	1.00	1.63 [0.68, 3.92]	**2.92 [1.20, 7.12]**
Very good at sports (win a race)	1.00	0.52 [0.21, 1.31]	**0.19 [0.06, 0.59]**
Watches lots of TV	1.00	0.62 [0.26, 1.48]	0.48 [0.20, 1.17]
Eats lots of food	1.00	0.75 [0.30, 1.87]	0.80 [0.33, 1.99]
Choose to be friends with	1.00	**0.30 [0.12, 0.76]**	**0.02 [0.00, 0.18]**

Note. Odds [95% CI] in bold are statistically significant

Table 3

Ratings of 'Holly', and 'Alfina' as Healthy Weight, in a Wheelchair, or Fat (M, SD).

	Healthy weight		Wheelchair		Fat	
	'Alfina'	'Holly'	'Alfina'	'Holly'	'Alfina'	'Holly'
	(*N*=36)		(*N*=41)		(*N*=41)	
Gets teased because of how they look	2.93 (1.71)	2.79 (1.66)	2.48 (1.69)	2.77 (1.77)	2.70 (1.90)	3.47 (1.68)
Very happy with the way they look	4.07 (1.44)	4.62 (0.98)	4.26 (1.24)	3.61 (1.59)	4.67 (0.88)	3.47** (1.72)
Have lots of friends to play with	4.10 (1.45)	4.24 (1.22)	4.26 (1.03)	3.84 (1.59)	4.50 (1.11)	3.57 (1.72)
Get invited to lots of parties	3.83 (1.39)	4.21 (1.26)	4.42 (0.89)	3.39** (1.61)	4.67 (0.76)	3.67** (1.54)
Very good at their school work	4.00 (1.46)	3.41 (1.64)	4.39 (1.02)	3.26** (1.61)	4.33 (1.35)	3.23** (1.74)
Naughty at school	1.93 (1.44)	2.62 (1.80)	2.32 (1.74)	3.00 (1.79)	2.37 (1.85)	3.03 (1.81)
Very good at sports (win a race)	3.72 (1.46)	3.79 (1.59)	4.19 (1.22)	3.00** (1.69)	4.60 (0.81)	3.03** (1.79)
Watch lots of TV	3.69 (1.69)	2.93 (1.73)	3.61 (1.45)	3.00 (1.48)	3.50 (1.61)	2.83 (1.76)
Eat lots of food	3.76 (1.55)	3.59 (1.43)	3.58 (1.36)	3.42 (1.57)	3.63 (1.45)	3.50 (1.70)

Note. Significant difference between ratings of 'Holly' and 'Alfina' ** p<.01. Ratings on a scale of 1 to 5.

Table 4

Odds [95% CI] of Wheelchair and Fat 'Alfina' Being Chosen over 'Holly' in a Forced Choice Test Compared with Normal Weight 'Alfina'.

	Healthy weight 'Alfina' (*N*=29)	Wheelchair 'Alfina' (*N*=30)	Fat 'Alfina' (*N*=29)
Gets teased because of how they look	1.00	0.51 [0.18, 1.44]	1.63 [0.57, 4.67]
Very happy with the way they look	1.00	**0.18 [0.06, 0.55]**	**0.05 [0.01, 0.19]**
Have lots of friends to play with	1.00	0.38 [0.13, 1.08]	**0.19 [0.06, 0.58]**
Get invited to lots of parties	1.00	0.50 [0.17, 1.46]	**0.31 [0.10, 0.99]**
Very good at their school work	1.00	**0.21 [0.06, 0.69]**	**0.27 [0.08, 0.85]**
Naughty at school	1.00	1.29 [0.43, 3.83]	1.73 [0.55, 5.41]
Very good at sports (win a race)	1.00	0.39 [0.14, 1.11]	**0.13 [0.03, 0.45]**
Watch lots of TV	1.00	2.37 [0.82, 6.81]	1.48 [0.51, 4.33]
Eat lots of food	1.00	1.33 [0.48, 3.69]	1.85 [0.66, 5.21]
Choose to be friends with	1.00	0.37 [0.13, 1.10]	**0.08 [0.02, 0.38]**

Note. Odds [95% CI] in bold are statistically significant

Table 5

Ratings of 'Alfina' as Healthy Weight or Fat, in the Company of Healthy Weight or Fat Peers (M, SD).

	Healthy weight 'Alfina'		Fat 'Alfina'	
	Healthy weight peers	Fat peers	Healthy weight peers	Fat peers
	(*N*=29)	(*N*=30)	(*N*=30)	(*N*=30)
Gets teased because of how they look	2.79 (1.66)	2.60 (1.85)	3.47 (1.68)	2.97 (1.90)
Very happy with the way they look	4.62 (0.98)	4.77 (0.63)	3.47 (1.72)	3.77 (1.65)
Has lots of friends to play with	4.24 (1.22)	4.50 (1.08)	3.57 (1.72)	3.93 (1.60)
Gets invited to lots of parties	4.21 (1.26)	4.20 (1.16)	3.67 (1.54)	3.67 (1.58)
Very good at their school work	3.41 (1.64)	4.63 (0.77)	3.23 (1.74)	3.40 (1.85)
Naughty at school	2.62 (1.80)	2.27 (1.80)	3.03 (1.81)	3.43 (1.81)
Very good at sports (win a race)	3.79 (1.59)	4.70 (0.79)	3.03 (1.79)	3.17 (1.76)
Watches lots of TV	2.93 (1.73)	3.63 (1.56)	2.83 (1.76)	4.10 (1.47)
Eats lots of food	3.59 (1.43)	3.90 (1.27)	3.50 (1.70)	4.17 (1.09)

Note. Ratings on a scale of 1 to 5.

Figure 1
All Pictures in the Story Book Showing 'Alfie' as Healthy Weight with his Friends 'Thomas' and 'Holly' (and 'Toby' the Cat).

Figure 2

The First Page of the Story Books Showing 'Alfie' in a Wheelchair, or as Fat.

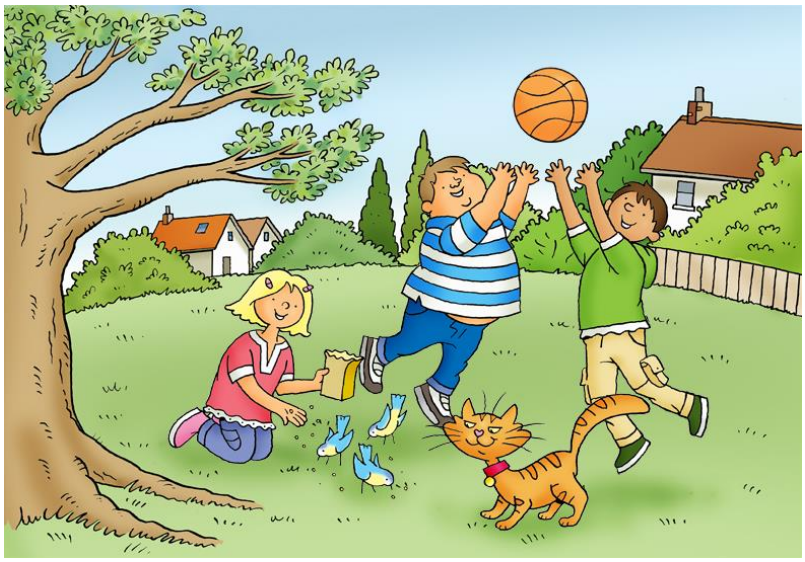
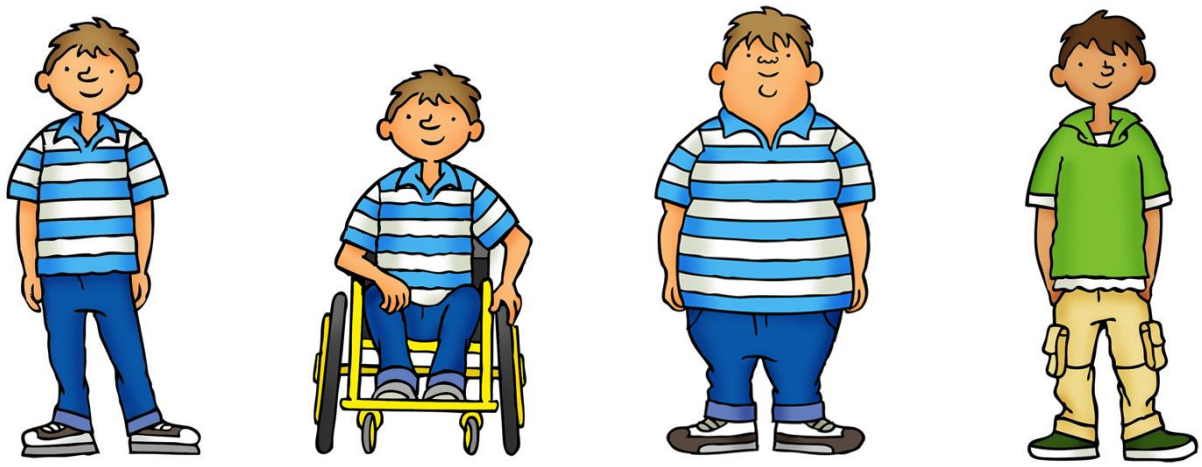


Figure 3

The Drawings of 'Alfie' (Healthy Weight, in a Wheelchair, Fat) and 'Thomas' used in the Ratings and Choices Between the Characters.



The Drawings of 'Alfina' (Healthy Weight, in a Wheelchair, Fat) and 'Holly' used in Study 2.