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Causal Information on Children's Attitudes and Behavioural Intentions Toward a Peer
With Obesity

Summary

Background: This study examined the effect of types of causal information about overweight on children's attitudes and intentions toward a peer presented as overweight. **Methods:** Participants (N = 176) were randomly assigned to read a vignette of an overweight peer in one of three conditions, which varied in the explanatory information provided for the aetiology of the peer's overweight condition: biological, environmental, or no causal information, along with a vignette of an average-weight peer. **Results:** The provision of information that the overweight was the result of biological factors and of no causal information yielded more positive attitudes toward the overweight peer compared to those who were provided with environmental information. Information on overweight had no impact on behavioural intentions. A social desirability bias was found for each of the three experimental conditions and for the average weight condition. **Conclusion:** Information explaining overweight had a minimal positive effect on attitudes and no effect on intentions toward an overweight peer.

Keywords: Obesity; Weight Stigma; Attitudes; Intentions; Bias Reduction

Introduction

There is much evidence that the prevalence of overweight and obesity among school-aged children has increased in recent decades across all countries, including Ireland [1]. Overweight and obesity in childhood is associated with a variety of physical [2] and psychosocial problems [3]. From a psychosocial standpoint, obesity is considered to be “ [4, p.1818]. Research has shown that prejudiced attitudes from other children and resulting peer rejection are the most common sources of stigmatization of obese children [5, 6]. There is also evidence that young children rate peers with obesity as less liked and less preferred as friends or playmates than they do average-weight peers or peers with other stigmatizing attributes (e.g., facial disfigurement, being wheelchair-bound) [6]. Research among 9 year olds showed that negative characteristics, such as being lazy and having few friends, are more likely to be attributed to children who are overweight [7].

Given common negative stereotypes of children who are overweight or obese, it is not surprising that they often experience peer rejection [5, 8]. Children who are overweight are more likely to experience social marginalization [9], peer victimization [10], and weight has been cited as the primary reason for bullying in schools [11]. Studies have also shown that weight-based stigmatization is associated with low self-esteem [10], body dissatisfaction [12], low physical activity levels [13], and depressive symptoms [10]. Despite evidence documenting the negative consequences of weight bias, few published studies have specifically attempted to reduce stigma and negative attitudes toward children who are overweight or obese [14]. Interventions aimed at reducing levels of weight bias among children have met with mixed success [8, 15, 16]. This may be partly the results of an inadequate understanding of factors that contribute to weight bias in children and of demographic differences (i.e., sex, age and ethnicity) in the levels of its endorsement [17]. Factors that contribute to children’s weight-based stigmatization need to be better understood to develop effective programmes to reduce weight stigma.

Attribution of causality has been suggested as an important factor in the formation of children’s attitudes toward obesity. According to Weiner’s attribution theory [18], affective responses to other people should be more positive when the cause of their medical condition or physical disability is uncontrollable than when it is controllable. When negative attributes of a person are seen as controllable, the individual is viewed as being personally responsible for them and thus will be more

stigmatized than when the attribute is viewed as uncontrollable and the individual is not seen to be personally responsible. For instance, DeJong [19] investigated how adolescent girls' perceptions of an obese peer were influenced by their beliefs about the cause of her obesity. Findings showed that unless the obese target could offer an "excuse" for her weight (e.g., glandular disorder) she was less liked and evaluated less positively than a normal weight peer. Similarly, another study presented audio vignettes to children (aged 5-7 & 9-10 years) and found that the provision of low-responsibility information reduced children's tendency to hold an obese girl responsible for her condition [20]. However, it did not alter their liking for the obese girl and liking was found to be related to the nature of the condition than to its perceived cause. In a similar study, children, aged 9-11 years, attributed less blame to an obese peer whose weight was attributed to medical causes. The provision of this medical information had little effect on overall attitudes, especially among older children [8]. In contrast, a study among 8-12 year old children found that greater beliefs about the controllability of obesity was positively associated with the strength of belief in negative stereotypes about overweight individuals [21]. Taken together, these studies suggest that attributions about the causes of obesity may play a role in expressions of weight bias towards children. However, to date, little is known about the effectiveness of providing different types of information about the causes of overweight, for example that suggesting weight status is the result of certain environmental factors, on the subsequent evaluation of an overweight peer.

Investigating whether children's attitudes and intentions toward an overweight peer will yield different results from previously published studies [8] when providing an environmental explanation of obesity is worthwhile. The examination of environmental factors in weight-based attitudes and intentions is important given that these factors are often the target of behavioral weight management interventions [22]. Recently, many public health campaigns such as the "Let's Move" [23] initiative in the US or the "Little Steps" [24] healthy living campaign in Ireland emphasize the role of the environment in the childhood obesity epidemic. These messages, highlighting the important role the environment plays in obesity, may have an impact on youth and their behavioural intentions toward an overweight peer. However, no such study to date has examined environmental factors in weight-based attitudes and intentions.

Over the past decade, Ireland has experienced rapid change in the social and physical environment. The proliferation of fast food has led to increasing public health problems including obesity, where research has shown that 19% of Irish children aged 9 years are overweight and 7% are obese [25]. Levels of overweight and obesity among children in Ireland are high relative to other Northern European countries and levels continue to increase [25]. This has important implications for the health and well-being of children and will increase the proportion of overweight and obese adults in Ireland in the future. The current investigation focuses on a population that has not been examined previously in relation to weight-based stigma. Extending our understanding of weight stigma among children outside of the US is worthwhile. The aim of the study is to examine the effect of different types of causal information on children's attitudes and behavioural intentions toward a peer presented as overweight. This study builds on previous research investigating the efficacy of medical causal information in reducing weight-based stigmatization and at the same time represents the first exploration of the effectiveness of environmental causal information in this respect. The current study was informed by Bell and Morgan's [8] methodology, where children were randomly assigned to observe a video of a peer in one of three conditions: average-weight, obese, obese with medical explanation. Similar to Bell and Morgan's study, stereotypic attitudes were assessed using the Adjective Checklist (AC) [26]. Behavioural intentions, defined as a person's relative strength of intention to perform a behaviour [27], were assessed on the Shared Activity Questionnaire-B (SAQ-B) [28]. Children were randomly assigned to read a vignette of a peer in one of three conditions: obese with no causal information, overweight with biological information explaining the overweight, overweight with environmental information explaining the overweight. In addition, all children read a vignette of a peer depicted as average weight. The current study presented children with female targets in the vignettes in light of research which shows that girls are more likely to report wanting to lose weight compared to boys (Gusella, Goodwin, & van Roosmalen, 2008) and that obese females experience a greater degree of social stigmatization of obesity than obese males (Harris, Walters, & Waschull, 1991). Furthermore, weight-related stigmatization is more likely to affect girls than boys (Sobal & Nicolopoulos, & Lee, 1995; Neumark-Sztainer, Falkner, Story, Perry, Hannan & Mulert, 2002). Given that females are particularly vulnerable to weight biases and experience greater societal pressure to adhere to the thin body ideal than

males, it was decided to employ female targets in the vignettes.

A second goal of this study is to explore a possible social desirability effect in the reporting of behavioral intentions. The SAQ-other [28] is included as a measure of social desirability. The recent attempts to promote positive attitudes and reduce stigma toward overweight peers [29] may cause children to respond in a “socially desirable” manner; that is, they may have presented themselves through their ratings to be consistent with their beliefs of how “good boys” and “nice girls” should respond to someone who is overweight [30]. Research has suggested that children may report positive intentions towards children with certain types of physical conditions because it is “socially desirable” to do so [31]. To explore a possible social desirability effect, children are asked to rate not only their own behavioral intentions toward the overweight peer (SAQ-self) but also their perception of their classmates behavioural intentions (SAQ-other). Finally, given mixed findings regarding whether boys and girls express different levels of weight bias [15, 31], the present study aimed to examine possible sex differences in attitudes and behavioral intentions toward an overweight peer following provision of specific information about the causes of overweight.

Thus, primary additions of the current study to the literature are the consideration of environmental factors in weight-based attitudes and intentions, which has not been previously examined in the literature, the examination of weight-based stigmatization in an Irish sample thus extending our understanding of weight-based attitudes outside of the US, and the inclusion of a measure of social desirability.

Hypothesis

The following hypotheses were tested:

1. Children will rate the average weight child more positively than the overweight child on the Adjective Checklist and the SAQ-self.
2. There will be a significant effect of type of causal information presented about overweight (biological, environmental, no causal information) on children’s ratings on the Adjective Checklist and the SAQ-self.
3. Due to a potential social desirability bias, children’s ratings of the peer who is depicted as overweight (biological, environmental, no causal information) will be lower (less favourable) on the SAQ-other than the SAQ-self.

Method

Participants

Participants were 176 boys ($n = 92$) and girls ($n = 84$), from the three most senior classes in the Irish primary school system (4th, 5th, & 6th class) of an urban school, and ranged in age from 9 to 12 years ($M = 11.23$, $SD = .89$). Nearly all of the participants were Irish (97%). Parental information leaflets and consent forms were distributed by class teachers. Only children whose parent/guardian, class teacher, and the school principal had consented to their participation and who had also provided written consent themselves were involved. Table 1 shows the demographic breakdown of the sample by school year, sex and experimental condition.

[Insert Table 1 Here]

Experimental Conditions

Children were randomly assigned to read a vignette about a girl presented as overweight in one of three conditions, with each indicating a different cause for the obesity: (a) biological- overweight presented as the result of a biological condition (a glandular problem), (b) environmental- overweight was the result of environmental factors (poor diet and no exercise), and (c) no causal information (NCI)- no information was presented about the cause of the girl's overweight. Furthermore, all children received a vignette of a girl presented as average-weight (the control target).

A between-within subjects design was employed in this study where each participant was randomly assigned to one of three obesity conditions, and all participants received the average-weight control condition. A between-subjects design was selected over a within-subjects design for the obesity condition to avoid practice/carry over effects and to avoid interference between the experimental conditions.

Furthermore, a between-subjects design reduced the response and cognitive burden for children that would be required with employing a within-subjects design, where participants would be required to read four vignettes (each obesity condition and average-weight condition) and answer the same questions on each vignette multiple times.

The vignettes for the average-weight peer and the over-weight peers were similar. For the average weight peer, the vignette stated: *Anna is a girl who is about the same age as you. She is average weight compared to most children her age. Anna likes to read and do puzzles and she likes to read every night before bed.* For the overweight peers, all three vignettes stated: *Suzy is a girl who is about the same age as you. She is overweight compared to most children her age. Suzy likes to read and do puzzles and she likes to read every night before bed.* The vignettes presented

across the three experimental obesity conditions were the same with the exception that, for the biological condition, the following explanation for the peer's overweight was also provided: *Suzy's mum recently brought her to the doctor to discuss the weight problem and the doctor identified Suzy's difficulty to be because of a problem with her glands where she is able to store more food in her body than most children her age*, while in the environmental condition, a different explanation for the peer's overweight was provided: *Suzy's mum recently brought her to the doctor to discuss the weight problem and the doctor identified Suzy's difficulty to be because of a poor diet and lack of exercise*. All vignettes were uniform with the exception of the biological/environmental/no causal information manipulation and each vignette included the same introduction statement "*Suzy is a girl who is about the same age as you. She is overweight/average weight compared to most children her age.*" and the same concluding statement "*Suzy really enjoys reading and spends lots of time reading and doing puzzles in the evening*". Vignettes were specifically created for the purpose of this study and were assessed for reading and face validity by a panel of child developmental experts (with Ph.D.'s in Developmental Psychology). Vignettes were also pilot tested with school-aged children to assess suitability and comprehension. Given research showing that children are more likely to stigmatize overweight girls than boys [c.f. 32], a female target was presented across these vignettes.

Dependent Measures

The Adjective Checklist (AC). The AC [26] consisted of 32 adjectives (16 positive and 16 negative) that represented four domains: affective feelings (e.g., happy, sad); physical appearance (e.g., pretty, ugly); academic assessment (e.g., smart, dumb); and social behaviour (e.g., cheerful, bored). Participants were required to circle adjectives that they believed to be appropriate descriptions of the target girl. The checklist was scored by subtracting the total number of negative adjectives from the total number of positive adjectives and adding a constant of 20. Thus, scores range from 4-36, with scores above 20 indicating more positive attitudes towards the target girl and scores below 20 indicating more negative attitudes. Factor analyses confirmed construct validity for positive or negative value of the adjectives, and a coefficient alpha of .81 indicated acceptable internal consistency [26]. Good construct and concurrent validity with the AC has been shown [28].

Shared Activity Questionnaire (SAQ). The SAQ [30] was employed to assess participant's willingness to engage in certain activities with the average weight and overweight girls presented in the vignettes. It has three broad activity areas consisting of 8 items each: General Social (e.g., "Eat lunch next to Suzy at school"); Academic (e.g., "Work in the school library with Suzy"), and Active Recreational (e.g., "Pick Suzy to be on my soccer team"). As the SAQ was originally created for use with American children, some item wordings were appropriately revised for use with Irish children (e.g., '*arithmetic problems*,' was changed to '*maths problems*') [33]. Below each item are line drawings of faces with corresponding responses: "yes" with a smile (score of 3), "maybe" with a neutral expression (score of 2), and "no" with a frown (score of 1). The participant circles the answer that shows how he or she feels about sharing each activity with the target child. A total score was obtained by summing responses (ranging from 24-72); and scores for the three individual activity areas were also obtained (ranging from 8-24; higher scores reflect more willingness to share in the activity with the target child). Good concurrent validity of the SAQ has been demonstrated with children [30]. In the present study, alphas for the SAQ were .73, .86, and .65, $p < .001$ for the girl presented as overweight in the no causal information, environmental, and biological condition, respectively. For the girl presented as average weight, one item, "*Do you think you would go to the cinema with Suzy?*", was deleted from the Active Recreational subscale because its inclusion resulted in a marked reduction in alpha ($\alpha = .59$); the resulting alpha was .92 (95% CI: .90-.93), $p < .001$.

Shared Activity Questionnaire-other (SAQ-other). A modified version of the SAQ, the SAQ-other, was administered to participants in order to detect socially desirable responding [see also 31]. This measure had the same format as the SAQ outlined above, with the exception that participants responded in accordance with how willing they thought *their classmates* would be to interact with the targets. For the overweight girl in the biological, environmental and no causal information conditions, alpha was .93, .94, and .90 respectively, $p < .001$. For the average weight girl, one item "*Do you think your friend would eat lunch next to Suzy at school?*" was deleted from the General Social subscale because its inclusion resulted in a marked reduction in alpha ($\alpha = .60$); the resulting alpha was .91 (95% CI: .88-.92), $p < .001$.

Procedure

Ethical approval for this study was granted by the School of Psychology Ethics Review Group at the host university. Participants were informed that they would read two short stories about children of their own age. All participants read the vignette depicting the average weight girl. Participants at each school year were randomly assigned to read a vignette of a peer presented as overweight in one of three conditions: (1) overweight girl with information that her condition is a biological problem, (2) overweight girl with information that her condition is an environmental problem, and (3) overweight girl with no causal information. To control for order effects, the vignettes were counterbalanced so that half of the participants received the average-weight vignette first, followed by the overweight vignette, while the other half received the vignettes in the opposite order. Chi-square tests revealed no significant differences in sex distribution from condition to condition across school year. ANOVAs revealed no significant differences in age between conditions.

After reading each vignette, participants completed the AC followed by the SAQ and the SAQ-other. The dependent measures were administered to children in a class setting and each item was read aloud to participants by the researcher. Four children were unable to participate due to developmental delays that precluded them from completing study measures. In addition, two children where English was not their first language were excluded. The researcher was available to answer any questions about the vignette or survey items in the event that a child needed assistance. Children with reading difficulties were assisted by the classroom teacher, who read instructions but required the child to circle their own response.

Analysis Plan

Prior to conducting statistical analysis, data were screened for normality and outliers. All survey items showed skewness and kurtosis within an acceptable range [34]. A series of paired samples t-tests were conducted to examine if there were differences in ratings on the AC and SAQ-self for the average weight peer and the peer depicted as overweight in each of the three experimental conditions (biological, environmental, no causal information). A series of 3 x 2 between-subjects analysis of variances were conducted to examine the effect of experimental condition and sex on the AC and SAQ-self. A mixed analysis of variance (ANOVA) was conducted to examine the effect of experimental condition on social desirability responses (SAQ-other). Alpha was set to 0.01 to avoid Type 1 errors with multiple tests.

Results

[Insert Table 2 About Here]

Table 2 shows the means and standard deviations for scores on the AC and for subscale scores and total scores on the SAQ and SAQ-other.

Weight stereotypes and bias

A series of paired samples *t*-tests were conducted to determine if there were significant differences between children's ratings on the AC for the girl in the average weight condition and the girls presented as overweight in each of the experimental conditions (biological, environmental, and NCI). Results showed that in each case ratings were significantly higher for the average weight target than the overweight targets (biological: $t [62] = -9.43, p < .001$; environmental: $t [57] = -11.08, p < .001$; NCI: $t (54) = -6.861, p < .001$; see Table 1).

A 3 (experimental condition: biological, environmental, NCI) x 2 (sex) between-subjects analysis of variance (ANOVA) was employed to analyze total scores on the AC, while correcting for social desirability (scores on the SAQ-Other). A significant main effect was found for experimental condition, $F (2, 169) = 10.01, p < .001$, partial $\eta^2 = .11$. Post-hoc tests indicated that children in the biological condition rated the girl presented as overweight more favourably than children in the environmental condition ($p \leq .01$). Post-hoc tests also indicated that children in the NCI condition rated the girl presented as overweight more favourably than children in the environmental condition ($p < .001$).

Behavioral intentions

A series of paired samples *t*-tests were also conducted to determine if there were significant differences between children's ratings on the SAQ for the girl in the average weight condition and the girls presented as overweight in each of the other three conditions (biological, environmental, and NCI). Significant differences were observed in each case (biological: $t [62] = 3.64, p < .001$; environmental: $t [57] = 4.74, p < .001$; NCI: $t [54] = 3.27, p < .001$; see Table 1).

A 3 (experimental condition) x 2 (sex) between-subjects ANOVA was employed to analyze total scores on the SAQ, while correcting for social desirability (scores on the SAQ-other). A significant main effect was found for sex, $F (1, 169) = 28.54, p < .001$, partial $\eta^2 = .14$. Girls ($M = 58.94; SD = 8.80$) reported significantly more positive behavioural intentions toward a girl presented as overweight than boys ($M = 46.29; SD = 11.17$).

Social Desirability

To determine the effect of social desirable responding on SAQ scores, a mixed between-within subjects ANOVA was conducted to examine if there were significant differences between ratings on the two versions of the SAQ (self and other) across the three experimental conditions (biological, environmental, no causal). There was no significant interaction between ratings on the SAQ-self versus SAQ-other and experimental condition, Wilks Lambda = .99, $F(2, 173) = .54$, $p = .59$, partial $\epsilon^2 = .006$. There was a main effect for scores on SAQ-self versus SAQ-other, Wilks Lambda = .92, $F(1, 173) = 14.19$, $p < .001$, with all conditions showing higher scores on the SAQ-self versus SAQ-other. Using guidelines by Cohen [35], this effect was moderate, partial $\epsilon^2 = .08$. The main effect comparing the three conditions was not significant, $F(2, 173) = 1.26$, $p = .29$, partial $\epsilon^2 = .01$, suggesting no difference in the type of experimental condition on social desirability responses. Examination of the means in Table 2 shows that participants in the three experimental conditions were more positive in their own ratings on the SAQ than they were in rating how their classmates would respond (SAQ-other).

Social desirability effects were also examined on SAQ scores for average weight peer in each of three conditions. A mixed ANOVA was conducted and showed that there was no interaction between scores on the SAQ-self versus other and experimental condition, Wilks Lambda = .98, $F(2, 173) = .18$, $p = .179$, partial $\epsilon^2 = .02$. There was a significant social desirability effect for the three experimental conditions, Wilks Lambda = .96, $F(1, 173) = 6.78$, $p \leq .01$. Using guidelines by Cohen (1988), this effect was small, partial $\epsilon^2 = .04$. The main effect for condition was not significant, $F(2, 173) = .87$, $p < .87$, $\epsilon^2 = .002$.

Discussion

This study examined children's attitudes towards peers presented as average-weight and overweight, as well as the impact of different types of causal information on children's responses toward a peer depicted as overweight. Consistent with previous research [5, 8], the current findings demonstrated that children tended to rate the target depicted as overweight more negatively across all conditions, in comparison to the average-weight target. In line with previous research, conducted in the US children in the current study seem to have internalized the prevailing socio-cultural message that "fat is bad" and "thin is good" [36].

When examining the impact of causal information toward the peer who was overweight, different patterns of results emerged for attitudes and behavioural

intentions. Providing children with information that a peer's overweight was the result of environmental factors had a more negative impact on attitudes in comparison to children being informed that the target child's weight problems were due to biological factors or the provision of no information at all about the aetiology of the overweight. However, there were no significant differences in children's behavioural intentions toward the peer depicted as overweight across the three experimental conditions which is in line with previous findings [8]. Given that this type of study has been implemented in adults with mixed or little success [37, 38], it is not surprising that there was little effect on behavioural intentions in the current study. However, a recent study of weight bias in medical students may be encouraging where it was found that genetic information reduced anti-fat stereotypes relative to a control (i.e. chronic head pain) or information about the behavioural mechanisms of obesity [39].

The current findings do not provide strong support for Weiner's attribution theory. There is some support for the view that when children think the peer is responsible for their own condition (i.e. they have a poor diet and no exercise), this is associated with more negative attitudes, however, the same pattern is not observed for behavioural intentions. In addition, there is no evidence to suggest that the provision of medical information results in a more positive pattern of responses toward the peer who was overweight. While environmental information resulted in more negative attitudes, the provision of biological information did not result in any improvements in children's attitudes or behaviours in comparison to no causal information. Portraying the view that overweight is a condition that is uncontrollable and not one's fault did not result in desirable outcomes in the present study.

The findings suggest that researchers need to reconsider whether presenting causal information is an appropriate direction for future interventions. It has been suggested that attributions of responsibility may not be the primary reasons for bias in behavioural responses towards children who are overweight [37]. The effects of an educational film intervention to enhance understanding for obese adolescents' problems was assessed among students' and findings revealed that although there was an increased understanding of the problems of obese people after the intervention, students showed stronger prejudice against them [40].

Social desirability effects were identified in the present study, in that children provided more positive behavioural intentions for the self in comparison to their views of how others would respond to an overweight peer and an average weight peer

in the three experimental conditions. However, the results showed that the social desirability effect was stronger for the overweight peer than the average weight peer based on Cohen's [35] guidelines. To the authors' knowledge, this is one of the first studies to consider social desirable responding in weight bias research with children. It is recommended that social desirability is measured and controlled for in future attitudinal studies on overweight. There is also scope for greater reliance on implicit attitude measures in order to tap into automatic associative processes. Research using the Implicit Association Test has found higher levels of bias on the IAT than with explicit measures [41].

An important strength of this study was the experimental design employed to investigate the effects of different types of causal information on children's attitudes and behavioural intentions towards a peer depicted as overweight. This study extended Bell and Morgan's [8] research by examining the effect of environmental information on children's weight-based attitudes and intentions, which has not been done before. Additional strengths of the study include that this is the first known examination of weight-based stigma in an Irish sample, the use of a large sample, and the consideration of social desirability. Furthermore, this research contributes to the literature by providing evidence of weight-based stigma in a non-US sample of youth.

There are several study limitations that must be considered for improving future research. First, some constructs potentially important to weight-related stereotypes and behavioural intentions were not assessed. For example, developmental factors such as age and pubertal status may be important constructs to consider when studying weight stereotypes among children. Given that many physical, emotional, and social changes take place during this period, future research would benefit from considering developmental issues. Other variables that may also impact on children's judgements of a peer who is overweight include ethnicity, the amount of contact a child has with a peer who is overweight/obese, exposure to the media, and whether a child has a weight difficulty of his or her own. Recent studies have begun to examine some of these variables. For example, Gray et al. [42] recently found that certain age groups (that is, children compared to adolescents) and populations (that is, White adolescents compared to African American adolescents) had higher levels of weight-based stigmatization. **The current study found that girls had more positive behavioural intentions toward an overweight female target than boys. However, a limitation of this study is that all children were presented with**

vignettes of female targets only, which may potentially bias the current results. The gender effect may not have been found if boys were presented with an overweight male target. It may be that boys and girls have different perceptions of peers of the same or different gender and show more positive intentions toward the same-sex child regardless of their overweight status. Further research is warranted to examine whether there are gender differences in behavioural intentions towards an overweight child, and whether this may vary depending on the gender of the target child. Studies could randomly assign children to read a vignette of a male or female target in each obesity-condition to determine if the gender of the target child influences children's behavioural intention ratings.

Another limitation is the extent to which children's responses on attitude and behavioural intention measures to a hypothetical overweight child can predict their actual behaviours with a peer who is overweight. Although attitudes have been described as good predictors of behaviours, in real life situations there is often a lack of correspondence between the two [43]. A wider range of assessments of social relationships and social responses could also be explored such as peer and friendship nominations, observations of children's behaviours toward peers who are overweight/obese in the school setting or measures of implicit attitudes towards overweight children. These assessments might allow for greater insight into the social context of children with weight difficulties and the relationships between attitudes and behaviours towards such individuals. It would also be worthwhile to measure participants' BMI or perceived weight in future research as, if the current study measured BMI, the results may have indicated an interactional effect of overweight condition and participant weight on behavioural intentions. Previous reductions of weight bias have been documented in adults, although restricted to overweight /obese participants [44]. This would be a worthwhile avenue for future research. Research on a large community-based sample of adults (N= 4,283) found that implicit and explicit anti-fat biases were significantly weaker among people with high BMIs compared with those with low BMIs (Schwartz, Vartanian, Nosek, & Brownell, 2006). However, other studies with smaller samples found that overweight individuals did not hold more favourable attitudes toward the ingroup / overweight group members (Rudman, Feinberg, & Fairchild, 2002; Wang, Brownell, & Wadden, 2004). Further research is warranted to examine whether overweight children show more favourable attitudes and behavioural intentions towards on overweight peer when compared to

normal weight children. It may also be interesting to consider whether the age of the child in the vignette has an effect on attitudes towards obesity, as there may be the perception that younger children are not entirely in control of their diet and exercise since they lack the agency of adults (e.g., they are not cooking/choosing their own foods, and may simply be eating what is available in the home). It may also be interesting to consider whether the results might differ if the vignette described an obese adult. Finally, another consideration for future research would be to employ a visual target as well as presenting a vignette with an explanation of the child's overweight condition. For example, Bell and Morgan showed a videotape of a child presented as overweight in conjunction with information on the child's obesity condition. The use of such visual cues would be warranted in future research as visual cues may change children's ratings towards the obese peer. Furthermore, presenting the child in action via video is a more realistic interaction and would have more external validity than that created by written vignettes.

The present research suggests a need to explore alternative approaches to improving attitudes towards children who are overweight and fostering integration of these children in society. One possible approach might be to promote messages emphasizing both children's similarities and differences (e.g., "all children are the same in a way, but each child is also unique") to others. There is some evidence that this approach was effective among Black and Latino youth in improving social tolerance towards people in general and improving desired social closeness to White youth [45], however, it has yet to be tested as a viable approach for children with health conditions. An alternative strategy that holds promise in reducing anti-fat bias involves manipulating social norms [37], although much further work in this area is required given the small number of studies conducted to date. Another potential strategy is the promotion of body size acceptance. A puppet program was implemented among elementary school children to promote size acceptance and found that the program was effective in reducing negative stereotypes about large body shapes by reducing teasing and encouraging students to treat everybody well [46]. More complex multi-component interventions that address the broad social ecology spanning peers, family, school, and society may also be required [42]. Gray et al. [42] suggests that the limited effectiveness of interventions to date is due to their exclusive focus on children, as opposed to their broader social network. School-based assessments of social interactions with overweight youth has been conducted and

shown that overweight youth were more likely to be socially isolated and to be peripheral to social networks than normal-weight adolescents [9]. Increased participation in sports and school clubs, and decreased television viewing were associated with more friendship nominations and higher network scores and, thus, may mitigate the social isolation of overweight adolescents. Further work examining the effectiveness of these strategies in reducing weight based stigmatization would be worthwhile.

In conclusion, the present study found that overweight peers were viewed negatively by their peers. Information explaining obesity had a minimal positive effect on children's attitudes and no effect on their behavioural intentions toward a peer presented as overweight. Further research needs to consider alternative ways of reducing stigma towards obese peers and how to promote acceptance among children who are overweight.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

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Table 1. Demographic Breakdown of Sample by School Year, Sex and Type of

| | School Year n (%) | Sex n (%) |
|--|--|------------------------------------|
| Overall Sample (N=167) | 4 th year: 55 (31%) 5 th year: 55 (31%) 6 th year: 66 (38%) | Male: 92 (52%) Female: 84 (48%) |
| Biological condition (n=63) | 4 th year (n=19) 30% 5 th year (n=20) 32% 6 th year (n=24) 38% | Male: 37 (59%) Female: 26 (41%) |
| Environmental condition (n=58) | 4 th year (n=17) 29% 5 th year (n=17) 29% 6 th year (n=24) 42% | Male: 30 (52%) Female: 28 (48%) |
| No causal information condition (n=55) | 4 th year (n=19) 35 % 5 th year (n=18) 33% 6 th year (n=18) 32% | Male: 25 (46%) Female: 30 (54%) |

Causal Information Condition

Table 2. Means and Standard Deviations of Participants' Scores on the Adjective Checklist, the SAQ and the SAQ-other by Overweight Condition and Gender of the Rating Child

| Group | Average weight (N = 176) | Obese – Biological (n = 63) | Obese – Environmental (n = 58) | Obese – No Causal Info (NCI) (n = 55) | F value F(df, n), p | Post-hoc |
|---------------------|----------------------------------|-----------------------------|--------------------------------|---------------------------------------|----------------------------|--|
| Adjective Checklist | | | | | | |
| Boys | <i>M</i> 26.74 <i>SD</i> 5.05 | 20.95 5.22 | 17.93 4.93 | 22.84 4.10 | | |
| Girls | <i>M</i> 29.31 <i>SD</i> 3.94 | 20.27 6.77 | 17.88 4.54 | 22.33 4.93 | F(2, 169)=1.59, p=.21 | No effect for sex on AC ratings of overweight target |
| Total | <i>M</i> 27.97 <i>SD</i> 4.72 | 20.67 5.86 | 17.88 4.54 | 22.33 4.93 | F(2, 169)=10.01, p<.001 | Main effect for obesity condition Biological > Environmental NCI > Environmental |
| SAQ-self | | | | | | |
| Boys | <i>M</i> 53.90 <i>SD</i> 9.62 | 46.59 10.78 | 45.73 11.57 | 46.52 11.67 | | |
| Girls | <i>M</i> 61.19 <i>SD</i> 6.14 | 61.23 8.71 | 55.71 10.20 | 59.97 6.61 | F(1, 169)=28.54, p<.001 | Main effect for sex on SAQ-self ratings of overweight target Girls > Boys |
| Total | <i>M</i> 57.38 <i>SD</i> 8.91 | 52.63 12.28 | 50.55 11.95 | 53.85 11.39 | F(2, 169)=1.34, p=.26 | No effect for obesity condition |
| SAQ-other | | | | | | |

| | | | | | | | |
|-------|-----------|-------|-------|-------|-------|-----------------|--------------------------------|
| Boys | <i>M</i> | 53.79 | 44.57 | 45.00 | 46.48 | | |
| | <i>SD</i> | 10.43 | 9.25 | 11.77 | 10.12 | | |
| Girls | <i>M</i> | 60.74 | 55.31 | 52.43 | 55.70 | | |
| | <i>SD</i> | 7.93 | 10.60 | 10.41 | 7.98 | | |
| Total | <i>M</i> | 55.38 | 49.00 | 48.59 | 51.51 | F(1, 173)=14.19 | SAQ-self>SAQ-other across all |
| | <i>SD</i> | 8.86 | 11.11 | 11.65 | 10.06 | p<.001 | obesity conditions |
| | | | | | | F(2, 173)=1.26, | No difference in type of |
| | | | | | | p=.29 | experimental condition on SAQ- |
| | | | | | | | other responses |
