

# **Weight Bias and Theory of Mind in Young Children**

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

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## **Abstract**

**Introduction:** Childhood obesity has been described as an epidemic. For children with obesity, they are likely to experience the additional challenge of obesity stigma. This was the first study to investigate the impact of ToM and weight bias in young children. Lapan & Boseovski (2016) suggest children with high ToM are able to disregard physical characteristics when making trait attributions. Therefore it was hypothesised weight bias would be present and children with high ToM would show less bias.

**Method:** Children (63 male and 76 female) aged four to six years, were read a storybook which contained an assessment of ToM and weight bias. Children were asked to make forced choices between characters differing in body shape and then to justify their decisions.

**Results:** In the character selection, children showed significant bias towards the healthy weight character. There were significantly more negative comments, made by children, after choosing the character with obesity. After their choice, three themes emerged in their reasons: 'emotion', 'story' and 'appearance'. ToM impacted children's character selection, as a higher proportion of children with high ToM showed weight bias. There were no differences between children with low and high ToM in their justifications. No differences in weight bias were observed between girls or boys, nor in younger or older children.

**Discussion:** Weight bias was present in young children's character selection and the valence of their justifications. Bias was not clear in the thematic analysis of responses and reference to body shape was very limited. It is suggested children may modify their responses when asked to talk about bias, which may be evidence of a separate process. ToM is likely to enhance this process. Further research is needed to understand the impact of ToM on other biases young children hold such as disability. ToM is a helpful framework to increase understanding of stigma in young children, which may in turn inform interventions to reduce bias.

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## **Introduction**

### **1.1. Childhood obesity**

A child is described as having obesity if they have an “abnormal or excessive fat accumulation that presents a risk to health” (World Health Organization, 2018). Obesity is classified using a central index system, the Body Mass Index (BMI). An individual’s BMI is calculated (dividing weight by height squared), the score is then compared to the general population to give an indication of levels of obesity. Childhood obesity is accepted as a “...BMI at or above the 95th percentile for children and teens of the same age and sex” (Centers for Disease Control and Prevention, 2016). This study will use the word ‘obesity’ to refer to the medical condition and ‘fat’ when referring to input from children, as that is often the term they use.

There is a serious impact of obesity across society. In the UK, 20% of children leaving primary school are classified as having obesity, which is an increase on previous years (Public Health England, 2018). The childhood obesity “epidemic” has attracted attention from doctors, psychologists, politicians, educators and the media (Klaczynski et al., 2009). One of the reasons for this is that children who have obesity are five times more likely to be obese as an adult than peers of average weight (Simmonds et al., 2016). Obesity leads to inequalities such as employment, education and healthcare as the assumption is made the individual is to blame, unhelpfully marginalising individuals (Puhl & Heuer, 2009). There is also a financial impact; with the cost of obesity to the NHS estimated at £6.1 billion per year and to the economy £27 billion per year (Public Health England, 2017).

The government recognises the current levels of childhood obesity are unacceptable and one of the strategies they introduced to monitor and address this was the National Child Measurement Programme (Public Health England, 2013). The programme records the BMI of children in reception (four-five years) and in year six (10-11 years). The aims of the programme are; to understand and inform planning of local services, gather trends in obesity, increase awareness amongst the public of weight issues and as a means to speak to families about health. Although the primary focus is identifying children who are overweight or have obesity, the inclusiveness of the process prompts questions around children’s understanding of healthy eating, weight and activity.

The literature in this area uses a range of terms such as ‘anti-fat’ ‘obesity stigma’ and ‘bullying’ (Crandall & Schiffhauer, 1998; Griffiths et al., 2006). Key papers were found using these search terms and then seminal papers mentioned in the key papers were read. The current study used a broad definition of obesity to incorporate the spectrum of research available. The term ‘obesity bias’ and ‘weight bias’ are used to correspond with the terms currently used in the field. What follows is a review of the literature; obesity stigma in children, child development, theory of mind (ToM), prosocial behaviour as a measure of weight bias, and gender differences.

## **1.2. Obesity bias in children**

Obesity is understood to be, “one of the most stigmatizing and least socially acceptable conditions in childhood” (Schwimmer et al., 2003). However, understanding the social (teasing) and psychological (self-stigmatisation) correlates of obesity is not well studied (Klaczynski et al., 2009). Obesity stigma can be defined as, “...negative weight-related attitudes and beliefs that are manifested by stereotypes, bias, rejection and prejudice...because they are overweight or obese” (Puhl & Latner, 2007, p. 558).

Language is important because of the impact it can have on the recipient and those in proximity. Vartanian (2010) asked students to respond to a number of questions about ‘fat people’ or ‘obese people’. Results showed more negative judgements when the targets were referred to using the term ‘obese people’ rather than ‘fat people’. In addition, ‘obese people’ were seen to be less familiar to participants which could explain the increased negativity. Therefore, language will have an impact and needs to be considered so as not to exacerbate negative attitudes.

Children who are perceived as having obesity are vulnerable to the expression of weight bias; experiencing negativity from others due to their weight (Puhl & Latner, 2007). This could be subtle (exclusion from activities), through to more overt forms of discrimination (physical bullying). One of the inherent challenges with this research is young children are often unable to fully express, through language, their beliefs. Therefore research from older children can be helpful in understanding the process later and then research can work backwards. The literature has been organised with studies drawn from adolescent populations followed by research in younger children.

### **1.2.1. Studies with adolescents**

Being rejected by peers could be one of the primary psychological costs for individuals with obesity. In a study of adolescents, 84% of respondents reported observing students being teased for their weight, and 65% to 77% had observed individuals being excluded from social activities or having rumours spread about them (Puhl et al., 2011). Additionally, as a response to bullying, some children may become the perpetrators of bullying in response to being subjected to negativity due to their weight. Jansen et al. (2014), completed a large cross-sectional study in the Netherlands. Teacher and peer related incidents of bullying were related to children's BMI. Results indicated a higher BMI (particularly children with obesity) was associated with more perpetration of bullying. Not all children who are overweight will be victimised, victimise others or have relationship difficulties but these issues begin in young children.

Healthy weight children may experience adversity if they associate with children who are obese. When asked if they intervened to help, when they observed peers being victimised for their weight, only 50% of adolescent respondents said they had (Puhl et al., 2011). This suggests adolescents recognise rejection of peers due to weight, but their own fear of social derogation may be a factor preventing them from intervening.

There is growing evidence of a developmental pattern in weight bias. Klaczynski et al. (2009) conducted a study with adolescents, asking them to indicate beliefs about sketches of children who varied in weight, gender and ethnicity. Weight bias was more prevalent in older participants and was not mediated by appearance idealisation, body esteem or beliefs about causes of obesity. Adolescents experience a myriad of physical changes. These changes may go towards explaining why body shape is a more salient dimension for categorisation in adolescents than in children, but understanding attitudes prior to adolescence may inform understanding.

### **1.2.2. Studies with children aged five-11**

Children's popularity has been shown to be negatively associated with increasing weight. Kornilaki & Cheng, (2017) asked children aged five to nine to nominate three children they liked best and three children they liked least in their school class. A scoring procedure was then used to calculate popular, rejected, neglected and controversial children. Findings showed a clear relationship between body size and social status, with popular children having lower mean BMI. No child with obesity was

rated as popular in the study which suggests body shape is impacting who is perceived as a desirable peer.

There is a suggestion weight bias is becoming more common. Latner and Stunkard (2003), replicated a study conducted 40 years previously and found weight bias had increased. The study surveyed children aged 10-11-years of age and reported an increase of 40% weight bias (denigration) towards children who are obese. In comparison with the previous study, children liked the child with obesity significantly less and the child of healthy weight significantly more. The study by Latner and Stunkard suggested children were demonstrating greater weight bias than they had done previously, even though obesity has been increasing.

As discussed above, there may be a consequence for younger children who associate with peers who are obese, known as a 'proximity effect'. This refers to the negativity a non-stigmatised individual may experience as a result of by being seen with an individual of a stigmatised group (Hebl & Mannix, 2003). One study showed female participants (aged 5 to 10 years), derogating average weight characters in a story, if they were associated with overweight characters in the background (Penny & Haddock, 2007). This result was not shown in male participants. The study included older children (up to age 10) so this could indicate that bias becomes more pronounced in females with age. This is the only study to have found this result so may need replication. However, it alludes to social processes; stigmatisation is not exclusive to the individual and if healthy weight children are discouraged from making friends with those who are overweight, this could increase the effects of weight bias.

### **1.2.3. Studies with young children (three to five years)**

There are studies which have focused on weight bias in young children. Cramer & Steinwert (1998) were the first to report children attribute negative characteristics to overweight drawings. Children aged three-to five-years old described character drawings of overweight children to be mean and to make undesirable playmates. This result was replicated later with children describing the obese character stimuli as mean, friendless and stupid (Turnbull et al., 2000). Young children (aged four-six years) are aware of the social and physical consequences of changing from thin to fat and visa-versa; with characters with obesity less likely to be favoured by children across a range of activities (e.g. to be nice or win a race) (Baxter., 2016). Gender differences have not been observed in young children's responses in this context (Harrison et al., 2016).

Young children may view obesity no differently to way they view other physical differences. Charsley et al. (2018) asked children to choose between figures as to who was most similar to them, who they would like to be friends with and other preference questions. The figures included characteristics of body shape, gender and physical impairment (wheelchair). Children did not comment on obesity more than other characteristics (gender and physical impairment). The young age of the participants studied is important to understand the development of these attitudes and also because continuous rejection has negative consequences for an individual (McDougall et al., 2006).

#### **1.2.4. Summary of studies on weight bias**

In summary, weight bias is apparent in some studies, but there is a suggestion that with age, children learn to inhibit their expression of unfavourable attitudes. There is limited understanding around acquisition and development of weight bias, (Di Pasquale & Celsi, 2017). Some studies show weight bias in young children (Cramer & Steinwert, 1998; Di Pasquale & Celsi, 2017), however other studies have failed to find this (Kilmurray, 2017). One reason for this discrepancy could be in the methodology, so this will now be discussed.

#### **1.2.5. Measurement of weight bias**

Caution needs to be taken when attempting to measure weight bias. Research has focused on attitudes and behavioural intentions, rather than direct discrimination as this was thought to be more accurate and less resistant to social desirability (Puhl & Latner, 2007). Early studies asked 10 to 11 year old children to rate line drawings as to who they liked best; the character with obesity was frequently chosen last (Richardson et al., 1961). Further studies have now shown this bias in some younger children aged three-to-five year olds (Cramer & Steinwert, 1998). A criticism of the use of line drawing methodology is that they are unrealistic and poorly presented. Therefore, studies have started to use higher quality colour pictures, in a storybook format, to make the materials more similar to other reading material children may be exposed to (Dearing, 2018; Harrison et al., 2016). Harrison et al. (2016) concluded that methodology can inflate bias as in forced choice, children rejected the overweight character, but this was reduced in their subsequent ratings. Children were asked a question such as, “how likely is the character to win a race” and the responses were marked on a predetermined scale. Ranking items shows a preference but this does not

necessarily equate to negative attitudes (only that they like the character with obesity least). Therefore, careful consideration of the methodology is needed to detect subtle discrimination but avoid over-confirmation of weight bias.

The limitations to the rating method have been addressed through listening to children's responses. Qualitative studies have enabled a more in-depth and alternative means of understanding weight bias. However, qualitative studies are not without their challenges. There can be strong biases in the questions asked of children and it is important to consider children may not verbalise an unpopular response (social desirability). It is argued that combining forced choice and listening to children's responses to a 'why' question offers added value and could increase validity.

Qualitative studies are recognised as a viable alternative method to use with children (Kirk, 2007). Qualitative studies in the area have increased our understanding of weight bias in young children (Baxter et al., 2016; Charsley et al., 2018; Harrison et al., 2016; Kilmurray, 2017). Most recently, Dearing (2018) was able to identify weight bias by asking children to give rationale for their character selection after making a choice between characters. It was interesting that children appeared to make inferences, independent of factors in the story, when there was not a rationale forthcoming or they deemed it unsuitable to share. These studies suggest strong support for qualitative methodology to understand weight bias in young children but that further research is needed to understand the process of their development.

Asking young children to speak openly about weight is informative to understand how bias and skills to manage social decisions may develop (Solbes & Enesco, 2010). It is acknowledged, measuring weight bias is a challenge. Any conclusions, need to carefully consider children's preferences for those similar to themselves and the limitations of expressive language at this age.

#### **1.2.6. Factors impacting the development of weight bias**

There are likely to be many factors influencing the development of weight bias. Research suggests weight bias develops in early childhood and there are likely to be multiple influences (Paxton & Damiano, 2017). The following factors which may influence attitude development will now be discussed in turn; parents, peer relationships, media and health professionals.

Firstly, parents could be a source of weight bias. Adams et al. (1988) asked parents to tell their young child a story using pictures of children of different body shapes. On analysis of the parent's stories, the character with obesity was portrayed to

have the lowest self-esteem and the least likely to have a successful outcome. Therefore, if children are exposed to negative beliefs in the family home, they are likely to become engrained and taken on by the child themselves. (Lydecker et al., 2018) found parents demonstrated implicit (automatic negative associations) and explicit bias (statements of blame) when talking to their children about obesity. There are only a few studies showing the transmission of these attitudes so this observation may not be representative, but it suggests a socialisation model of parents impacting on development of weight bias in children. It could be that children influence their parents in more of a two-way process. However, these studies indicate the viability of intervening by implementing strategies to reduce parental bias with the aim of generating more healthy attitudes in children.

As children socialise outside the family home they will be influenced by their peer relationships (Cramer & Steinwert, 1998). Weight bias may be viewed as the norm, so children quickly learn to accept it. Beliefs are likely to be impacted from children their own age or older. Kilmurray (2017) conducted a paired reading task, with a younger child (five-to- seven-year-old) reading with an older child (nine-to-11-year-old). Overt forms of bias included more laughter while reading about the character with obesity (explicit bias), but there was no evidence that older children passed negative attitudes onto the younger children (or vice versa). This could suggest the negativity was already present for the younger child and shared in the task in implicit ways.

Weight bias is portrayed in the media. Herbozo et al. (2004) conducted a content analysis of body image related messages in popular children's books and films. The results indicated that body image related messages appeared more frequently over other attributes. This is socialising children to the importance of physical appearance. Another study found advertising of unhealthy foods to five-to-seven-year olds increased their consumption of unhealthy foods (Halford et al., 2007). If children have high exposure to messages about body shape being important and unhealthy foods, it creates multiple problems.

Weight bias could be used by the media to increase viewing. Wasserman et al. (2015) used a coding instrument to analyse popular television shows. Television shows targeted specifically at adolescents demonstrated greater incidences of weight bias (55.6%) than those aimed at a general audience (8.3%). Thirty per cent of these incidences were followed by negative consequences and canned laughter. There is likely to be a complex relationship between television producers and perceived values in



society, but it highlights negative attitudes are capitalised, to generate humour for adolescents, reinforcing weight bias.

Lastly, it is suggested professionals' opinions impact on the development of weight bias in children. Consistent stigmatisation has been documented in employment, education and healthcare (Puhl & Brownell, 2001). One study showed, a fifth of school staff reported students with obesity were less likely to succeed than healthy weight peers and a third thought being obese was "one of the worst things that could happen to a person" (Neumark-Sztainer et al., 1999). Similar attitudes were also present in health professionals (Teachman & Brownell, 2001). Health professionals were asked to complete an attitude and belief-based 'Implicit Association Test' followed by assessments of explicit attitudes. Clear evidence for implicit bias were found in the implicit measures. These views are likely to be transmitted to young children and influence the development of weight bias.

#### **1.2.7. Consequences for children who experience bias**

From an early age, children are aware of an ideal body and may express dissatisfaction with their own. Tremblay et al. (2011) suggest children as young as three identified their body size. Overweight children and their parents more consistently underestimated the child's body size. The authors suggest this underestimation allows children to maintain self-esteem and not internalise negative social attitudes towards being overweight. Interestingly, young children in this study also expressed dissatisfaction with their body and expressed desires towards thinness. A longitudinal study by Duchin et al. (2015), found children's dissatisfaction with their body had an association with BMI trajectories. Therefore children from a young age may hold a distorted view of their body size which has negative consequences for their weight and self-image.

Bullying has a negative impact on psychological wellbeing. Weight based bullying can increase the challenges for children with obesity and they may use food to manage these difficulties, making it even harder to lose weight (Qualter et al., 2015). Schvey et al. (2019) completed a longitudinal observational study with 110 young people who were at risk or overweight. Result showed young people who reported greater incidents of 'teasing' for their weight, gained the most weight. This demonstrates an association between bullying and being overweight. However, as the authors admit, it may not be teasing which causes weight gain but another factor (e.g. disinhibited eating). Aside from bullying, weight can play a role in friendships. Fletcher

et al. (2011), showed children with obesity are more likely to have friendships with other children with obesity, so share eating behaviours. Peer pressure to engage in dieting and junk food within friendship groups could exacerbate the issue.

Children who experience stigmatisation due to their body size face serious consequences. Studies have shown there is an increased risk of children with obesity developing anxiety and depression (Rankin et al., 2016) and experiencing lower quality of life (Griffiths et al., 2010). These effects can be quite long lasting. Eli et al. (2014) interviewed parents and grandparents of pre-school age children about their experiences of becoming aware of their own body size as children. The findings showed comments about weight had enduring negative effects such as low self-esteem and developing disordered eating.

Research continues to demonstrate a correlation between childhood obesity and psychological difficulties. However, as highlighted in a recent systematic review, the direction of the relationship remains unclear (Rankin et al., 2016). Therefore, it is uncertain which factors are the precipitators. This emphasises the need for research, similar to this study, which increases our understanding of weight bias.

#### **1.2.8. Interventions to reduce weight bias**

There are interventions to reduce weight bias but these have poor outcomes. Attribution theory states if children believe an individual has control over their weight, they are more likely to be angry with or distance themselves from children who are obese (Musher-Eizenman et al., 2004). Research has been conducted to try to understand if educating participants of uncontrollable factors leading to obesity reduces bias (e.g. genetics). Anesbury & Tiggemann (2000), showed those children who received the intervention, successfully reduced the amount of control associated with obesity. However, there was no effect on weight bias. Interventions have also been conducted with adults in health professions. O'Brien et al. (2010) delivered three programmes which differed on the amount of causation attributed to an individual; one with the controllable reasons for obesity, one with uncontrollable reasons for obesity and a control group. The results showed weight bias could be reduced when participants were given information regarding the causes of obesity. This is the only study to have found significant reduction in bias.

In a review of interventions, 16 studies were found but these were criticised for methodological difficulties, e.g. not randomising participants or using pre and post measures (Dánielsdóttir et al., 2010). Whilst some interventions may have altered

participants' beliefs about causes of obesity, these changes have not had an impact on weight bias. Therefore it is argued supporting young children before attitudes become established is more effective in tackling weight bias, rather than offering interventions later. This could include promoting healthy eating in schools, encouraging self-efficacy in weight management programmes and increasing understanding of the development of weight bias.

### **1.2.9. Summary of weight bias**

Weight bias exists in young children and becomes more resistant to change in adolescence. Measuring weight bias is challenging and a critique of some studies is that design has led to an overestimation of prevalence. Parents, peers, media and professionals can all contribute to children's negative attitudes towards people who are obese. Interventions to reduce weight bias have been introduced but with limited success. Therefore, it could be argued it is more effective to intervene before attitudes become established. Understanding the development of weight bias within the context of child development may enable this.

## **1.3. Child Development**

Child development refers to the constancy and change that occurs from conception to adolescence for an individual (Berk, 2013). The area is often divided into physical, cognitive, emotional and social domains, but the domains influence each other in what has been called a "multifaceted phenomenon" (Slee & Shute, 2003, p1). There are models which provide timeframes for typical development, but variation is common (Berk, 2013). In terms of physical development, the most rapid period of brain growth occurs around birth, but the peak density varies at different ages in different brain regions (Johnson, 2001). Although beyond the scope of the current study, it is important to continue to understand how specific changes to brain structure relate to new behaviour in children.

Physical development, in particular increased mobility, positively impacts a child's social world and the complexities that accompany this. Research suggests children as young as three start to show favouritism for the in-group as they try to establish a social identity and find people similar to themselves (Yee & Brown, 1992). Children learn a process of social categorisation which allows them to quickly analyse and make decisions (Tafjel & Turner, 1986). This process helps children develop a self-

concept, based on their relation to others and belonging to a group, which in turn affects their self-esteem.

Emotional development is important for children to understand themselves and others. By age three children have learnt to label emotions (Widen & Russell, 2008). The development of language skills enables children to have conversations about their experiences, which promotes emotional vocabulary and further emotional development (Westby & Robinson, 2014). These changes prepare the child to develop and maintain relationships.

### **1.3.1. Understanding weight bias in the context of child development**

The expression of weight bias can be explored alongside child development and this is what makes the current study novel. Weight bias has been observed in young children (Cramer & Steinwert, 1998). Explicit weight bias is then thought to reduce as children become more aware of social desirability (Solbes & Enesco, 2010). It is unclear what age this occurs (Penny & Haddock, 2007). A decrease in weight bias can be explained by the development of children's emotional and cognitive skills, increasing their capacity to consider the needs of others and potentially disguise bias. In addition as children develop their language skills, they learn to express themselves with more sophistication and sensitivity.

Social reasoning research is concerned with understanding how children learn to use social information, to make judgements about the world (Benenson & Dweck, 2016; Heyman et al., 2003). The attribution of traits and the ability to make behavioural predictions are recognised as pivotal to social functioning. Crick and Dodge (1996) demonstrated children who have a goal of building social relationships will act differently to those less concerned with relationships. Heyman et al. (2003), demonstrated the beliefs children hold affect their motivation. Their study found that children's understanding of ability and achievement had a greater impact on responses than the difficulty of the specific task. Developmental Intergroup Theory (Bigler & Liben, 2007) suggests how young children may develop prejudice through the process of categorising individuals as in-group or out-group; a process all children engage in. Developmental trends in social reasoning research have been identified but studies have not focused on the individual differences in these judgements (Lapan & Boseovski, 2016; Yuill & Pearson, 1998).

It is important to consider children's development and understanding when discussing body shape. Any education about eating, weight or body shape needs to match the child's cognitive understanding. A mismatch will cause problems, potentially confusing the broader message of healthy living. There is very little research focusing on children's psychological development in the acquisition of weight bias. Research has drawn on Piaget's framework (1970) and for the age group in the current study children are in the pre-operational stage of cognitive development. At this stage, they develop skills in using words to represent objects and engage in mental reasoning. However, the majority will be concrete in their thinking, for example physical characteristics will determine certain trait attributions and behaviour predictions. Children at this age are egocentric. Therefore, they are likely to assign to characters in the story the same beliefs as their own, as it is difficult to consider others may hold differing beliefs.

It is argued addressing the application of children's psychological development may increase our understanding of weight bias. Firstly, creating some flexibility rather than seeing development in distinct stages and time periods would be helpful as this is more likely to be closer to reality. Secondly, because there is very little research that has systematically linked cognitive development with weight bias i.e. it is a topic broadly devoid of applied developmental theory. Finally, newer post-Piagetian perspectives on child development offer different ways of considering the shaping and expression of weight bias. ToM is just one of these approaches (and one that has had very little research attention in this area) but may increase understanding about how children function in social settings.

#### **1.4. Theory of Mind**

ToM is essential for children to understand the social world in which they live. ToM refers to an individual's ability to represent their mental states and those of others (Happé, 1994). It can include (but is not limited to), "...the ability to engage in joint attention and pretence, the understanding of play pragmatics, empathy, intentionality, and the capacity to distinguish appearance from reality and the mental from the physical world. It involves affect recognition, first- and second-order thinking, visual perspective-taking, and the understanding that seeing leads to knowing" (Hutchins et al. 2016, p95). ToM has been used interchangeably with 'social cognition', 'mind-reading', 'mentalizing', and 'perspective-taking' (Hutchins et al., 2012). A deficit in ToM has been used to explain some of the difficulties that children with autism experience

(Baron-Cohen et al., 1985). Since then research has tried to understand how ToM develops.

ToM is understood within the child's developmental process. Westby & Robinson (2014) propose that ToM development occurs in two main stages. The first stage, from birth to 18 months, involves interaction and responding to joint attention. In the second stage, eighteen months to four years, children learn they are separate from others and have different desires. Instead of ToM being understood as a single component, authors now suggest there could be multiple elements such as cognitive and affective ToM which develop simultaneously (Wellman & Liu, 2004; Westby & Robinson, 2014). Cognitive ToM refers to thinking about beliefs of others compared to affective ToM which focuses on the emotional experiences of others. Integrating knowledge from neuroimaging studies and developmental psychology will continue to improve researchers' understanding of ToM (Mahy et al., 2014).

False belief understanding (FBU) is thought to be a critical element in developing ToM and refers to a person's ability to reason about a perspective not their own (Tompkins et al., 2019). FBU refers to an individual's ability to understand their beliefs may contrast to reality (Wellman et al., 2011). Devine & Hughes (2014) completed a meta-analytic review of 9,994 participants aged three to-six years and found an association between executive function, language and FBU. ToM requires children to grasp content, context and quality of language in their description of mental states (Tompkins et al., 2018). Children's exposure to conversations about mental states in the family home could encourage the development of these skills (Devine & Hughes, 2018). Language and ToM are both multifaceted and interrelated, although the specific mechanisms and direction of association remains unclear (Tompkins et al., 2019).

Variation in the development of ToM occurs across individuals, but research is limited to explain these differences. Some studies suggest that girls have more advanced ToM skills over boys and from an earlier age (Walker, 2005). Others suggest there are no gender differences (Mathieson & Banerjee, 2011). It has also been implied that growing up with a sibling helps children develop ToM from the increased exposure to social interaction that having another child in the family produces (Lewis et al. 2009). There seem to be similarities across cultures in the development of ToM (Callaghan et al., 2005). One explanation for variation in ToM is in how it is measured, so this will now be discussed.

#### **1.4.1. Measurement of ToM**

FBU was initially used to measure ToM (Baron-Cohen et al., 1985). These tests assess children's ability to suspend their own beliefs and understand that others can hold different beliefs (Wimmer & Perner, 1983). Typically, children pass aged four, but there can be variation with some not passing until they are older (Hughes et al., 2005). It is argued that false belief tasks assess factual accuracy, rather than inferences of mental states. There are complex measures of ToM such as the Theory of Mind Battery (Hutchins, Bonazinga, et al., 2008) which is a 15 item assessment designed to assess explicit ToM competence, and the Theory of Mind Inventory (Hutchins et al., 2012) a 42 item assessment designed to assess applied ToM competence. Both measures have good test retest reliability and construct validity (Hutchins, Prelock, et al., 2008; Lerner et al., 2011). However, due to the time taken to administer the complex measures, research tends to use Happé's 'Strange Stories' (1994). The 'Strange Stories' offer a more naturalistic means of assessing ToM (Happé, 1994). The full set consists of 24 stories of which there are 12 types; lie, white lie, joke, pretend, misunderstanding, persuasion, appearance/reality, figure of speech, sarcasm, fail to recall, double bluff and contrary emotion. Children are asked to make judgements about the actions of characters based on inferences of mental states. Story books such as developed by Happé (1994) are intended to be used with children of school age (around four years old) and have shown to have good psychometric properties (Blijd-Hoogewys et al., 2008).

#### **1.4.2. Summary of ToM**

ToM helps children to understand their mental state and that this may differ from those around them. ToM emerges around the age of three to four. This is at a similar time to when some studies have investigated the presence of weight bias in young children. ToM and weight bias require careful investigation as variation can be subtle. ToM is complex but may increase researchers' understanding of the development of weight bias. Measuring ToM in naturalistic settings arguably increases likelihood of predicting "world functioning" and children's inclination to engage in prosocial behaviours (Imuta et al. 2016, p1200).

### **1.5. Prosocial behaviour**

It has been suggested that prosocial behaviour may improve social inclusion in primary school children (Layous et al. 2012). A definition of prosocial behaviour is,

“voluntary, intentional behaviour that results in benefits for another” (Eisenberg & Miller, 1987, p.91). Understanding prosocial behaviour allows researchers to predict how children will respond to the world around them. Prosocial behaviours are likely to develop at varying times across individuals, in line with their broader psychological development (Paulus, 2014). Researching ToM and prosocial behaviour provides the opportunity to understand the constructs independently and how they may relate to one another.

One study failed to confirm that ToM could predict pro-social behaviour in children aged three-to-six years old (O’Toole et al., 2017). This study used FBU to measure ToM and teachers reports of prosocial behaviour. As discussed earlier, FBU has now been identified as a less applicable way of assessing ToM, so this highlights the need for careful selection of methodology whilst also thinking about the context; e.g. children displaying more prosocial behaviour in school.

In a recent meta-analysis, Imuta et al. (2016) concluded there was a significant association between ToM and pro-social behaviour. They found evidence that the association is stronger in six-to 12-year olds than in younger children. In an attempt to explain this the authors argue children’s understanding (ToM) is not sufficient motivation to act pro-socially, but will be affected by parenting behaviour, sibling influence, religiosity, mood, social conventions and empathy.

Gender may affect the acquisition and demonstration of prosocial behaviours. Tisak et al. (2007) interviewed children aged three-to-six years old and found girls were more helpful than boys. Children seemed to be more pro-social when directed at an individual of the same gender. However, gender differences were not observed in the meta-analysis (Imuta et al., 2016). Higher levels of empathy are likely to increase a child’s engagement in prosocial behaviour so this will now be discussed.

### **1.5.1. Empathy and prosocial behaviour**

Prosocial behaviour requires children to recognise a need arising in another and then act accordingly. Empathy may provide the motivation for this action. Empathy can be defined as, “an affective state that stems from the apprehension of another’s emotional state or condition”(Eisenberg & Miller, 1987, p.91). That is to say, there must first be a recognition of an emotion in another and then the ability to feel the emotion for another. Hoffman (1984) proposed a three level model of empathy. The first stage develops in the first year of life as infants learn to recognise distress. In the second stage, infants become preoccupied with themselves known as ‘egocentric empathy’. The



third stage is empathy for another's feelings which develops between three-to-eight years of age. Current understanding alludes to empathy being multidimensional including cognitive and emotional elements (Lawrence et al. 2004).

Research suggests that empathy and prosocial behaviour may be demonstrated at a young age. From the age of one, infants show concern over others in distress but this develops rapidly by age two (Zahn-Waxler et al., 1992). Children as young as 18 months have been shown to respond to distress by giving a peer a hug (Howes & Farver, 1987). Svetlova et al. (2010) showed infants were motivated to pass a blanket to an adult who indicated they were cold. Infants at 30 months old demonstrated this behaviour, however younger infants (18 months) did not. Therefore, younger infants may be able to respond to distress with scaffolding from an adult, but it is not until they get older that spontaneous prosocial behaviour becomes consistent.

Research has shown that the context can affect children's behaviour. Caplan and Hay (1989) showed three-to five-year-old children recognised distress but were less likely to comfort a peer in the presence of an adult. The children were filmed in their nursery environment for a week. Following this, interviewers chose clips to show the children and asked them a series of questions to understand their responses to distress. The children were acutely aware of the distress and identified the feelings of the individual with 87% answering 'yes' to 'should somebody do something?' In terms of social responsibility when asked 'is there anything you could do to help?' 54% said they could help. When asked 'who is supposed to do something?' 92% said the teacher should help with eight per cent saying 'Mum' should help.

This suggests a number of skills are required to use empathy and act pro-socially. Strayer and Roberts (1989) suggest role taking is positively associated with empathy and prosocial behaviour. Six-year-old children were asked to explain the information known to the characters in the story. Results were then compared to empathy scores collated from a questionnaire (child self-report) and frequency of prosocial behaviour reported by parents and teachers. There is not a "single route" for children to develop empathy (Schonert-Reichl, 2011, p192). Rather, many factors will impact its development such as ego resilience (Strayer & Roberts, 1989). More recently there have been an increase in programmes promoting empathy in schools (Schonert-Reichl, 2011).

### **1.5.2. Empathy and bias**

A better understanding of the relationship between empathy and bias, may help reduce weight bias. Batson et al. (1997), argue empathy inducing experiences are: relatively easy to conduct; low cost; low risk to an individual (within the comfort of a room); controlled more than face to face contact; directly working with feeling rather than relying on inferences and produce a counterbalance to selfish desires. In their study, inducing empathy reduced negative attitudes towards three groups of people with high levels of bias. Therefore, similar interventions could be used towards children who experience negativity due to their weight.

Providing more information about the cause of obesity may reduce weight bias. Dejong (1980) asked participants to rate teenagers who were overweight after reading a vignette. If the reason for being overweight was described as out of the teenagers' control, participants rated the teenagers more positively than the teenagers for whom a medical reason was not provided. Children attributed negative stereotypes to figures with obesity despite being provided with causes of obesity (Anesbury & Tiggemann, 2000). Therefore, more research needs to be done to understand empathy and reducing weight bias in young children.

However, the relationship between empathy and reducing bias is complex. There is a risk interventions could increase children's attention to the characteristic. Stephen & Finlay (1999) suggest having a clear goal of an intervention may mitigate this. Even with a goal, interventions have the potential to increase anxiety around the desired characteristic and therefore increase avoidance, which could be the case for obesity in young children.

### **1.5.3. Summary of prosocial behaviours**

Prosocial behaviours are evident in young children. Prosocial behaviours may provide a context for analysing the relationship between weight bias and ToM. Empathy is thought to be important as a precursor for prosocial behaviour. To reduce weight bias interventions have looked at inducing empathy mainly through providing reasons for obesity beyond an individual's control, but with limited success.

## **1.6. Gender differences**

Research has investigated gender differences in weight bias. Research in older children showed girls who made more shape comparisons had higher levels of body dissatisfaction, which was not true for boys (Jones, 2001). Girls may also be more

sensitive to comments from others. Fourth and fifth grade children were interviewed with their parents (Smolak et al., 1999). Direct parental comments, especially from mothers, had the most powerful effect on the child's belief and behaviours and this was greater for girls. So, there may be some gender differences in the amount of social comparisons and how sensitive children are to comments from others.

Girls may show more negative feelings towards children who are overweight. Latner & Stunkard (2003), in their study of children aged 10-12 years, found girls had a stronger preference against the child with obesity than boys. In children aged seven-to-eight years, girls with obesity were more likely to be victims of bullying whilst boys with obesity were more likely to be perpetrators (Griffiths et al., 2006). Taken together these studies suggest girls have greater negativity about weight but boys, who themselves have obesity, are more likely to turn that negativity into bullying.

Having established the presence of some gender differences in older children, it is important to understand when these attitudes develop. In young girls (aged three-to-five years) a study showed an idealisation of thin body shapes (Harriger et al., 2010). Thus, highlighting young girls, particularly in the western world, are socialised to a 'thin is better' idea. Boys were not included in this study so comments cannot be made as to whether this was true for boys.

In young children it can be more challenging to assess weight bias, so gender differences in prosocial behaviour may increase understanding. Consistent, fewer, positive behaviours to a stigmatised group may indicate presence of bias. No gender differences were observed in the responses of girls and boys in their proportion of helpful behaviour (Dearing, 2018; Lapan & Boseovski, 2016). In studies with young children no gender differences were found in incidences of prosocial behaviour. There do seem to be some gender differences in weight bias in older children, but with few studies it is difficult to say when these differences may emerge.

## **1.7. Rationale for the Current Study**

As obesity stigma is likely to be transmitted through relationships, it is hypothesised there will be an association with ToM. Through relationships, children learn that others hold different beliefs to their own and how to express these. Through experience children may test out beliefs about trait and behavioural attributions they may hold. On receiving feedback, children will then organise the information into an

internalised working model of the world. If a child is more sensitised to the desires and beliefs of others then they may be more likely to disregard the physical characteristic of weight (Gopnik & Wellman, 2012). The only study which has examined ToM and weight bias was conducted by Lapan and Boseovski (2016). They associated ToM with trait attributions and behavioural predictions in three-to six-year olds using a pro-social scenario. Children with better ToM skills had greater positive trait attributions and behavioural predictions about typically stereotyped characters. This means children with better ToM were less likely to show weight bias. A limitation to the study was that weight bias was only a minor focus of this study and the presentation of results makes interpretation of the role of ToM in these difficult to interpret.

The aim of this study was to build on the work by Lapan and Boseovski (2016). The main research questions were: is weight bias present in young children and do children with a more developed ToM show less weight bias?

In response to the first research question, it was hypothesised weight bias would be present. A similar methodology to that used by Dearing (2018) was adopted to assess weight bias by asking children to choose a character in a brief story and then explain their answer. In accordance with the work by Dearing (2018) it was predicted that weight bias would be present in the character selection but less overt in the rationale children gave for their selection.

In response to the second research question it was hypothesised children with a more developed ToM would show less weight bias. Lapan & Boseovski (2016) concluded that children with high ToM demonstrated less negativity about a character with obesity as they were more able to disregard physical characteristics when making trait attributions. As the current study used similar methodology, similar results were expected. However, evidence from broader studies could suggest the opposite to be true and children with high ToM may show more bias. It has been suggested overt weight bias may be greater in children up to the age of ten (Penny & Haddock, 2007). Above this age, children learn to inhibit overt bias as social desirability becomes more of a priority (Solbes & Enesco, 2010). ToM rapidly develops around the age of four and it is anticipated more older children will have high ToM (Westby & Robinson, 2014). Therefore, children with high ToM may be more observant of stereotyped beliefs and confident to express bias, or the opposite could be true.

Additionally, it was predicted there would be no difference in weight bias between girls and boys, or in the relationship with ToM. Some studies have suggested

girls may have more weight bias (Harriger et al., 2010; Latner & Stunkard, 2003). However, there was only one study in the age group for the current study, which did not include boys, and with some studies concluding there were no differences in gender (Dearing, 2018; Lapan & Boseovski, 2016) there was no strong evidence to suggest a difference.

## Method

### 2.1. Participants

Approval for the study was given by the School of Medicine Ethics Committee at the University of Leeds (MREC 18-042, see Appendix A). Recruitment took place through primary schools in the north of England. Schools were selected if they had broadly average demographic characteristics (e.g. pupils eligible for free school meals). In total, 42 suitable schools were contacted of which six participated, providing a good sample size. Following consent from head teachers (Appendix B), parents were contacted (Appendix C). Within the six schools, 337 children from Reception classes and Year 1 were invited to participate. In total, 139 (41%) parents gave consent for their child to participate in the study. There were 63 males and 76 females. The mean age of children was 5.2 years (SD 0.7). They ranged in age between four and six years old; 74 children were from Reception and 65 children from Year 1. The ethnicity of participants was not formally recorded. However, around 80% of children were white European in appearance.

### 2.2. Materials

#### 2.2.1. Story Book

A story book was developed in which the first part assessed ToM and the second part evaluated responses to characters of different body shape (see Appendix D). The characters in the story were drawn for a previous research project (Harrison et al., 2016). There were two characters of healthy weight (Holly and Thomas) and two with obesity (Alfina and Alfie; Figure 1).

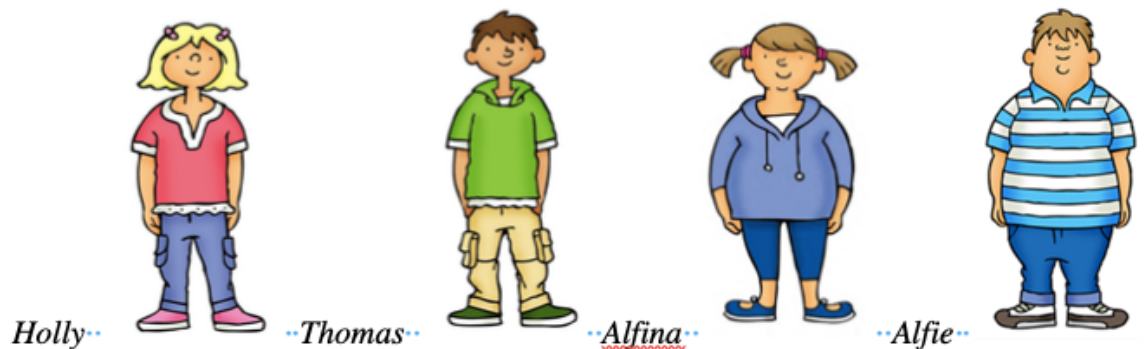


Figure 1. The story characters

ToM assessment: Two of the ‘Strange Stories’ were used in this study as they are the most commonly used method for evaluating ToM, (Happé, 1994). The ‘Strange Stories’ are a set of 24 vignettes with accompanied line drawings and two questions (comprehension and justification) designed to assess ToM. As a measure of ToM the ‘Strange Stories’ have shown good validity (Devine & Hughes, 2013) and good internal consistency (Hayward & Homer, 2017). Minor stylistic modifications were made to the stories (e.g. colour pictures were used instead of line drawings) for consistency between materials in both parts of the assessments. The two stories that were selected (a pretend scenario followed by a lie scenario) are aspects of ToM thought to develop first (Wellman & Liu, 2004). The narrative for the present scenario was the following; ‘Thomas and Holly are playing in the house. Thomas picks up a banana from the fruit bowl and holds it to his ear. He says to Holly “Look! This banana is a telephone”’.

Figure 2. shows the order of the story book. The questions were specifically designed to isolate ToM from working memory and receptive language, ‘Is it true what Thomas says? Why does Thomas say this?’ The first question required children to make a decision, followed by the second question which asked the children to give rationale for their decision (open).

Weight bias assessment: The second half of the story book included two stories to assess attitudes to characters of different body shape. The stories included colour pictures and a written story for a comforting and stealing scenario (Dearing, 2018). Questions followed the same format as for ToM assessment; the first required the child to make a choice of character and the second to give a reason. A third question was used, “Alfie/ Alfina is fatter than Thomas / Holly. Does that make a difference?”, to draw the child’s attention to the weight of the characters in the story to increase opportunity to assess attitudes. Pilot work was carried out to ensure the story book was accessible to and understood by children of this age range. Following the pilot work very minor changes were made, for example, instead of asking the third question after both the comfort and steal scenarios it was asked only after the steal scenario.

### **2.2.2. Body shape ratings**

Using a body figure scale (Collins, 1991, see appendix E) the body size of each participant was estimated by the researcher using a series of seven preadolescent figures widely used in previous research (Charsley et al., 2018; Dearing, 2018; Kilmurray, 2017).

### **2.3. Procedure**

On the day of the study the researcher liaised with the class teacher to find a suitable place for the interviews to take place. The researcher introduced themselves to the whole class as someone who would read to some children. The teacher provided the researcher with a list of children who had consent from parents to participate. The researcher met with the children individually. The children gave the written consent form to the researcher and then children's assent was gained (Appendix F). All children with consent to participate in the study were interviewed, with the exception of 4 children who teachers considered would not understand the story. Children were aware they could withdraw from the study at any point. All interviews were audio-recorded. Children were encouraged to read the story aloud but some preferred the researcher to read the story. In this case the children were encouraged to read along to improve engagement. Children were presented with stories which were gender matched – i.e. the participant's gender was matched with the character in receipt of the social or anti-social behaviour - as research has shown children are kinder to peers of the same gender (Tisak et al., 2012). The interview procedure is represented in the flow diagram below (Figure 2).



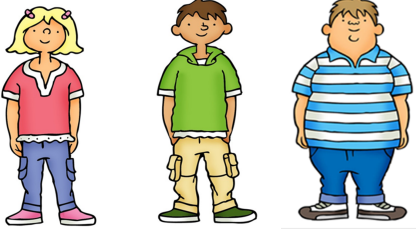
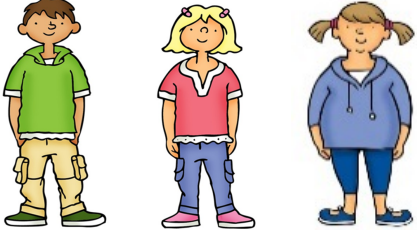
<b>Part 1</b>	
Children were introduced to the main characters (two healthy weight, one overweight)	
<b>Male participants:</b>  <b>Holly      Thomas      Alfie</b>	<b>Female participants:</b>  <b>Thomas      Holly      Alfina</b>
Children read two situations that involved Holly/ Thomas (to assess children's ToM).	
Scenario 1	After each the children were asked two questions: 1. "Is it true what Holly/ Thomas says?" 2. "Why does Holly/ Thomas say this?"
Scenario 2	
<b>Part 2</b>	
Children read about two social situations	
Scenario 1: In which a character is comforted	Children were asked two questions after each situation: 1. Who do you think Holly/Thomas will comfort/steal from first? 2. Why do you think Holly/Thomas will comfort/steal from them?
Scenario 2: In which one character steals from another	
Children were asked a question about the character's weight: Alfie/ Alfina is fatter than Thomas / Holly, does that make a difference?	

Figure 2. Interview procedure

Following reading each situation, a choice was presented to the child. In Part 1 this was, "Is it true what Holly / Thomas says?" On a few occasions the children required a further prompt, "Is it true?" Once the child had made a decision, they were asked to justify their choice, "Why does Holly / Thomas say this?" After both situations were completed the child read Part 2, which followed the same format (see Figure 2). Once the children had completed part one and two, they were asked, "Alfie/ Alfina is fatter than Thomas / Holly. Does that make a difference?" This provided another opportunity for children to verbalise opinions from which bias may be inferred. Children were informed the activity had finished, were thanked for their participation and given a sticker as a reward for participation. The researcher evaluated the relative

body shape of the child during the assessment using the figure rating scale (Appendix F).

## 2.4. Data Analysis

Children's comments and reasons were transcribed from the audio recordings. The data were then put into an excel spreadsheet to aid analysis. The researcher scored answers on the ToM questions from 0-2 corresponding to the system used by Happé (1994). A score of 0 suggests children do not have a ToM compared to a score of 2 which indicates children can appreciate people hold differing beliefs. There were 2 scenarios so scores ranged from 0 to 4. From the weight bias assessment, responses were coded as having either positive, negative or neutral valence (see Appendix G for the detailed coding framework). Examples of positive valence are, "they are good friends and play basketball" and "she looks sadder". Examples of negative valence are, "he took them all" and "he is bigger". Examples of neutral valence are, "she has a plait in" and "she is the same size". Using the valence framework the coding of responses was checked independently by the supervisors.

In addition, the researcher immersed herself in the data to understand the responses of the children. Common themes across the scenarios and associated sub-themes were identified (Appendix H). Frequency of the themes were calculated. The frequency of the children's character selection was analysed. One proportion z-score tests were used to compare the proportion needed to reject the null hypothesis (character choice being even at 50%).

Children were allocated into one of two groups dependent on their ToM score; low ToM (score 0-2) and high ToM (score 3-4). This was seen as a conservative way of discriminating children who had some ToM and those who had more consistent ToM. It was similar to the process described by (Lapan & Boseovski, 2016). Z scores were calculated ([https://www.medcalc.org/calc/test\\_one\\_proportion.php](https://www.medcalc.org/calc/test_one_proportion.php)) to compare ToM and responses to the weight bias scenario. Chi-square tests were used ([https://www.medcalc.org/calc/comparison\\_of\\_proportions.php](https://www.medcalc.org/calc/comparison_of_proportions.php)) to understand whether there was a difference in proportions of frequencies observed in the low and high ToM groups.

Responses to the final question, "Alfie/ Alfina is fatter than Thomas / Holly. Does that make a difference?" were reviewed and key themes identified. Outliers of

ratings for children's body size were cross checked against responses to identify any extreme responses.

Interrater reliability was calculated for the thematic analysis and the valence coding to assess the agreement between the author and one of her supervisors. The full sample was coded by one supervisor. Weighted Kappa was calculated using SPSS (Cohen, 1968). There was strong agreement on both coding frameworks; for the thematic analysis Kappa = 0.92,  $p < 0.001$ , for the valence framework Kappa = 0.98,  $p < 0.001$ . A score between 0.8-1 indicates the strength of the agreement is very good (Altman, 1991).

## Results

This section has been organised to follow the research aims. Firstly, weight bias is established, followed by a comparison between the responses of children with low and high ToM.

### ToM

Children's responses to the two scenarios (pretend and lie) that assessed ToM were scored (see Table 1). The most frequent score was four (37.4% n=52). Overall, proportionately more females and children in Year 1 achieved this score ( $\chi^2(1)=11.93$ ,  $p<0.001$ , and  $15.52$ ,  $p<0.001$ ) respectively).

Table 1. Percentage of children scoring on each level of ToM

ToM score	Percentage (frequency)				
	Male (63)	Female (76)	Reception (65)	Year 1 (74)	Total (139)
0	72.2 (13)	28.8 (5)	88.9 (16)	11.1 (2)	12.9 (18)
1	71.4 (5)	28.6 (2)	85.7 (6)	14.3 (1)	5.0 (7)
2	38.5 (10)	61.5 (16)	50.0 (13)	50.0 (13)	18.7 (26)
3	44.4 (16)	55.6 (20)	36.1 (13)	63.9 (23)	25.9 (36)
4	36.5 (19)	63.5 (33)	32.7 (17)	67.3 (35)	37.4 (52)

### 3.1. Weight bias: character selection

Frequencies and percentages of character selection for all children are presented in

Table 2. Responses were coded as bias present if the character of healthy weight was selected in the comfort scenario and bias absent if the character with obesity was chosen. In the steal scenario, responses were coded as bias present if the character with obesity was chosen and bias absent if the character of healthy weight was chosen. Frequencies were combined to give an overall total.

Table 2. Weight bias responses in children with low and high ToM

ToM	Percentages (frequencies)					
	Comfort		Stealing		Both scenarios	
	Healthy Weight	Obese	Healthy weight	Obese	Bias Present	Bias absent
All Children (139)	79.2 (111)***	20.1 (28)	31.7 (44)***	68.3 (95)	74.1 (206)***	25.9 (72)
Low ToM (51)	70.6 (36)***	29.4 (15)	39.2 (20)	60.8 (31)	65.7 (67)**	34.3 (35)
High ToM (88)	85.2 (75)***	14.8 (13)	27.3 (24)***	72.7 (64)	79.0 (139)***	21.0 (37)

\*p<0.05 ,\*\*p<0.01, \*\*\*p<0.001

There was a clear weight bias in their selection, children choose to comfort the character of healthy weight and steal from the character with obesity ( $z=7.92$ ,  $p<0.001$ ). Those with high ToM were significantly more likely to show weight bias (79.0%) than those with low ToM (65.7%; ( $\chi^2(1)=5.93$ ,  $p=0.01$ ).

Children were divided into 3 groups based on the amount of bias demonstrated; ‘Bias present’, ‘Bias absent’ and ‘Other’. ‘Bias present’ was used for children who chose to comfort the character with healthy weight and steal from the character with obesity. ‘Bias absent’ for children who comforted the character with obesity and stole from the character with healthy weight. ‘Other’ was used for children who chose the same character in both scenarios, therefore it was unclear if bias was present. The percentages are shown in Figure 3. (For specific character selections, see Appendix I). Considering both scenarios together, a similar proportions of children with low and high ToM had ‘bias present’ (56.9%, 67.0%,  $\chi^2(1)=1.36$ ,  $p=0.24$ ).

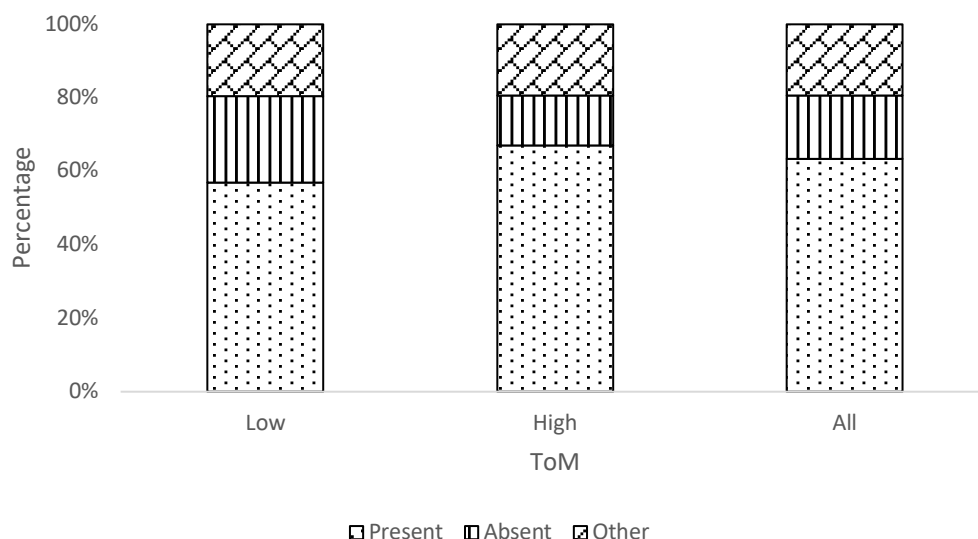


Figure 3. Presence of weight bias for children with low and high ToM

Girls were no more likely to show weight bias than boys (boys 73.0%, girls, 74.3%,  $\chi^2(1)=0.45$ ,  $p=0.50$ ). Older children did not show more weight bias than younger children (reception 70.0%, Year 1 77.7%,  $\chi^2(1)=2.13$ ,  $p=0.14$ ). The scenarios were then considered separately. In the comfort scenario, children with high ToM demonstrated a stronger preference to comfort the healthy weight character (85.2%,  $z = 6.61$ ,  $p<0.001$ ). This was also true for children with low ToM (70.6%,  $z= 2.94$ ,  $p<0.001$ ). In the stealing scenario, children with high ToM showed a preference for stealing from the character with obesity (72.7%,  $z=4.27$ ,  $p<0.001$ ). Children with low ToM demonstrated a preference to steal from the character with obesity but this was not significant (60.8%,  $z=1.54$ ,  $p= 0.12$ ).

### 3.2. Children’s reasoning for their choice of character

Across the two scenarios, in 32.0% of responses children either failed to give an answer or said, “don’t know”. Some children gave a non-response to both scenarios (27.0%). A similar number of boys and girls gave non-responses ( $\chi^2(1)=0.53$ ,  $p=0.47$ ). More non-responses were made by younger children ( $\chi^2(1)=7.13$ ,  $p=0.008$ ) and by children with low ToM ( $\chi^2(1)=6.22$ ,  $p=0.02$ ). A similar proportion of non-responses were made in the comfort ( $n=46$ ) and the steal scenario ( $n=44$ ) ( $\chi^2(1)=0.15$ ,  $p=0.69$ ). After removing these non-responses, 189 reasons were given. Three responses were excluded because they were considered to relate more to the child providing the answer, rather than to the scenario e.g. “I am called Thomas and I like it”.

### 3.2.1. Valence of reasons provided

Across the two scenarios responses were most frequently coded as positive (42.5%), followed by neutral (31.7%), with the least number coded as negative (25.8%). (Examples of coded responses are in Appendix J). Across both scenarios, 48 negative comments were coded, with the majority after choosing the character with obesity (Alfie or Alfina) ( $n=37$ , 77.1%,  $z= 7.39$ ,  $p<0.001$ ). Boys and girls made similar frequencies of negative comments (boys 27.4%, girls 24.5%,  $\chi^2(1)=0.09$ ,  $p<0.77$ ). In total, 79 positive comments were made, with just 16 after choosing Alfie or Alfina (20.3%,  $z= 8.10$ ,  $p<0.001$ ). Similar frequencies of positive comments were made by boys and girls (boys 45.2%, girls 40.2%  $\chi^2(1)=0.47$ ,  $p<0.50$ ).

Table 3 shows the character selection followed by the coded valence of reasoning. When the scenarios were considered together, children with low and high ToM made similar frequencies of negative comments (low 20.0%, high 28.6%,  $\chi^2(1)=1.56$ ,  $p=0.21$ ) and positive comments (low 45.0%, high 41.3%,  $\chi^2(1)=0.22$ ,  $p=0.63$ ).

Table 3. Valence of justification for character choice

ToM	Character	Percentages (Frequencies)		
		Positive	Neutral	Negative
All	Combined (186)	42.5 (79)	31.7 (59)	25.8 (48)
Children	Healthy weight (104)	60.6 (63)	28.8 (30)	10.6 (11)
	Obese (82)	19.0 (16)	35.4 (29)	45.1 (37)
Low	Combined (60)	45.0 (27)	35.0 (21)	20.0 (12)
	Healthy weight (32)	62.5 (20)	31.3 (10)	6.3 (2)
	Obese (28)	25.0 (7)	39.3 (11)	35.7 (10)
High	Combined (126)	41.3 (52)	30.2 (38)	28.6 (36)
	Healthy weight (72)	59.7 (43)	27/8 (20)	12.5 (9)
	Obese (54)	16.7 (9)	33.3 (18)	50.0 (27)

Table 4 shows the coded valence when the reasons were the scenarios were considered separately. In the comfort scenario, there was a similar frequency of negative comments in children with low (3.7%) and high ToM (3.2%,  $\chi^2(1)=0.01$ ,  $p=0.90$ ). In the steal scenario, more children with high ToM made negative comments (54.0%) (low 33.3%,  $\chi^2(1)=3.69$ ,  $p=0.05$ ). No negative comments were made by children in the low or high ToM group after choosing the character with obesity. After choosing to steal from the character with obesity, a similar proportion of children with high ToM gave a

comment coded as negative (high 58.7% low 45.4%,  $\chi^2(1)=1.03$ ,  $p=0.31$ ). The valence of comments were compared for children scoring lowest (0) and highest (4) on the ToM assessment but no difference was found, ( $\chi^2(1)=1.6$ ,  $p=0.21$ ).

Table 4. Valence of justification by scenario

Scenario	ToM	Character	Percentages (Frequencies)		
			Positive	Neutral	Negative
Comfort	Low	Combined (27)	81.5 (22)	14.8 (4)	3.7 (1)
		Healthy weight (21)	81.0 (17)	14.3 (3)	4.8 (1)
		Obese (6)	33.3 (5)	6.7 (1)	0
	High	Combined (63)	77.8 (49)	19.1 (12)	3.2 (2)
		Healthy weight (55)	76.4 (42)	20.0 (11)	3.6 (2)
		Obese (8)	87.5 (7)	12.5 (1)	0
Steal	Low	Combined (33)	15.2 (5)	51.5 (17)	33.3 (11)
		Healthy weight (11)	27.3 (3)	63.6 (7)	9.1 (1)
		Obese (22)	9.1 (2)	45.5 (10)	45.5 (10)
	High	Combined (63)	4.8 (3)	41.3 (26)	54.0 (34)
		Healthy weight(17)	5.9 (1)	52.9 (9)	41.2 (7)
		Obese (46)	4.4 (2)	37.0 (17)	58.7 (27)

### 3.2.2. Themes of reasons provided

Figure 4 is a thematic map of the reasons children provided when asked, “Why do you think they will comfort / steal from that character?” There were 3 master themes. The theme with the highest number of responses was ‘Emotion’ (74). The second most common was ‘Story’ (50) and the third ‘Appearance’ (34). There were some responses which could not be coded so they have been put under ‘Other’ (27).

Figure 4 below, is a description of each theme and subtheme (see Appendix K for example responses for each theme).



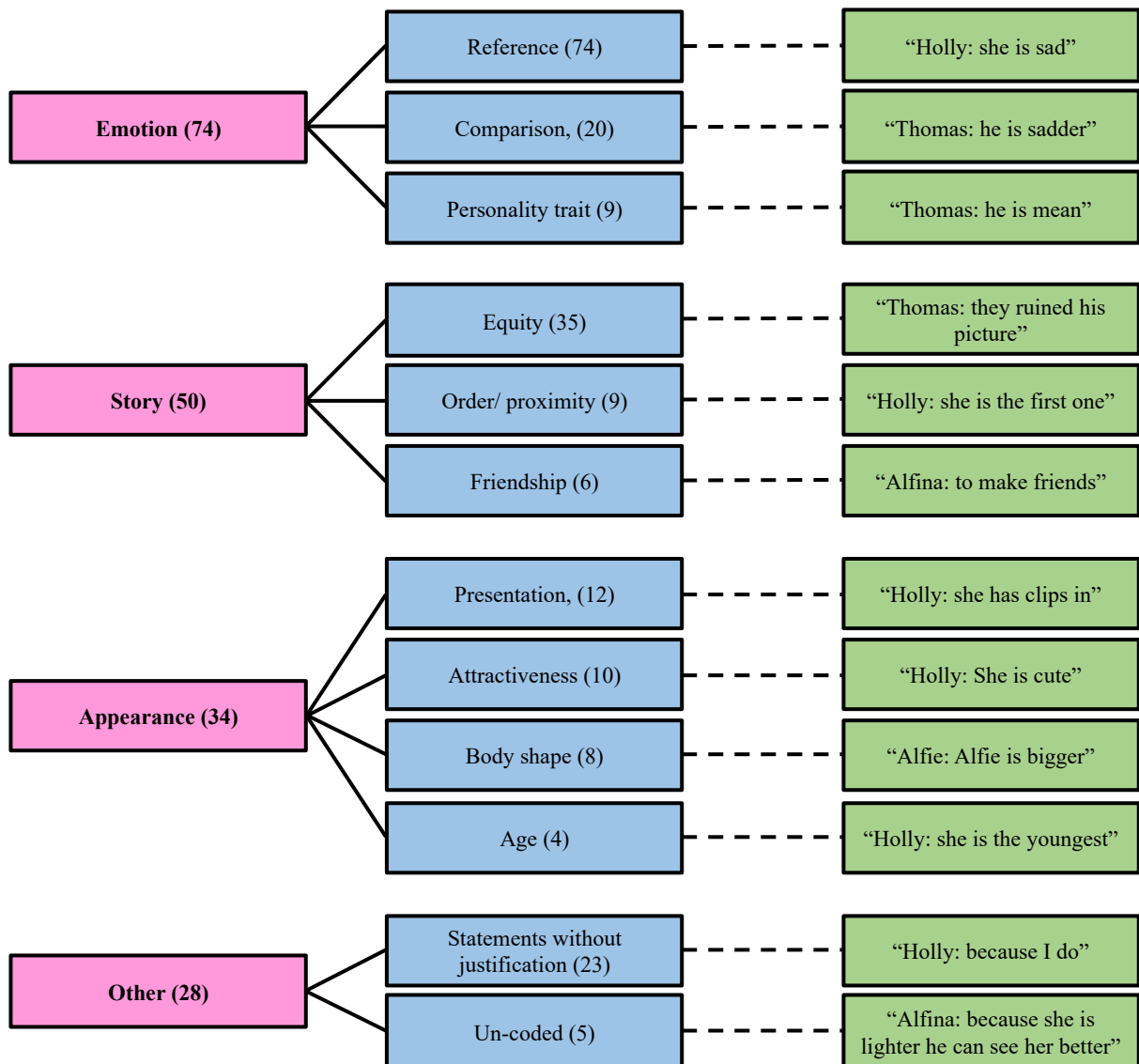


Figure 4 - Thematic Map of weight bias scenario. Master themes, subthemes and an example.

(Frequency denotes the number of times the response matched a theme. Each child provided a maximum of 2 comments; one for each scenario.)

Emotion (subthemes: reference, comparison, personality trait)

The most common master theme was 'emotion' (39.8%, 74 responses). Children spoke about perceived emotion in the characters to justify their decision. The subtheme 'reference' was used when there was a reference to a character's emotional state, e.g. "Holly: she is sad", "Holly: make her feel better". The second subtheme was 'comparison', which included an explicit comparison between two emotional states attributed to the characters e.g. "Thomas: he looks the saddest", "Thomas: he is upset even more". A third subtheme was 'personality trait' as several children made comments that alluded to the imagined personality of the characters e.g. "Alfie: because he is nice" and "Thomas: he is mean".

Story (subthemes: equity, order/ proximity, friendship)

This theme captured comments children made referring to aspects of the story to justify their choice (26.9%, 50 responses). The first subtheme was 'equity' which was used for comments that added imaginary detail to try to justify the behaviour, e.g. "Thomas: they ruined his picture", "Alfina: she took the most stickers". A second subtheme of 'order / proximity' included comments referring to either the position of the character in the picture (e.g. closest to the left), in the description of the story (e.g. which character was mentioned first), or in the child's imagination. Examples for this subtheme included "Holly: she is the first one", "Thomas: she already gave Alfie a hug so she hasn't done something to him." A theme of friendship emerged as some children spoke about an imagined relationship between the characters e.g. "Alfina: to make friends", "Alfina: it's not her best friend".

Appearance (subthemes: presentation, attractiveness, body shape, age)

Of the responses, 18.2% (34 responses) related to the character's physical appearance in the pictures. Children descriptive comments on the physical appearance of the characters were coded as 'presentation' e.g. "Holly: she has clips in", "Thomas: he has a green t-shirt". A second subtheme was 'attractiveness', in which a clear preference was stated for one character and attributed to their physical appearance, e.g. "Holly: she is cute", "Alfina: boys like blue and she is wearing blue". A subtheme of body shape referred to comments about the character's size and weight, eg. "Alfie is bigger", "Alfina: Alfina looks bigger than her". The subtheme of 'age' was used to capture the perceived age of the character as justification for their selection, e.g. "Holly: she is the youngest", "Alfie: Alfie is older".

Other (subthemes statements without justification, un-coded)

In the remaining 28 responses some children did not justify their character choice, and these were coded as ‘statements without justification’; “Holly: because I do”, “Holly: they made it messy”, or “Alfie: there is no more everyone took them”. A few responses could not be coded because the language was not clear and so were grouped as ‘un-coded’ eg. “Alfina: because she is lighter he can see her better”.

**3.2.3. Differences in response by children with low and high ToM**

Considering both scenarios together, the frequency of master themes were compared. Figure 5 shows the percentage of themes used by all children and then split by level of ToM. Themes were ranked from most to least frequent. The same ranking occurred in children with low and high ToM (see Appendix L for full table).

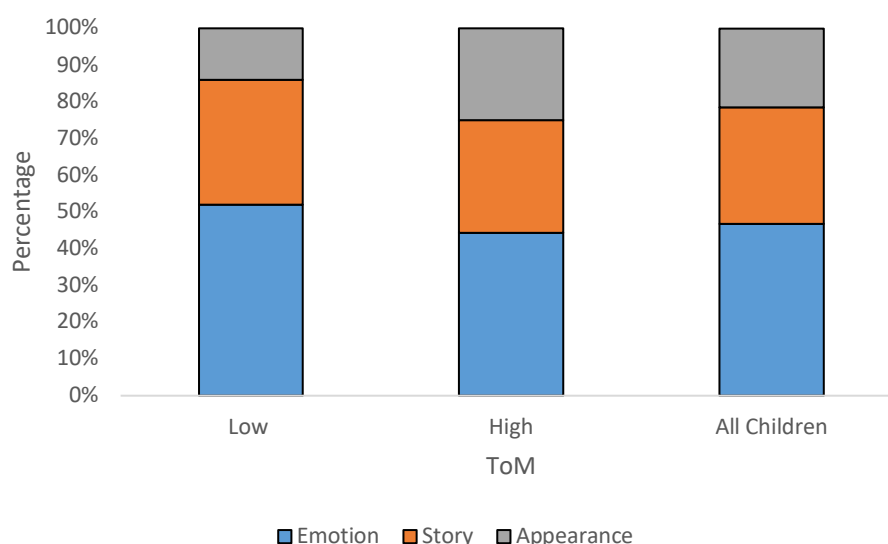


Figure 5. Themes used to explain character selection (percentages)

‘Emotion’ was the most frequent theme; (all 46.8%, low ToM ,43.3% and high ToM, 37.2%). The second most frequent theme was ‘Story’ (all 31.6%, low ToM 28.3% and high ToM 25.6%). The least frequent theme was ‘Appearance’ (all 21.5%, low ToM 11.6%, high ToM 20.9%). A comparison of gender was completed for each of the subthemes. There were no gender differences in the proportion of responses coded under each theme, ‘emotion’ (boys 53.2%, girls 40.7% ( $\chi^2(1)=2.46$ ,  $p=0.12$ ) ‘story’ (boys 27.3%, girls 35.8%,  $\chi^2(1)=1.31$ ,  $p=0.25$ ) or ‘appearance’ (boys 19.5%, girls 23.5%,  $\chi^2(1)=0.27$ ,  $p=0.60$ ).

A test of proportions was completed to understand if there was a difference in reasoning between children with low and high ToM for each theme. There was no significant difference in proportions between children with low and high ToM for any of the major themes: ‘emotion’ ( $\chi^2(1)=0.63, p=0.43$ ), ‘story’ ( $\chi^2(1)=0.15, p=0.70$ ), or ‘appearance’ ( $\chi^2(1)=2.38, p=0.12$ ).

As ‘emotion’ was the most frequent master theme, a comparison was made for the subthemes. Across all the children, ‘reference’ (60.8%) was the most frequent, followed by ‘comparison’ (27.0%), with the least frequent theme ‘personality trait’ (12.2%). Figure 6 shows the respective frequencies for all children, children with low and high ToM for the subthemes of emotion. For children with low ToM, ‘reference’ was the most frequent subtheme (73.1%), then ‘personality trait’ (23.1%) and ‘comparison’ (3.8%). In children with high ToM, the most frequent subtheme was ‘reference’ (54.2%), ‘comparison’ (39.6%) and then ‘personality trait’ (6.3%).

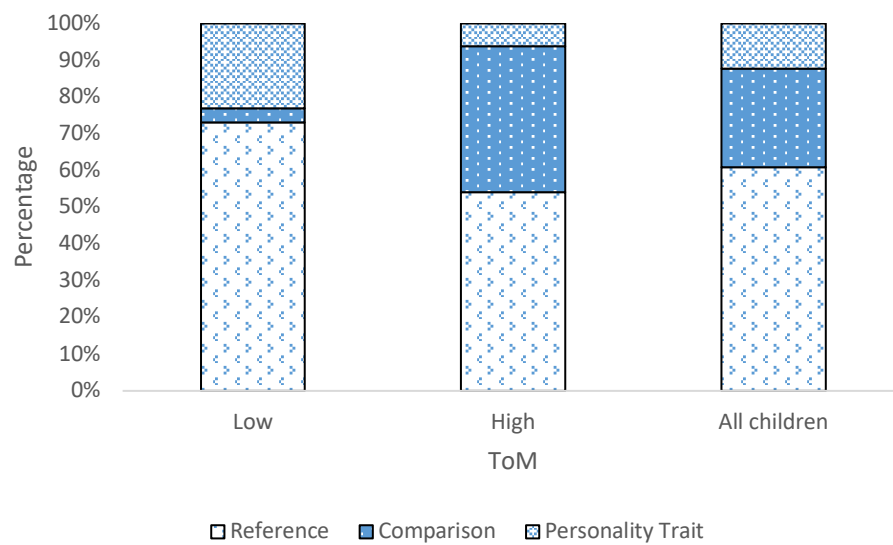


Figure 6. Subthemes within the emotion theme (%)

A similar proportion of responses from children with low and high ToM were coded as ‘reference’ ( $\chi^2(1)=2.50, p=0.11$ ). More responses from children with high ToM were coded under ‘comparison’ ( $\chi^2(1)=10.81, p<0.001$ ) and more responses from children with low ToM were coded under ‘personality trait’ ( $\chi^2(1)=4.38, p<0.04$ ).

### 3.2.4. Comparison of scenarios

The frequency of responses to the main themes were then considered separately for each scenario. Figure 7 shows the frequencies across the master themes for each scenario. In the comfort scenario, the theme with the highest number of responses was ‘emotion’ (56); e.g. “she is the saddest”. Compared to the stealing scenario, the most frequent responses were coded under the ‘story’ theme (n=38), e.g. “Alfina took a sticker first”.

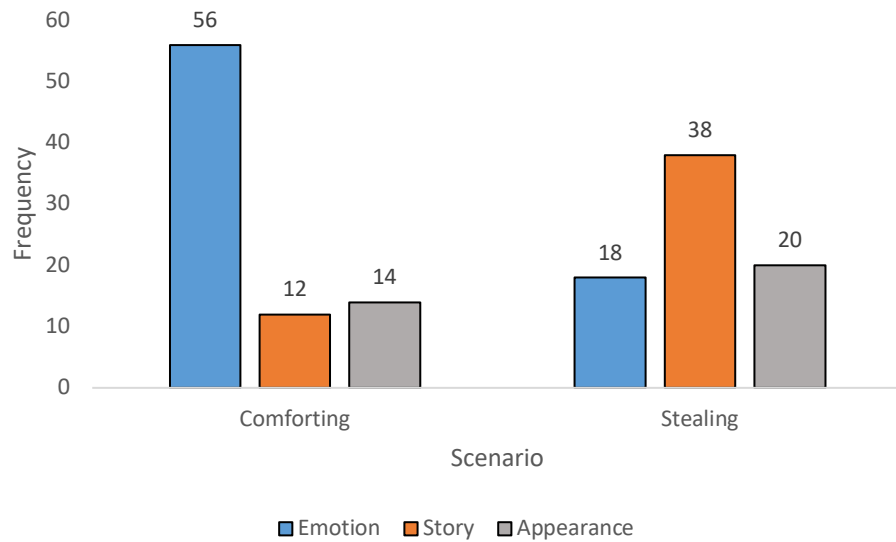


Figure 7. Frequencies of responses in the main themes from the comfort and steal scenarios

In the comfort scenario, responses were coded as follows: 68.3% ‘emotion’, 14.6%, ‘story’ and 17.1% ‘appearance’. The proportions of responses were then compared for children with low and high ToM. Figure 8 shows the proportions of themes in the comfort scenario, used by all children and then separated by low and high ToM.

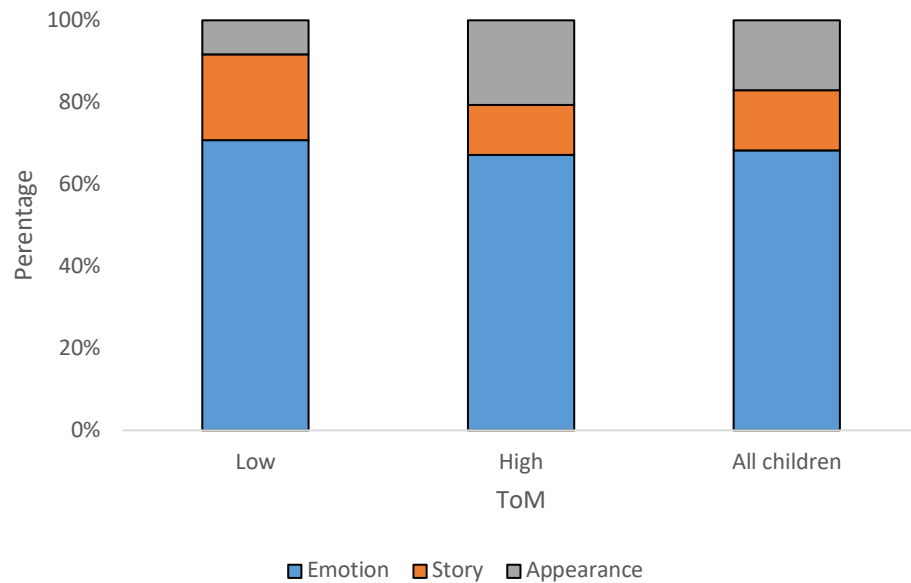


Figure 8. Themes in the comfort scenario (%)

There were no differences in responses between children with low and high ToM: ‘emotion’ (low 70.8%, high 67.2% ,  $\chi^2(1)=0.10$ ,  $p=0.75$ ), ‘story’ (low 20.8%, high 12.1% ,  $\chi^2(1)=1.015$ ,  $p=0.31$ ), ‘appearance’ (low 8.3% high 20.7%,  $\chi^2(1)=1.82$ ,  $p=0.17$ ). In the ‘emotion’ master theme, for children with high ToM no responses were coded under the subtheme ‘personality trait’ (see Appendix L).

Next, the data for the steal scenario were analysed. The most frequent master theme was ‘story’ (50.0%) then ‘appearance’ (26.3%) and least frequent ‘emotion’ (23.7%). Figure 9 shows the proportions of themes used by all children and then separated by children with low and high ToM. There were no differences across the themes for children with low and high ToM: ‘emotion’ (low 34.6%, high 18.0%,  $\chi^2(1)=2.57$ ,  $p=0.11$ ), ‘story’ (low 46.2%, high 52.0%  $\chi^2(1)=0.23$ ,  $p=0.63$ ), ‘appearance’ (low 19.2% high 30.0%,  $\chi^2(1)=1.02$ ,  $p=0.31$ ). In the ‘emotion’ master theme, no responses were coded under the subtheme ‘comparison’ (see Appendix L).

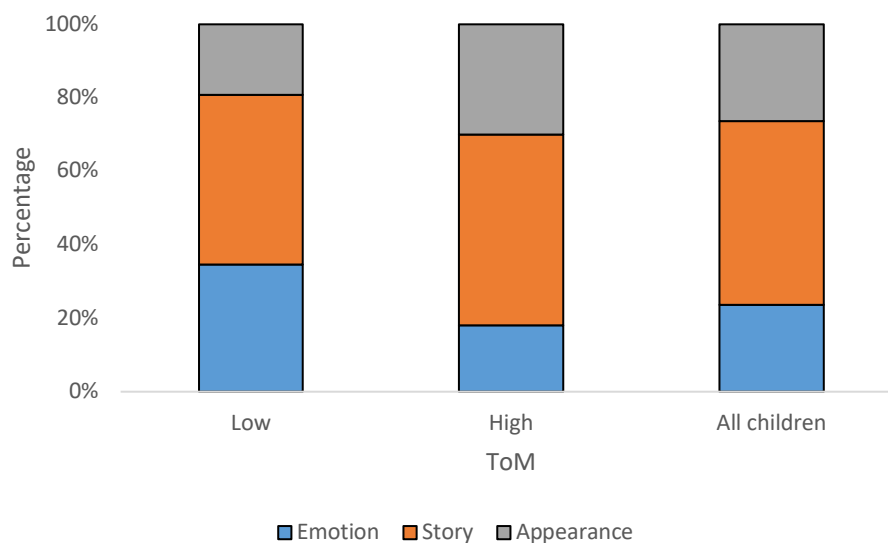


Figure 9. Themes in the steal scenario (%)

The numbers were small, but a comparison was made to see if there were differences between children scoring lowest (0) and highest (4) on the ToM assessment. Comparing children at each end of ToM scale may have provided a greater difference in weight bias. This comparison failed to reveal any differences in the reasoning children gave for their character choice (see Appendix M).

### 3.2.5. Comments relating to character body shape, size or weight

Across both scenarios, very few reasons for children's choices included specific comments regarding body shape, size or weight (n=8). Seven different children made these references (5.0% of the total sample). Only one child spoke about body shape in both scenarios. Of the children who made comments about body shape; 5 were male, all were in Year 1, 5 were in the high ToM group.

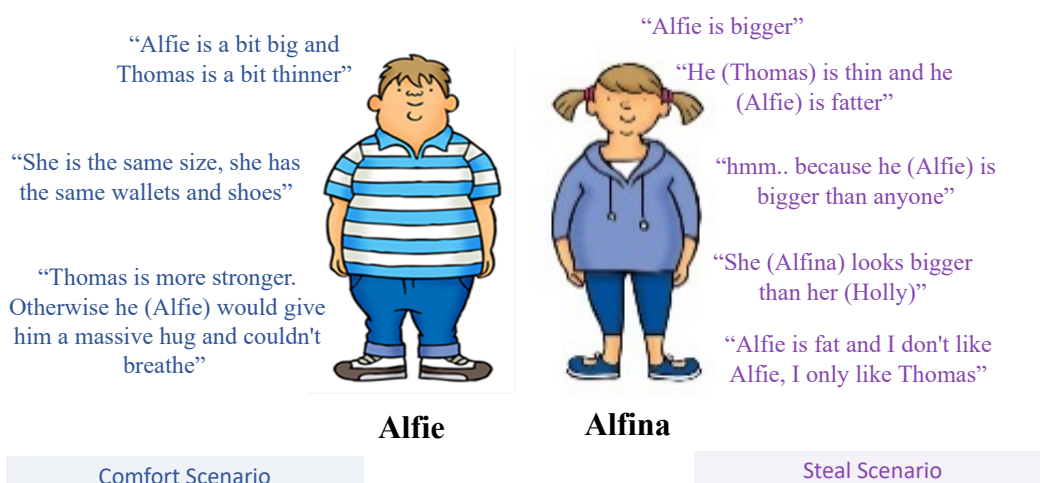


Figure 4. The comments made about body shape, size or weight (comfort scenario, steal scenario)

Figure 4 summarises all the comments made referring to body shape, size and weight. In the comfort scenario, 3 comments were made about body shape which explicitly states a justification for why they chose the healthy weight character to receive the hug e.g. “Alfie is a bit big and Thomas is a bit thinner”. All the children had chosen to steal from the character with obesity before giving their explanation.

### 3.3. Question about character weight

Children responded to the question; “Alfie / Alfina is fatter than Thomas/ Holly. Does that make a difference?” Within this 59.7% of children said ‘no’ and 40.3% said ‘yes’. Children were asked to explain their choice, 41.0% said ‘don’t know’ or gave no further response so was coded as a non-response. More non-responses were made by children with low (56.9%) than high ToM (31.8%) ( $\chi^2(1)=8.28, p<0.004$ ). Children’s reasoning was analysed using the themes in Figure 4 above. The most frequently coded theme was ‘Appearance’ (65.9%), with 96.3% of these children referring to body shape using words such as “fat, big, heavy” (“he (Alfie) is fat and he (Thomas) is not”, “he is too heavy”, “she is fat (Alfina), she is skinny (Holly), put them together and they are not the same”). The remaining responses were coded as ‘Story’ (9.0%) ‘Emotion’ (2.0%) and ‘Other’ (23.0%). Examples of ‘story’ responses “he wants to get one sticker,” I think its Holly he steals from”. Two responses were coded as ‘emotion’ e.g. “it doesn’t matter what they are doing, it just matters how kind they are”. ‘Other’ responses



included comments such as ‘it doesn’t matter’ and responses which could not be coded because they were unclear “he is on the red door”, “they are the same”. Responses for children with low and high ToM were analysed. The results failed to show any difference in the themes in which high and low ToM children answered the question.

Three children made specific responses to the use of the word “fat” in the storybook. They said, “that (fat) is a mean word”, “you are not allowed to say people are fat”, “you can’t say fat at school. You have to say you are skinny. You can’t say you are fat it’s a really bad word. We are not allowed”.

Some children shared explanations of overweight; “she ate too much food and grew big”, “He (Alfie) has been eating a lot of food”, “Alfie ate too many stuff and Thomas eats healthy stuff,” “sometimes people are fat and sometimes they lose weight”. Interestingly, one child made the assumption that people with obesity take more food and so they would take more stickers, “some people are fat as they take lots of things, so I think it was him (Alfie).” There was one response which tried to make a differentiation between behaviour and trait attributions, “it doesn’t matter what they are doing, it just matters how kind they are.”

### **3.4. Body shape ratings**

On analysing the average body size of the children, most were given a rating of 4. This is the midpoint in the body shape rating scale used (Collins, 1991). There were no clear outliers (scoring 6 or 7). Some children scored a rating of 5 (n=15) but only one of these mentioned body shape in their reasoning for the comfort scenario. The lack of diversity in the ratings precluded further analysis of the construct.

## **Discussion**

### **4.1. Summary of results**

The main aims of this study were to investigate the presence of weight bias in young children and the potential influence of ToM. The results are discussed in reference to the hypotheses and then in context of the literature.

#### **4.1.1. Weight bias**

Presence of weight bias was established through a process of choosing a character and then explaining the choice. The first hypothesis can be accepted, as children showed negativity towards the character with obesity. Children chose to steal from the character with obesity significantly more than the healthy weight character. Significantly higher frequencies of negative comments were made after choosing the character with obesity. Significantly fewer children chose to comfort the character with obesity and fewer positive comments were made after choosing the character with obesity.

It was expected that explicit weight bias would be rare. Children's justifications for their character selection were analysed and three themes identified: 'appearance', 'emotion' and 'story'. 'Appearance' was the least frequent master theme and very few comments (4.3%) related specifically to body shape. Therefore, the least common reason children gave for their choice was due to visual differences with few children (7) using body shape as a justification for their character choice. There was no significant difference observed in weight bias between girls and boys. In the character selection there were similar frequencies for boys and girls choosing the character with obesity. When responses were coded for valence and themes, similar proportions were observed for girls and boys.

The results of this study suggest whilst weight bias was apparent in children's character selection and in the valence of their justification, explicit bias in terms of language was infrequent. This suggests that when children are asked to give an explanation, bias may become more conscious and modified when required to verbally express it.

#### 4.1.2. ToM

It was hypothesised children with high ToM would show less weight bias. When both scenarios were considered, children with high ToM showed greater weight bias against the character with obesity, at least in their character selection. In the comforting scenario, children with high ToM showed greater weight bias against the character with obesity than the children with low ToM. In the stealing scenario, children with high ToM showed significant weight bias but those with low ToM did not. When asked to give a justification for their character choices, more non-responses were made by children with low ToM than high ToM.

When the scenarios were considered separately, there were differences in the valence of comments between children with low and high ToM. In the stealing scenario, there were more negative comments made by children with high ToM. However, there were no differences in the comfort scenario between children with low and high ToM.

There were no differences in the frequencies of themes coded for children with high and low ToM. Proportion of responses for themes of ‘emotion’, ‘story’ and ‘appearance’ were similar in children with low and high ToM. Within the ‘emotion’ theme, children with high ToM, spoke more to the subtheme ‘comparison’ e.g. “Thomas: he is sadder”. In children with low ToM, there was a greater frequency of comments referring to ‘personality trait’ e.g. “Thomas: he is mean”. This suggests there may be some subtle differences in children’s reasoning, particularly in their vocalisation of social judgements and this could be influenced by ToM. Therefore, this hypothesis is rejected as in the character selection, children with high ToM showed more weight bias. The results will now be considered in the context of the literature.

### 4.2. Results in the context of the literature

#### 4.2.1. Weight bias

This study has shown, in children of a young age (four- six-years old), that there was implicit weight bias in the character selection and negative valence of justifications. This was bias against the character with obesity. Batson et al., (1997) suggests two reasons why improving attitudes is difficult. Firstly, it is a cognitive process and any positive changes are often dismissed as being distinct to the individual rather than generalising to the stigmatised group. For example, if child A falls and hurts themselves and is comforted by child B who is obese, child A may view child B as a kind individual, but this will not be generalised to all children who are obese. Secondly, the

negative consequences of changing attitudes, with a threat to an individual's position of advantage or belief in a just world when this is viewed negatively by the majority.

It could be assumed that children used the same cognitive process to make both the choice between characters and then again to justify this choice. That is to say, children had strong bias evidenced in the choice, but that bias was subsequently edited and reduced in the justification. Previous research suggests that the age of children who took part in this study would not yet be concerned with covering their bias for social reasons, as it is something which develops later (Solbes & Enesco, 2010). Explicit bias is thought to decrease as children become more concerned with social desirability and learn to inhibit unfavourable responses (Durante et al., 2014). It is not that children reduce their implicit bias towards people of difference, but that social consensus becomes a higher priority and so is internalised (Patel & Holub, 2012). Children become more concerned with how their peer group will perceive them, if they associate with a stigmatised group (Penny & Haddock, 2007). Therefore, the lack of negativity in the verbal reasoning may be evidence that children, especially those with high ToM, are starting to learn this process.

However, it could be that making a choice and providing a justification are two different cognitive processes. Kahneman (2011) makes a distinction between System 1, (fast, unintentional, unconscious, associative) and System 2 (slow, intentional, conscious and propositional). If this were the case, children could have used System 1 to make their character choice and then System 2 for their justification. Using System 2 may have allowed the children to more carefully consider their beliefs and values, demonstrating less bias. System 1 is more likely to pick up bias as it is less conscious therefore, there is less time for people to inhibit responses. This could suggest when given more time, children hold less negativity towards peers who are obese.

A criticism of this dual-system is that it does not allow for relational knowledge, 'information about the way in which elements are related' (De Houwer, 2019, p257). For example, a young child may assume a sister is a young girl, but then learn later that a sister can also refer to a middle age woman. In the same way, weight is a relational concept which children will need to learn. Relational knowledge is proposed to develop after the age of four, when children have an established vocabulary and it is proposed that comparison is a mechanism of learning (Gentner, 2005). This is interesting as 'comparison' was a subtheme in the current study, which may be evidence of children trying to practise concepts of relational knowledge.

Qualitative methodologies are helpful in providing the space for children to express their beliefs. Previously, research has limited the opportunity for children to give more extended answers e.g. Cramer & Steinwert, (1998). More recent qualitative research has suggested early studies may have overestimated the negativity regarding overweight that is held by young children (Dearing, 2018; Kilmurray, 2017). Asking children to explain their reasoning provides an opportunity for greater insight into beliefs and how these develop. Anecdotally, there is a fear that children may find it difficult to provide an answer, which whilst there were a high rate of non-responses it is important to give children the chance to explain their thinking. A sensitive, careful research methodology was required to detect bias, but not overestimate its prevalence. A few comments after the direct question about the character's weight indicated that some children held negativity towards the character with obesity, as they shared their explanations "he has been eating too much food".

Children have to learn factors which impact on body shape and integrate this knowledge with cultural attitudes. In this study, young children demonstrated knowledge of eating, body shape and the negative consequences associated with 'being bigger'. The main cause children gave for obesity was food consumption ("she ate too much food and grew big"), which was found in previous research (Baxter et al., 2016). Baxter et. al used semi-structured interviews to listen to children's understanding of weight change. The children were a similar age to those in the current study. Children did not mention losing weight by decreasing food consumption or exercise. The results of the current study confirms previous research showing that young children mainly focus on simple links between food and weight (Fielden et al., 2011). In social settings, children have to integrate knowledge about eating, weight and shape, cultural attitudes, ethics and their own motivation. Therefore variations in their behaviour could potentially be explained by ToM.

#### **4.2.2. ToM**

To the author's knowledge, this was the first study specifically investigating weight bias and ToM. Children with high ToM showed a greater preference for the character with healthy weight in their character selection. This finding contrasts with findings of a previous study suggesting children with high ToM showed less bias (Lapan & Boseovski, 2016). High ToM indicates an individual who is more skilled in understanding that people hold different perspectives. There are several explanations which could account for the difference in findings. Firstly, the current study used a

more conservative measure of ToM. By using scenarios more developmentally appropriate for the age group, there was an increased likelihood of children being in the high ToM group and arguably, providing results that are more generalisable. This study used a “lie” scenario, as compared to a “white lie” scenario. Understanding a “white lie” is more complex and develops later in the acquisition of ToM (Westby & Robinson, 2014). Secondly, the current study included a forced choice rather than reporting proportions of likely behaviours which may have provided greater distinction. Lapan & Boseovski, (2016) reported a greater proportion of behaviour to help and to make positive trait attributions by children with high ToM.

When asked to provide a rationale, children with low ToM gave more non-responses which suggests some found it too difficult to give a justification. In the rationale, there was no difference in the themes of the justifications given by children with low and high ToM. One explanation of the lack of bias in children’s reasoning could be due to being in their school environment which encouraged some children to modify their verbal responses, for example “you can't say fat at school. You have to say you are skinny. You can't say you are fat it's a really bad word. We are not allowed”. Previous research suggests, children in this study were too young to modify their responses but this study may suggest they are beginning to do this. Alternatively, the forced choice and the explanation of rationale could be measuring two different processes, as discussed above.

Children with high ToM could have suppressed their explicit bias (verbal explanation) but not their implicit bias (choice of character). The understanding of an increased rejection by children with high ToM could be because they are more attuned to wider cultural beliefs about weight stigma in society. Bias is a difficult topic to research but here lies the additional challenge and complexity. On the one hand, children with high ToM have a greater appreciation of other’s thoughts and feelings and may be more able to inhibit hurtful responses. A high ToM may also make children more aware of expectations and consequences. However, on the other hand, children with high ToM may have greater knowledge of cultural beliefs and enhanced abilities to understand the consequences to their social standing of aligning with a stigmatised group. There may also be variation in how aware children are of this conflict.

It was encouraging to note that the most frequent theme in the weight bias scenario was ‘emotion’, thus providing some additional validity that ToM and bias are associated. Decision making in social scenarios is complex and may not be fully

conscious. Therefore understanding the process is a challenge. This study has shown ToM may offer a valuable psychological theory and developmental perspective to aid understanding of how children make social judgements about the world (Benenson & Dweck, 2016; Heyman et al., 2003).

Understanding ToM and weight bias in young children is more complex because of the language requirements inherent in the tasks. Some children were unable to give a reason for their answer (32.0%). Reasons that were provided were often brief and a couple were nonsensical “he is expensive”. Whilst this was anticipated due to the age of the children, it increases the complexity of understanding children’s decision making process. During analysis, I questioned whether the child was concerned for the stigmatised group or to save face. This was beyond the scope of the research, but it might be suggested that given the young age of the children (being at the ‘egocentric’ stage), they were concerned for themselves.

It is understood that children acquire language through listening to and imitating what they observe, either in actuality or in the media (Skinner, 1957). In their reasoning, children could be repeating verbatim phrases, rather than understanding and processing the ideas for themselves. For example, a child may have heard from a teacher “you can’t say fat at school” which was then repeated as a response to the direct question about the character’s weight. Vygotsky’s collaborative learning model suggests social interaction and conversations with others will help children develop cognitive and linguistic abilities, so repetition is expected (Vygotsky, 2012). In the same way, children will assimilate both attitudes (towards stigmatised groups) and colloquial words such as ‘fat’ (Baxter et al., 2016). Language remains an inherent challenge (and delight) to understanding ToM and weight bias in young children.

#### **4.2.3. Prosocial behaviour**

This study showed children were more likely to comfort the character with healthy weight over the character with obesity. This was more exaggerated in children with high ToM. There is agreement ToM and prosocial behaviour are associated (Imuta et al., 2016; Lapan & Boseovski, 2016). The development of this association and the integration with knowledge of stereotyped groups remains unclear. It is likely a variety of factors will interplay e.g. growing up with siblings (Lewis et al., 2009). However, using ToM is a helpful means to understand the development of prosocial behaviours.

Weight bias in prosocial behaviours, including helping, sharing and comforting, has been shown in previous research (Dearing 2018). Flook et al. (2019) describe an

“apparent paradox of development” as they note older children are more able to make discriminations which can lead to “helpful or hurtful behaviour” (p7). Flook et al. explored sharing behaviours of preschool children (mean age five years) with older children (mean age 10 years). Older children were found to be more selective than younger children dependent on the recipient. Greater discrimination demonstrated by the older children could explain the results of the current study, with their higher ToM and greater weight bias suggesting older children learn to make more discriminations.

There are limited studies which have investigated comforting as a prosocial behaviour in young children, Dearing (2018) being one of few. Therefore, comparisons are drawn from studies using other prosocial behaviours to inform our understanding, e.g. helping and sharing (Flook et al., 2019; Lapan & Boseovski, 2016; Patel & Holub, 2012). However, children’s responses may vary depending on the type of prosocial behaviour. Dunfield (2014) recognised the different negative states each behaviour is aiming to alleviate; an instrumental need (helping), a material desire (sharing) and emotional distress (comforting). Once children understand the problem (the unique negative state), children must understand the solution and then have the motivation to alleviate the problem. It is suggested that helping and sharing behaviours carry less social risk of derogation than comforting behaviours (Patel & Holub, 2012). Comforting is an action that requires close physical proximity to someone else, which is not necessary with other prosocial behaviours. It is suggested other-orientated comforting may emerge later than other prosocial behaviour, as children learn about the emotional experiences of others and situational constraints (Hoffman, 2001).

It was challenging to understand the motivation behind the children’s responses in the present study. A greater number of responses coded under the emotion master theme for the comfort scenario could be explained as prosocial behaviours and ‘being kind’, as frequently encouraged in school and books /films. The inclusion of a stealing scenario was important as it has been less researched and is possibly less familiar to children. Potentially, the stealing scenario required children to think more carefully before providing a response. An attempt was made to observe evidence for this e.g. in response times and non-verbal behaviour, but if they were present then they were too subtle to measure. Understanding children’s motivation to act will provide insight into their understanding of the social world.



#### 4.2.4. Gender differences

In this study, girls scored higher on the ToM assessment than boys. However, there were no differences between girls and boys in weight bias, in terms of character selection or in the reasons for choices. This is consistent with previous research (Baxter et al., 2016; Charsley et al., 2018; Harrison et al., 2016). In a few studies, a greater bias in girls' attitudes against characters with obesity has been indicated, (Dearing, 2018; Latner & Stunkard, 2003). However, this was not found in the current study suggesting that young girls and boys have similar views of obesity.

The stories were gender matched based on the recipient's gender as in previous research. This recognised the desire of young children to more frequently play with the same gender and for young children the strongest bias is against the opposite gender (Charsley et al., 2018; Patel & Holub, 2012). Matching the child's gender to the characters with different body shapes removed an additional variable as children could respond to characters of the opposite gender differently, which was beyond the scope of this study.

Gender differences in bias shown by young children have not been widely reported in the literature. Tisak et al. (2007) identified young children's perception of prosocial behaviour differed with context; with girls expected to be more helpful at school. Therefore, any future research investigating gender differences would need to consider the context of the study so as not to create a false positive result.

#### 4.2.5. Individual differences in bias / ToM

This study has provided an opportunity to consider individual differences in weight bias. Research most often reports the responses of groups of children (Cramer & Steinwert, 1998; Patel & Holub, 2012). This can be helpful to show patterns in responses but overlooks potentially important and revealing individual differences in children's attitude to weight. The design of this study allowed the reasons behind the selection to be analysed and some patterns emerged through the themes and valence.

Specific comments about body shape were infrequent. Nevertheless, it is interesting to consider the small group of children who discussed body shape. The seven children (5 males) were all white, in Year 1 and five were in the high ToM group. No children were rated as outliers on the body rating scale, (five were rated as 4, one as 3 and one as 5). The numbers are very small, so limited conclusions can be drawn. The reasons for the small number may suggest most children were not using size to justify their decision, children were not aware they were using size or children were using the

characters' size but could not verbalise it. Few children voicing weight bias is reassuring and could imply less obesity stigma or at least children are not making this overt.

It is important to acknowledge factors that impact on individual differences yet these were beyond the scope of the project. Parental bias plays a role in the development of stigma but this was not assessed (Lydecker et al., 2018). It would have been interesting to understand each child's exposure to media, as films can convey negativity towards people who are obese (Herbozo et al., 2004). Factors that affect the development of ToM, may in turn impact weight stigma. For example, being born into a family when there are already children has been shown to facilitate ToM (Lewis et al., 2009). This is likely due to increased exposure to social interaction and similarly increasing weight bias through the same process.

The present study showed a preference for the character of healthy weight, when given a choice, but the children's rationale for this was less clear. Trying to understand the words that children use may provide more insight. The results could be understood as children showing a preference for the character who fits their 'ideal' (Charsley et al., 2018). It is therefore recognised that individual differences are important when thinking about interventions to address the development of attitudes and the expression of weight bias.

### **4.3. Reflexive analysis**

In my clinical work, I have worked with people who have experienced weight stigma. Bias is a complex phenomenon and it has been interesting for me to understand how it presents in young children. I thoroughly enjoyed interviewing the children and trying to understand their particular decision-making process. It was compelling to see children as young as four willing to engage in the interview process. I was surprised by the attention and willingness of the children to read the storybook, and it was really encouraging to see the children give thought and consideration to the task. When the children sat with me, they seemed to speak freely and enjoy the process. Chatting to the children before starting the storybook appeared to increase the fluency of the children's responses. On reflection this suggests that the children were relaxed during the task.

It was challenging and frustrating to set up meetings with headteachers and is probably a reflection of the increased pressure in schools. I was disappointed to have a parental response rate of 41%, but this was anticipated. The response rate was similar to

that in previous studies (Baxter et al., 2016; Harrison et al., 2016). It is difficult to know how this can be addressed. I made considerable effort to encourage the teachers to speak to parents. In the schools where this happened, the parental response rate was slightly higher. This is understandable as people can be wary of research, so having the sanction of someone trusted locally by the parents really helped.

It is important for me to recognise the adult/ child power imbalance. Every effort was made to minimise this, but there is an inherent difficulty with this research in that I was an adult which may have affected the children's honesty. I was also a stranger to the children and therefore, they may have been more defensive about fully sharing their beliefs and bias.

As an adult, I feel privileged to have had the opportunity to speak with children and listen to their thoughts and ideas. I want to acknowledge the part I played in the analysis and whilst I consulted with my supervisors, it is possible if another individual had completed the analysis, different themes may have emerged. I have certainly learnt from this experience and hope others will too.

#### **4.4. Strengths and limitations of the current study**

##### Strengths

The main strength of this study was investigating the impact of ToM on weight bias using valid measures. The ToM assessment has been widely used in the literature. ToM is a complex phenomenon and so using a well-researched methodology was important. Whilst there is no standard way of assessing the validity of the short assessment, it replicated the methodology of a previous study (Lapan & Boseovski, 2016). ToM is multifaceted and presents challenges to researchers. In particular, as young children use shorter sentences and use less conjunctions, these challenges needed to be embraced to address obesity bias. The assessment of weight bias has been used by a few studies prior to this one (Dearing, 2018; Harrison et al., 2016). By using measures which have been used previously in other research, there can be higher levels of confidence in the findings.

One of the strengths of this study was that an adapted forced choice methodology was used. The use of forced choice has been shown to inflate bias (Harrison et al., 2016). In this study children were asked who they would hug first, therefore creating a situation that implies both children would receive a hug. The aim of this phrasing was to reduce the inflation of bias often seen in forced choice paradigms.

The findings of this study add to the current knowledge, increasing understanding of children's responses to different body shapes. A strength was the use of a professionally drawn colour storybook, similar to the material children would be used to reading. The children engaged with the process, which also increases confidence in the results. The children were asked to take the position of a character, so this may have allowed them to be more honest, rather than asking for their opinion. This method has real strengths in understanding children's reasoning.

The majority of comments fit into the final thematic framework. There were a handful of comments which could have gone into two themes. The research aims were used to inform the coding process. Within the theme framework, any comments with emotional content were prioritised under the 'emotion' master theme because it related to ToM. For example, 'Holly: She was upset' - was first coded under emotion rather than order. In the valence framework, the giver was prioritised over the recipient as the weight difference was between recipients. For example, 'Alfina: he (Thomas) is grumpy' was coded as neutral. There was very good inter-rater reliability in the coding of reasons which adds another strength to the study.

### Limitations

Having a larger sample size would have been helpful. As the study was focused on weight, which is a sensitive subject, it is possible this affected the levels of parental consent and therefore fewer children participated. In particular it may have reduced parents with extreme views allowing their children to participate. It is important to acknowledge the homogeneity of the sample as rated on the figure rating scale, indicates this may not be representative of the population which may limit the generalisability of the findings. The sample size was greater than in previous studies and had similar numbers of boys and girls (Lapan & Boseovski, 2016; Patel & Holub, 2012). There were some non-significant results. By interviewing a greater number and more diverse sample, it would have increased the power in the comparisons to detect a difference if there was one.

It is important to acknowledge there are some issues with establishing weight bias. Given the justifications offered by children it is not possible to understand if the character selection was a proxy of weight bias. Young children were used for the study because this is the age ToM is developing however there are issues around language ability (one third of responses were non-responses) which makes drawing conclusions

more difficult. The results could have been due to children choosing the character more like them reflecting the apparent weight of those interviewed or showing favouritism to the healthy weight character because they were used in the ToM assessment.

One limitation of the study was the limited information collected on each child. There are factors such as socioeconomic status and reading level which may have impacted children's understanding of the assessments but were not collected. In addition, it would also have been helpful to have the child's actual body weight rather than estimating from a visual scale. Nevertheless, the children's responses give an insight into their process of social judgements.

A further limitation of the study is how well the results generalise to everyday settings. It could be argued that the question format is not an accurate reflection of how a child may respond to a peer, when faced with a social judgement situation. This is a challenge of research, to try to translate responses in vivo in order to draw conclusions about human behaviour.

This study has suggested ToM makes a difference to weight bias. However, a limitation is the context of the difference. Further research is required to look into how ToM may be associated with obesity stigma and the expression of weight bias. It is also important to highlight that the responses reflect the children's current beliefs at a particular point in time. This does not account for where their beliefs may have come from, nor how these may develop over the next few months.

#### **4.5. Practical Implications**

There are several practical implications for the findings of this study. For children there is growing evidence weight bias is established early and is difficult to change (Durante et al. 2014; Solbes & Enesco, 2010). As discussed in the introduction there are implications for all children, both those who experience stigma for their weight and those in the non-stigmatised group. Children who have obesity are less likely to be comforted and more likely to be a victim of negative behaviour (Dearing, 2018; Griffiths et al. 2006). These children need support as much as any child or arguably more so if they experience more negativity. Left unaddressed, studies in older children suggest young children with obesity can expect bullying (Jansen et al. 2014), exclusion from friendship (Puhl et al. 2011) and negativity from health professionals (Teachman & Brownell, 2001). Long-term there are consequences for those who have obesity such as increased risk of anxiety and depression (Rankin et al. 2016), potentially lower

quality of life (Griffiths et al. 2010), negative self-esteem (Eli et al., 2014) and being less likely to find a romantic partner (Pearce et al, 2002).

ToM and its relationship with weight bias might be helpful for schools to consider when planning interventions. The development of ToM is a psychological theory which schools could utilise to explore attitudes and discrimination. In Leeds, the 'Mindmate' programme has developed six lessons across 6 themes: feeling good and being me; friends and family; life changes; strong emotions; being the same and being different; solving problems (Leeds South and East Clinical Commissioning Group, 2020a). The programme is designed to improve the social, emotional and mental health skills in primary school children. The lessons are pre-planned and delivered to children in years 1–6 and adapted to the appropriate key stage. The curriculum for Year 1, in the theme "Being the same and being different", requires children to 'say their friend is different and its ok' (Leeds South and East Clinical Commissioning Group, 2020b). This requires children to have ToM and shows it is on the agenda for schools to address aspects of children's emotional development.

Studies suggest training at an early age can increase prosocial tendencies in children. This is important as it indicates a possibility to intervene early and address the acquisition of weight bias. Izard (2002) suggests seven principles for developing interventions: being able to use positive and negative emotions; modulating emotion as a mediator of emotion utilization; emotion patterns in states and traits; different processes of emotion activation; emotion and communication in early life; development of connection for modular and emotion and cognitive systems. Flook, Goldberg, Pinger, & Davidson (2015), delivered a mindfulness based 'Kindness Curriculum' to preschool children. Following the intervention, teachers rated children as improving in their social competence, learning, health and social-emotional development. In the control group children were described as showing more selfish behaviour over time. As a child develops they increase their capacity to discern but also discriminate, so it is important these abilities are shaped (Flook et al., 2019). It is suggested this needs to be considered in the wider context of a child's social experiences, rather than confined to school, to help children develop their value system.

Finally, there are implications for professionals, particularly those working with primary school children. Studies have found some health professionals and teachers hold weight bias, which will be unhelpful when supporting children who are obese (Neumark-Sztainer et al., 1999; Teachman & Brownell, 2001). The results of this study

need to be disseminated and professionals supported to consider how they can minimise transmission of bias.

#### **4.6. Recommendations for Future Research**

This study is the first to explicitly look at ToM and weight bias. Assessing attitudes is challenging and any differences between children with low and high ToM are likely to be subtle. Further research would be needed to increase understanding of the relationship between ToM and weight bias. It would be helpful to repeat the current study with more participants to increase the power of the calculations and increase the confidence in the results. In the weight bias task, there were no answers within the story and so the children had to find one. The responses were short, but the thematic analysis gave an indication of the salient ideas children were using (e.g. emotion “he is sad”). Therefore another option may be to repeat the study with additional follow up questions. This may give children more opportunity to explain their thought processes and increase our understanding of the weight stigma. For example, asking children about their experiences of being comforted ‘have you been comforted before, who by, what was it like?’

Changing the focus of the study could be helpful for future research. The current study looked for evidence of weight bias. Instead a study could be designed to explore the idea of ‘thin idealisation’ (Patel & Holub, 2012). It could be suggested children are showing a preference for ‘thinness’ and as a result derogating the character who least fits this. This distinction is important as it could alter interventions delivered to children to ‘thinness’ rather than ‘fatness’.

Alternatively future research could investigate ToM in the context of other biases. Young children show bias to gender, ethnicity and disability. For example, the storybook could be written to include a child in a wheelchair. This would increase our understanding of ToM and social development within the context of a different bias.

## **Conclusions**

This study investigated weight bias and ToM in young children. Consistent with previous research, the findings were, in a forced-choice scenario, children showed bias against the character with obesity but when asked to justify their choice, bias was less clear-cut (Dearing, 2018; Patel & Holub, 2012). The results of this study indicated that children with high ToM were more biased in their character selection. This contrasts with previous research (Lapan & Boseovski, 2016). There were no significant differences in age or gender.

An explanation for the findings could be, for young children, making a choice may be outside of their conscious awareness (System 1). Although it may be social desirability caused the children to edit their justifications so bias was less prevalent. Although limited, the justifications suggest children may view weight alongside and not differently from other physical differences (Charsley et al., 2018). Some research has suggested children hold more negativity than observed in this study (Cramer & Steinwert, 1998; Patel & Holub, 2012). By using a qualitative method this study gave a voice to children and increased researchers' understanding of how the physical difference of weight is perceived. Therefore, when designing research with young children, it is important not to be too directive (with the risk of inviting bias) but provides some support to account for their stage of development.

Obesity and weight bias have a significant impact on society. It is imperative to address the messages that young children receive about body shape from family, peers, media and professionals. This study was unique in its investigation of ToM and weight bias in young children. Future research could build on these findings to understand how ToM impacts on other biases such as disability. The development of ToM is a helpful framework to understand stigma and bias in young children.



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## Appendices

### 5.1. Appendix A: Ethical Approval



UNIVERSITY OF LEEDS

Faculty of Medicine and Health Research Office  
School of Medicine Research Ethics Committee (SoMREC)

Room 9.29, level 9  
Worsley Building  
Clarendon Way  
Leeds, LS2 9NL  
United Kingdom

☎ +44 (0) 113 343 1642

24 January 2019

Mrs Clare Randall  
Trainee Clinical Psychologist  
Leeds Institute of Health Science  
Faculty of Medicine and Health  
Clinical Psychology, Level 10  
Worsley Building  
University of Leeds  
Clarendon Way  
LEEDS, LS2 9NL

Dear Clare

Ref no: **MREC 18-042**

Title: **Understanding children's responses to different body shapes: a role for Theory of Mind?**

Your research application has been reviewed by the School of Medicine Ethics Committee (SoMREC) and we can confirm that ethics approval is granted based on the following documentation received from you and listed below.

Document	Version	Date Submitted
MREC 18-042 ethics application CRANDALL v2	2.0	08/01/2019
MREC 18-042 CRANDALL Protocol v2	2.0	08/01/2019
MREC 18-042 RiskAssessment_CRANDALL	1.0	11/12/2018

Please notify the committee if you intend to make any amendments to the original research ethics application or documentation. All changes must receive ethics approval prior to implementation. Please contact the Faculty Research Ethics Administrator for further information ([fmhuniethics@leeds.ac.uk](mailto:fmhuniethics@leeds.ac.uk))

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

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

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

We wish you every success with the project.

Yours sincerely

**Dr Naomi Quinton**  
Co-Chair, School of Medicine Research Ethics Committee

*(Approval granted by Dr Naomi Quinton on behalf of SoMREC Co-Chairs)*

## 5.2. Appendix B: Letter to Headteacher



**UNIVERSITY OF LEEDS**

Doctor of Clinical Psychology Programme

Clinical Psychology Training  
Programme,  
Institute of Health Sciences,  
Level 10, Worsley Building,  
University of Leeds, Clarendon  
Way,  
Leeds,  
LS2 9NL.  
0113 343 2736

Dear Headteacher

My name is Clare Randall and I am a graduate psychologist studying for a doctoral degree in Clinical Psychology at the University of Leeds. I am writing to you regarding a research project I am undertaking. As part of my degree I am undertaking a project looking at young children's attitudes towards peers who are different body shapes. I am hoping to recruit children from reception and Year 1 in the local area and would be most grateful if your school would agree to take part.

The project involves children reading a story and answering some questions about the characters. I have enclosed the information sheet which will explain in more details what children are required to do. From pilot trials with the story I have found children have engaged well with the task and enjoyed it. I would like to ring you within the next two weeks to talk about this further and hopefully arrange a time to meet with you. If you would like to contact myself or my supervisor Professor Andrew Hill our telephone contact details and email are included in this letter.

Thank you for taking the time to read this letter.

Yours Sincerely

Handwritten signature of Clare Randall in black ink.

Clare Randall.  
Psychologist in Clinical Training.  
[umcr@leeds.ac.uk](mailto:umcr@leeds.ac.uk)

Handwritten signature of Prof. Andrew Hill in black ink.

Prof. Andrew Hill,  
Professor of Medical Psychology  
[A.j.hill@leeds.ac.uk](mailto:A.j.hill@leeds.ac.uk)

### 5.3. Appendix C: Letter to parents and consent form



Dear Parent/Guardian

#### **Who am I?**

My name is Clare Randall and I am currently studying for a doctoral degree in Clinical Psychology at the University of Leeds. As part of my degree I am conducting a research project looking at young children's attitudes towards peers who are different body shapes. I have spoken to your child's Head teacher, who has kindly agreed for the school to help me with this research and given me permission to contact you.

The project has been approved by the University of Leeds School of Medicine Ethics Committee, project reference SoMREC 18-042.

#### **Why am I writing to you?**

For this study I will be asking children in Reception and Year 1 about what they would do in different scenarios that involve stealing from, helping, sharing or comforting peers who are different body shapes. I hope to include over 100 children from different schools in West Yorkshire. This letter is intended to give you some information about the research and ask for your permission for your child to take part.

#### **What will I be asking your child to do?**

I will ask your child if they would be happy to read a story with me. I will tell them that I will be asking them some questions and would like to know what they think, but that there are no right or wrong answers. If they agree to take part, I will ask them to read a story with me about 4 friends; Holly, Thomas, Alfie and Alfina. These characters are depicted as having different body shapes.



These characters will appear in a story that will include different scenarios. The first part will ask children what they think is going on in the story. In the second part, one character will need to comfort or steal from another character. Your child will be asked who they think the character will comfort or steal from first. The task should take around 10 minutes. There aren't right answers to the questions, I am interested more in the reasons children give.

#### **What else is involved?**

To help me write up the research all interviews will be audio-recorded. These recordings will be anonymised (i.e. your child's name will not appear on the recording). All recordings will be stored securely so that only myself and research supervisor will have access to them. I will also need to record your child's age and gender. All data from the study will kept anonymous (your child's responses will be identified using a number) and confidential. All audio-recordings will be deleted after I have transcribed them. Transcriptions will be anonymous and stored securely on the University's shared drive. If quotations are used anonymity will be preserved. Children can withdraw at any time

without giving a reason however any responses already provided will be retained due to the nature of the anonymity of responses.

**Where and when will the study take place?**

The study will take place during normal school hours. I will arrange a time and date when it is convenient for me to visit the school. All interviews will be carried out in a quiet area of the classroom with a member of school staff present.

**What if I agree but my child does not want to take part?**

Your child will only take part if they are happy to do so. I will make sure that they are comfortable talking to me and tell them that can stop at any time without giving me a reason. If they do change their mind and decide not to take part they will return to their usual classroom lesson.

**Are there any benefits for my child?**

The task is designed to be fun! By taking part your child will have an extra opportunity to practice their reading skills. Your child will also be given a sticker at the end of the task to thank them for taking part.

**I have some more questions, how can I contact you?**

I am happy to answer any further questions you may have. You can contact me or my supervisor (Prof. Andrew Hill) on the email address and telephone number below.

Thank you for taking the time to read this letter.

Yours Sincerely

Clare Randall  
Psychologist in Clinical Training

Clinical Psychology Training Programme, Institute of Health Sciences, Level 10,  
Worsley Building, University of Leeds, Clarendon Way, Leeds, LS2 9NL. 0113 343  
2736 [umcr@leeds.ac.uk](mailto:umcr@leeds.ac.uk)

Prof. Andrew Hill, Institute of Health Sciences, Level 10, Worsley Building, University  
of Leeds, Clarendon Way, Leeds, LS2 9NL. 0113 343 2734 [A.J.Hill@leeds.ac.uk](mailto:A.J.Hill@leeds.ac.uk)





**UNIVERSITY OF LEEDS**

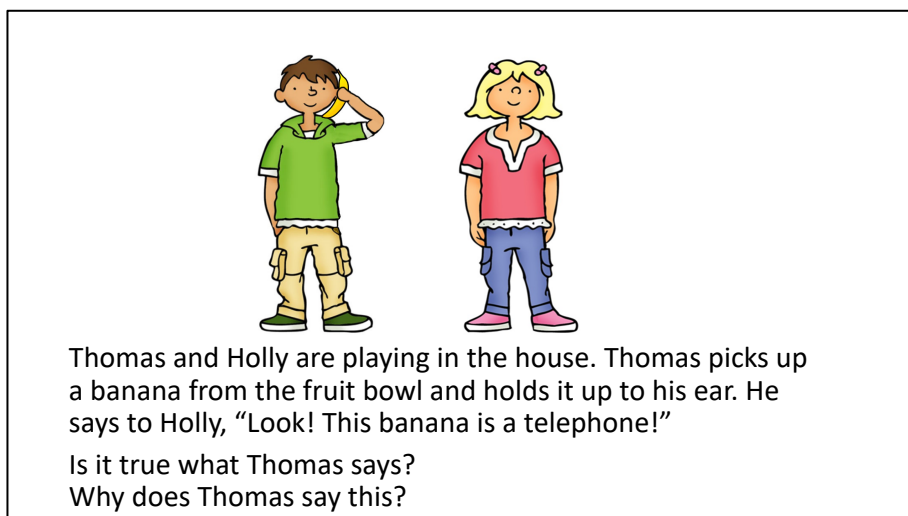
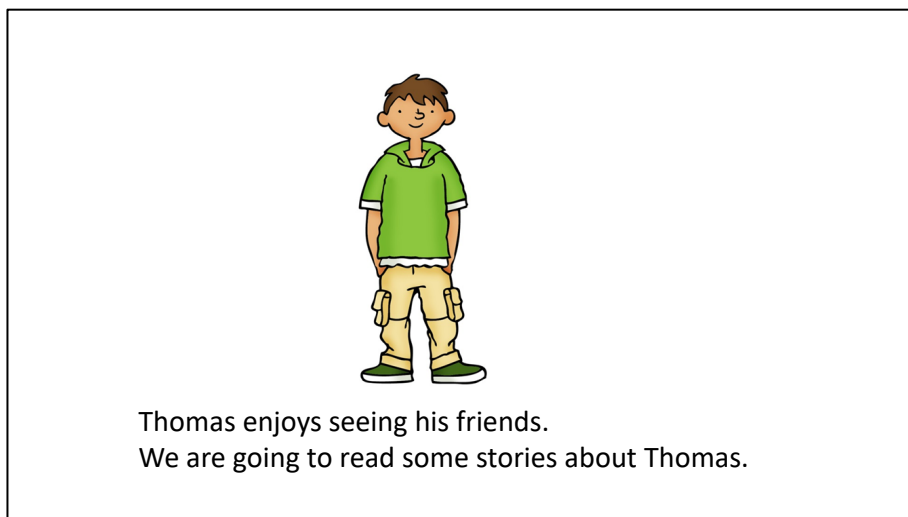
Doctor of Clinical Psychology Programme

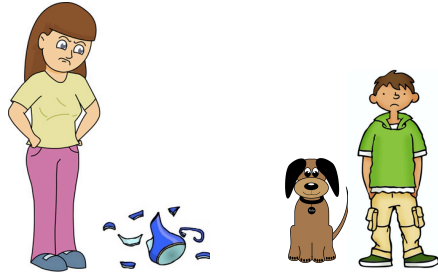
**Parental Consent Form**

I (parent/carers name) ..... (please delete) give  
consent for (child's name) ..... to take part in a  
research project to understand children's attitudes to different body shapes.  
Signature .....  
Date .....

Please sign and return this form to your child's teacher. Thank you.

## 5.4. Appendix D: Girls Storybook





Whilst Thomas is playing in his house, he accidentally knocks over and breaks his mother's favourite vase. Oh dear, when mother finds out she will be very cross! So when Thomas' mother sees the broken vase and asks Thomas what happened, Thomas says "the dog knocked it over, it wasn't my fault."

Is it true what Thomas says to his mother?  
Why did Thomas say this?

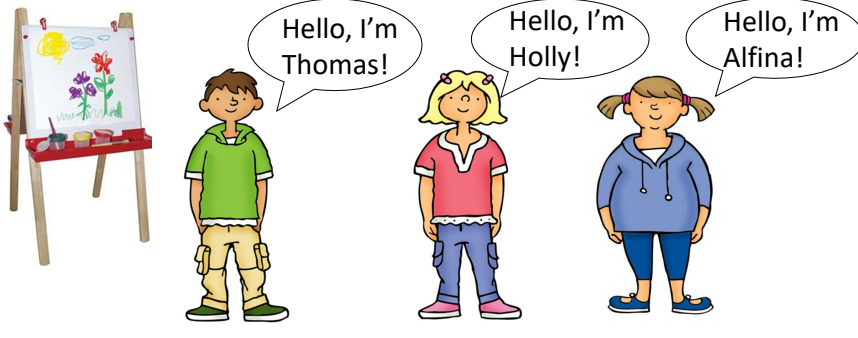
Mother tells Thomas not to worry. She bought a new bigger vase. Thomas went to bed, excited about school tomorrow.



Today at school the children are making pictures.



The teacher said that all the children's pictures can go on the classroom wall.





Hello, I'm Thomas!

Hello, I'm Holly!

Hello, I'm Alfina!

Thomas, Holly and Alfina love making pictures.  
Holly, Thomas and Alfina are using paint on their pictures.

“OH NO!” says Holly and Alfina. Somebody has spilled paint all over the pictures.



“Now our pictures are ruined!” Holly and Alfina are upset and start to cry.

Thomas sees that Holly and Alfina are upset and decides to give them a hug to cheer them up.



Thomas



Holly

Or



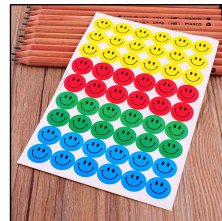
Alfina

Who do you think Thomas will hug **first**, Holly or Alfina?  
Why do you think Thomas will hug them first?



Next, Thomas, Holly and Alfina are using stickers on their pictures.

Holly and Alfina have taken their stickers.



It's Thomas' turn to take a sticker, but there isn't any left!





**Thomas**



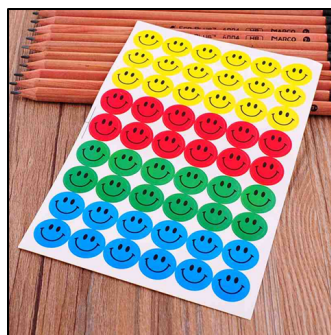
**Holly**

Or



**Alfina**

Thomas decides to steal a sticker from the girls.  
Who do you think Thomas will steal a sticker from, Holly or Alfina?  
Why do you think Thomas will steal from that girl?  
Alfina is fatter than Holly, does that make a difference?



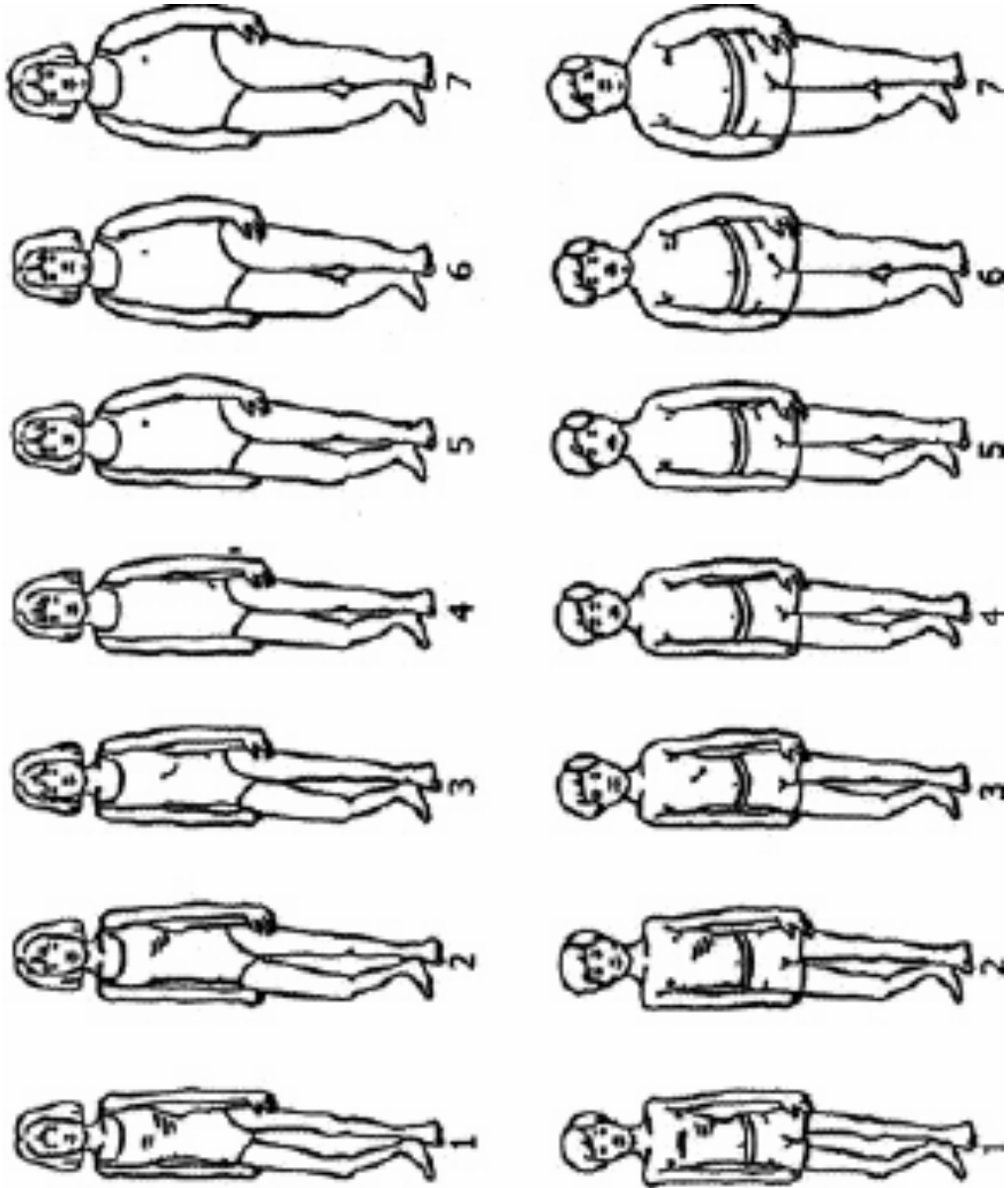
The teacher asks Thomas to give the sticker back and has found some more stickers for everyone.



The teacher sees all the pictures the children have made.  
"Oh, what lovely pictures!" says the teacher and puts all the children's pictures on the wall.

**THE END**

5.5. Appendix E: Body shape assessment (Collins, 1991)



## 5.6. Appendix F: Child assent

### Protocol for gaining assent from children

Hello, my name is Clare. I have a story for us to read this morning/afternoon. Is that ok?

In my story, there are some questions for you to answer. There are no right or wrong to these questions, I'm just interested in what you think. You don't have to answer any of the questions if you do not want to. Is that ok?

I would like to record your answers so that I can listen back to these later. Is that ok?



## 5.7. Appendix G: Coding Framework for Valence

### Positive

- Comments that give a compliment to the character, either by physical appearance or characteristic e.g. “Thomas: he is very kind”
- Comments that describe friendship between characters or between the child and the character e.g. “Holly: they are best friends.”
- Comments that suggest favouritism e.g. “Holly: Because she loves him.”
- Comments that describe comforting / giving a hug because they are sad eg. “Holly: she is sad”

### Neutral

- Comments that are neither positive or negative ‘Thomas: he has a green t-shirt’.
- Comments that refer to the proximity of the characters e.g. “Because Thomas is next to her.”
- Comments that reflect turn-taking e.g. “I chose Thomas last time.”
- Comments that describe the appearance of the character e.g. “Because Thomas has a long neck”
- Comments that describe the situation e.g. “Holly: Because they made a mess.”
- Miscellaneous comments that do not relate the characters e.g. “Thomas: they were both painting”
- Anything which is unclear how to code “Holly: because I do”

### Negative

- Comments that are negative about Thomas /Holly / Alfie/Alfina e.g. “Alfina: Thomas is naughty”.
- Comments that describe the character as fat e.g. “Holly: Holly isn’t fat and Alfie is fat and she’s fat too.”
- Comments that describe any of the characters has having a negative quality e.g. “Alfina: he wants everything”
- Comments that blame a character e.g. “Alfina: she took them all”
- the character being stolen from has more than the other (justified theft) e.g. “Alfie: he took hers”

## 5.8. Appendix H: Coding framework for themes

### Appearance

**This theme was used for comments children made that referred to the characters appearance as justification for the choice.**

Presentation – physical observations about the characters without stating a preference eg. Holly: has clips in, Thomas: he has a green t-shirt.

Attractiveness – clear preference started towards one character due to their physical appearance “Holly she is cute”, “Alfina: boys don’t like pink”

Body shape– reference to a character’s weight “Alfina: she is bigger than her”, “Alfie has a chin”.

Age – reference to the age of character as justification “Holly: she is the youngest” “Alfie: Alfie is older”.

### Emotion

**Children’s comments that referred to an emotion in the characters were put under this theme.**

Reference – any mention of emotion “Holly: she is sad, Holly: make her feel better”

Comparison – attempt to compare emotional states of the characters “Thomas: he looks the saddest, Thomas: he is upset even more”.

Personality Trait - comments that refer to the imagined personality of the characters “Alfie: because he is nice”, “Alfina: he is naughty”

### Story

**This theme was used when children cited aspects of the story to justify their selection.**

Order /proximity – comments referring to order, proximity “Holly: she is the first one,Alfina: I chose Holly first”

Equity – comments that added detail to try to justify the behaviour “Thomas: they ruined his picture”, “Alfina: she took the most stickers”

Friendship – comments that refer to the relationship between the characters “Alfina: to make friends”, “Alfina: it’s not her best friend”.

### Other

**Any comment which did not fit into the three themes above were put in this theme.**

Statement without justification – no clear rationale for the choice made “Holly: because I do”, or it is unclear from the response how they made the character choice eg. “Holly: they made it messy”

Uncoded - responses which were unclear so could not be coded. If the response is personal or not related to the scenario it would come under this subtheme “Holly: I like Holly”, “Alfina: because she is lighter he can see her”.

### 5.9. Appendix I: Character selection for weight bias Scenario

Choice 1	Choice 2	N	Percentages (%)
Thomas	Thomas	11	17.5
Thomas	Alfie	38	60.3
Alfie	Thomas	9	14.3
Alfie	Alfie	5	7.9
Holly	Holly	12	15.8
Holly	Alfina	50	65.8
Alfina	Holly	13	17.1
Alfina	Alfina	1	1.3

### 5.10. Appendix J: Coded responses for valence

Comfort			Steal	
Valence	Character	Rationale	Character	Rationale
Positive	Thomas	because he is very kind and will give him a biscuit	Thomas	he is happy
	Holly	she is sad	Alfie	he is a great boy
	Thomas	because he loves her	Alfina	she has his favourite colour on (blue)
	Thomas	because he is too sad	Holly	she looks happy a lot
	Holly	she will be happy if he hugs her	Holly	because she is happy
	Alfie	they are best friends	Alfina	He loves the colour brown (points to Alfina's hair)
	Thomas	she loves him	Thomas	he is the happy one
	Holly	they are good friends and play basketball	Alfie	he wasn't crying very much
	Holly	she has beautiful clothes on		
	Thomas	they ruined his (Thomas') picture		
Neutral	Thomas	he made a nice picture		
	Holly	She (Holly) is the first one	Holly	she has plaits in
	Holly	I just think Holly	Thomas	he doesn't mind
	Holly	she is cute	Alfie	there is no more, everyone took them
	Thomas	just think that one	Alfina	she has white on her t-shirt
	Thomas	he is more stronger. Otherwise he (Alfie) would give him a massive hug and couldn't breathe	Alfina	to get it from her
	Thomas		Thomas	holly doesn't have one
		Alfie	Alfie is older	

Negative	Thomas	Alfie is a bit big and Thomas is a bit thinner
	Holly	they made it messy
	Holly	someone wrecked her picture

Thomas	They (Thomas and Alfie) took all of them
Alfie	it was his
Holly	She has stickers
Alfina	she looks bigger than her (Holly)
Thomas	he has a green t-shirt. I like green
Thomas	she is next to him
Alfina	first it was Holly and then it was Alfina
Thomas	the boys don't have a sticker
Holly	They ran out of stickers
Holly	She took the blue one
Holly	She has clips in her hair
Holly	I think Holly
Alfina	she took them all
Alfie	he is too happy
Alfina	Alfina stole Thomas'
Alfie	Alfie will cry he will have no stickers
Holly	Holly took them all, she got 20
Alfina	she has the most stickers
Alfie	Alfie is bigger
Alfina	She is the oldest or maybe she took the most
Alfie	hmm.. Because he is bigger than anyone

### 5.11. Appendix K: Coded responses for themes

Theme	Subtheme	Comfort		Steal	
		Character	Rationale	Character	Rationale
Emotion	Reference	Holly	she is sad	Alfie	he is too happy
		Thomas	because he loves her	Alfie	Alfie will cry he will have no stickers
		Holly	She was upset first	Thomas	he is happy
		Holly	she will be happy if he hugs her	Holly	she looks happy a lot
		Thomas	she loves him	Alfina	I think she has got more than her (Holly)
		Thomas	Thomas is sad	Holly	because she is happy
		Alfina	she looks sad	Alfina	he cheered her (Holly) up first
		Holly	Holly's sad	Alfie	Thomas got a hug first and then its Alfie
		Thomas	because he is sad	Thomas	he is the happy one
		Alfie	he is very sad	Alfie	he wasn't crying very much
	Holly	she looks really upset	Thomas	she might not like Thomas	
	Comparison	Alfina	she is the saddest		
		Thomas	he is sadder		
		Holly	She looks sadder		
	Personality Trait	Thomas	because he is very kind and will give him a biscuit	Thomas	he doesn't mind
		Alfie	because he is nice	Alfie	he is a great boy
		Thomas	because ..he is a great boy	Alfina	he is naughty

Story	Equity	Holly	She didn't make much mess	Thomas	he is mean
		Thomas	they ruined his (Thomas') picture	Holly	he is jealous they got a sticker
		Thomas	he made a nice picture	Alfina	he is grumpy (Thomas)
		Holly	someone wrecked her picture	Alfina	she took them all
		Thomas	Thomas is next to her	Thomas	holly doesn't have one
		Holly	She (Holly)is the first one	Alfina	Alfina stole Thomas'
		Holly	she is the first in the story	Holly	Holly took them all, she got 20
				Alfina	she wrecked the picture
				Alfie	he sometimes takes the stickers
				Thomas	she is next to him
Appearance	Presentation	Alfie	they are best friends	Alfie	he's got thousands of stickers
		Holly	they are good friends and play basketball	Alfina	its not her best friend
		Alfina	to make friends		
		Thomas	Thomas has got a long neck	Thomas	he has a chin

	Thomas	he has a green t-shirt	Thomas	She has clips in her hair
	Holly	she has clips in	Holly	he has a green t-shirt. I like green
	Thomas	he has pockets (on his trousers)	Alfina	he is crossing his hands and that's what people do when they are hiding stuff
Attractiveness	Holly	she has beautiful clothes on	Alfie	boys don't like pink
	Holly	she looks pretty	Alfina	she has his favourite colour on (blue)
	Holly	She's pretty	Holly	his mouth isn't the right way, he should be smiling
	Holly	she is cute	Alfina	He loves the colour brown (points to Alfina's hair)
	Holly	he likes that she (Holly) has blue trousers	Alfie	
Body shape	Thomas	Alfie is a bit big and Thomas is a bit thinner	Alfina	she looks bigger than her (Holly)
	Holly	she is the same size, she has the same wallets and shoes	Alfie	Alfie is bigger
	Thomas	he is more stronger. Otherwise he (Alfie) would give him a massive hug and couldn't breathe	Alfina	hmm.. Because he is bigger than anyone
			Alfie	He is thin(Thomas) and He is fatter
			Alfie	Alfie is fat and I don't like Alfie, I only like Thomas
age	Holly	She is the youngest	Alfie	Alfie is older
			Alfina	She is the oldest or maybe she took the most



Other	Statement without justification	Alfina	they were both painting	Alfina Alfie	she looks a bit older so she might not mind there is no more, everyone took them
		Holly	because I do	Alfina	to get it from her
		Holly	I just think Holly	Thomas	They (Thomas and Alfie) took all of them
		Holly	he will hug her first	Alfie	it was his
		Holly	I like Holly	Holly	She has stickers
		Thomas	just think that one	Alfina	Thomas wants stickers
		Holly	they made it messy	Holly	They ran out of stickers
				Alfina	he wants everything
				Alfina	She has a sticker
				Alfina	its kind if you ask
	Miscellaneous	Alfina	because she is lighter, he can see her better	Thomas	He is going to the shops
				Holly	he doesn't have any
				Alfie	he has more children on his table

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### 5.12. Appendix L: Frequency of themes and subthemes for children with low and high ToM

		Percentages (Frequencies)												
		Emotion			Story			Appearance				Other		
Scenario	ToM	Character	Reference (45)	Comparison (20)	Personality Trait (9)	Order (9)	Equity (35)	Friendship (6)	Presentation (12)	Attractiveness (10)	Body Shape (8)	Age (4)	Misc (5)	SWJ (23)
Combined	Low	Combined (10)	31.7 (19)	1.7 (1)	10 (6)	1.7 (1)	21.7 (13)	5 (3)	3.3 (2)	3.3 (2)	3.3 (2)	1.7 (1)	0	16.7 (10)
		Healthy (5)	43.8 (14)	3.1 (1)	12.5 (4)	3.1 (1)	12.5 (4)	3.1 (1)	3.1 (1)	0	3.1 (1)	0	0	15.6 (5)
		Obese(5)	17.9 (5)	0	7.1 (2)	0	32.1 (9)	7.1 (2)	3.6 (1)	7.1 (2)	3.6 (1)	3.6 (1)	0	17.9 (5)
	High	Combined (18)	20.2 (26)	14.7 (19)	2.3 (3)	6.2 (8)	17.1 (22)	2.3 (3)	7.8 (10)	6.2 (8)	4.7 (6)	2.3 (3)	3.9 (5)	10.1 (13)
		Healthy (7)	25.7 (19)	24.3 (18)	1.4 (1)	5.4 (4)	8.1 (6)	1.4 (1)	9.5 (7)	8.1 (6)	2.7 (2)	1.4 (1)	2.7 (2)	6.8 (5)
		Obese (11)	12.7 (7)	1.8 (1)	3.6 (2)	7.3 (4)	29.1 (16)	3.6 (2)	5.5 (3)	3.6 (2)	7.3 (4)	3.6 (2)	5.5 (3)	14.5 (8)
Comfort	Low	Combined (3)	48.1 (13)	3.7 (1)	11.1 (3)	3.7 (1)	3.7 (1)	11.1 (3)	3.7 (1)	0	3.7 (1)	0	0	11.1 (3)
		Healthy (2)	52.4 (11)	4.8 (1)	9.5 (2)	4.8 (1)	4.8 (1)	4.8 (1)	4.8 (1)	0	4.8 (1)	0	0	9.5 (2)
		Obese (1)	33.3 (2)	0	16.7 (1)	0	0	33.3 (2)	0	0	0	0	0	16.7 (1)
	High	Combined (5)	30.3 (20)	28.8 (19)	0	3 (2)	4.5 (3)	3 (2)	4.5 (3)	9.1 (6)	3 (2)	1.5 (1)	1.5 (1)	6.1 (4)
		Healthy (4)	28.1 (16)	31.6 (18)	0	3.5 (2)	5.3 (3)	1.8 (1)	5.3 (3)	8.8 (5)	3.5 (2)	1.8 (1)	0	7 (4)
		Obese (1)	44.4 (4)	11.1 (1)	0	0	0	11.1 (1)	0 ()	11.1 (1)	0 ()	0 ()	11.1 (1)	0
Steal	Low	Combined(7)	18.2 (6)	0	9.1 (3)	0	36.4 (12)	0	3 (1)	6.1 (2)	3 (1)	3 (1)	0	21.2 (7)
		Healthy (3)	27.3 (3)	0	18.2 (2)	0	27.3 (3)	0	0	0	0 ()	0 ()	0	27.3 (3)
		Obese (4)	13.6 (3)	0	4.5 (1)	0	40.9 (9)	0	4.5 (1)	9.1 (2)	4.5 (1)	4.5 (1)	0	18.2 (4)
	High	Combined (13)	9.5 (6)	0	4.8 (3)	9.5 (6)	30.2 (19)	1.6 (1)	11.1 (7)	3.2 (2)	6.3 (4)	3.2 (2)	6.3 (4)	14.3 (9)
		Healthy (3)	17.6 (3)	0	5.9 (1)	11.8 (2)	17.6 (3)	0	23.5 (4)	5.9 (1)	0	0	11.8 (2)	5.9 (1)
		Obese (10)	6.5 (3)	0	4.3 (2)	8.7 (4)	34.8 (16)	2.2 (1)	6.5 (3)	2.2 (1)	8.7 (4)	4.3 (2)	4.3 (2)	17.4 (8)

**5.13. Appendix M Comparing themes for children scoring lowest (0) and highest (4) in ToM**

Scenario	ToM score	Character	Percentages (frequencies)			
			Appearance (21)	Emotion (39)	Story (21)	Other (16)
Combined	0	Healthy (11)	0	63.6 (7)	18.2 (2)	18.2 (2)
		Obese (12)	8.3 (1)	33.3 (4)	33.3 (4)	25.0(3)
	4	Healthy (43)	30.2 (13)	51.2(22)	9.3 (4)	9.3 (4)
		Obese (31)	22.6(7)	19.4 (6)	35.5 (11)	22.6 (7)
Comfort	0	Healthy (9)	0	66.7 (6)	11.1 (1)	33.3 (2)
		Obese (3)	0	66.7 (2)	33.3 (1)	0
	4	Healthy (33)	27.3(9)	60.6 (20)	3.0 (1)	9.1 (3)
		Obese (5)	20 (1)	60.0 (3)	0	20 (1)
Steal	0	Healthy (2)	0	50.0 (1)	50.0 (1)	0
		Obese (9)	11.1 (1)	22.2 (2)	33.3 (3)	33.3 (3)
	4	Healthy (10)	40.0 (4)	20.0 (2)	30.0 (3)	10.0 (1)
		Obese (26)	23.1 (6)	11.5 (3)	42.3 (11)	23.1 (6)