Theory of Mind and Children's Trait Attributions about Average and Typically Stigmatized Peers

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Abstract:

Previous research indicates that children hold negative beliefs about peers with foreign accents, physical disabilities, and people who are obese. The current study examined skills associated with individual differences in children's social judgements about these typically stereotyped groups. Theory of mind, memory, and cognitive inhibition were assessed in 3- to 6-year-olds. Then, children were asked to make trait attributions and behavioural predictions about story characters' willingness to help a peer. Results indicated that better theory of mind skills were related to greater positive trait attributions and behavioural predictions about typically stereotyped characters. Younger children made fewer positive behavioural predictions as compared to older children, but both age groups made positive trait attributions. Overall, memory and inhibition had little to no influence on children's responses, although the results varied by story type.

Keywords: theory of mind | attributions | social cognition | prejudice

Article:

A major goal of social reasoning research is to identify how children understand and use social information to make judgements about others (Benenson & Dweck, 1986; Heyman, Gee, & Giles, 2003; Heyman & Legare, 2005; Newman, 1991; Sigelman, 1991). Trait attributions and behavioural predictions have been recognized as central to children's social functioning, as these judgements can influence peer relations (Crick & Dodge, 1996), achievement motivation (Heyman, 2008), and prejudice (Bigler & Liben, 2007). Although developmental trends in children's trait attributions and behavioural predictions have been identified (Boseovski, Shallwani, & Lee, 2009; Yuill & Pearson, 1998), few studies have examined the skills associated with individual differences in these judgements.

There were three goals in the current study. First, we investigated the relation between theory of mind (ToM) and children's trait attributions (e.g., niceness and meanness) and behavioural predictions about typical peers and peers from stigmatized groups. We define ToM as the ability to represent mental states and attribute mental states to others (Happé, 1994; Wellman & Liu, 2004). Second, we examined the contribution of memory and inhibitory control skills to these social judgements. Third, we assessed whether ToM, memory, and inhibition account for the documented age-related differences in children's judgements about potentially stigmatized characteristics (e.g., obesity, Cramer & Steinwert, 1998, and physical disabilities, Sigelman & McGrail, 1985).

Skills Associated with Trait Attributions

During the preschool years, there is significant improvement in ToM skills (see Wellman et al., 2001) and substantial individual differences in these skills (Hughes et al., 2000; Hughes et al., 2005). This variation in ToM understanding is thought to influence children's conception of traits (Gopnik & Wellman, 2012), as mental states such as beliefs and desires are often related to dispositional traits (e.g., Sally desires to wear pretty clothes because she is vain; Wellman, 1990). Indeed, advanced ToM skills are associated with an understanding of traits as causal influences on desires (Yuill & Pearson, 1998). In addition to belief and desire reasoning, emotion reasoning plays an important role in trait understanding (see Yuill & Pearson, 1998). For example, advanced emotion understanding is related to more sophisticated attributions (Thompson, 1989; Weiner et al., 1982), positive attributions (Erdley & Dweck, 1993), and fewer hostile attributions of others' intent in ambiguous situations (Choe et al., 2013). Sensitivity to beliefs, desires, and emotions as internal states may encourage children to disregard salient external characteristics that are unrelated to individuals' internal dispositions (e.g., the awareness that an overweight person's body type has little to do with his or her personality).

Self-presentational ToM skills, including the ability to control how others perceive us (see Banerjee, 2002), may be particularly relevant to children's ability to make neutral or positive attributions about atypical individuals. Specifically, children high on these skills may be more likely to think about the consequences of making negative attributions about atypical individuals that others might perceive as incorrect or offensive. Moreover, children who make these negative attributions may experience negative emotions such as embarrassment or guilt. This proposition is consistent with social acumen theories of prejudice, which state that children's developing self-presentational ToM skills allow for the regulation of explicitly biased attributions (Aboud, 2013; Nesdale, 2013; Rutland, 2013). When children engage self-presentational skills in interpersonal contexts, they may reflect on and question the legitimacy of their negative beliefs.

Research supports the notion that ToM skills promote the regulation of biased beliefs in interpersonal contexts (Aboud, 1981; Beelmann & Heinemann, 2014; Gee & Heyman, 2007; Rutland et al., 2005). For example, Fitzroy and Rutland (2010) examined the relation between ToM and explicit racial bias (i.e., negative trait attributions) in 6- to 9-year-olds under conditions of high and low public accountability. Children were told that their trait attributions would be shared with others (i.e., high public accountability) or kept private (i.e., low public accountability). ToM skills were measured by children's ability to attribute appropriate emotions

to characters in hypothetical vignettes. As expected, ToM skills increased with age, and biased attributions decreased with age. Importantly, children with low ToM scores demonstrated lower explicit bias when public accountability was high, whereas children with high ToM displayed low explicit bias regardless of the level of public accountability. Thus, while external conditions (e.g., a public setting) can decrease bias, ToM skills are clearly influential to children's internalization of bias reduction (e.g., displaying little bias even in private settings).

In addition to ToM skills, researchers hypothesize that other social and cognitive skills are related to children's trait conceptions (Bigler & Liben, 2006; Boseovski & Marcovitch, 2012). One particularly relevant skill is memory (Bigler & Liben, 2006), as children may need to retrieve information about an individual or group to inform their social judgements. Developmental intergroup theory (DIT; Bigler & Liben, 2006) provides a model for understanding cognitive influences on the development and maintenance of stereotypes. In this model, children's memory for social information (e.g., schemas, social rules, and social knowledge) is the basis for stereotypes and attributions about others. Memory for social category labels can create and perpetuate stereotypes, whereas memory for stereotype-inconsistent information can reduce bias. There is ample evidence that advanced memory, particularly for stereotype-inconsistent information, is related to fewer biased attributions by children (Bigler & Liben, 1990, 1993; Liben & Signorella, 1980; Martin & Halverson, 1983).

The degree to which children rely on schemas or stereotypes is likely to be influenced by inhibitory control. According to the Hierarchical Competing Systems Model (HCSM), both habit and representational systems guide behaviour (HCSM; Marcovitch & Zelazo, 2009). In a social context, reliance on familiar stereotypes or schemas can be construed as a habit-based response (e.g., negative attributions about atypical peers). Such habits can be overridden via use of a representational system that enables people to reflect on the situation at hand (e.g., behavioural evidence) rather than responding impulsively. Strong inhibitory control skills may be necessary for such reflection to occur (Boseovski & Marcovitch, 2012). While no studies have been conducted with children, advanced inhibitory control skills in adults are associated with fewer biased attributions (Bartholow et al., 2006; Krendl et al., 2009; von Hippel, Silver, & Lynch, 2000) and thus were of interest in the current study.

Biases in Children's Social Judgements

Research has identified distinct developmental trajectories of trait attributions about typical and atypical children (Aloise, 1993; Benenson & Dweck, 1986; Boseovski, 2010; Boseovski, Lapan, & Bosacki, 2013; Cain, Heyman, & Walker, 1997; Giles & Heyman, 2003; Rholes & Ruble, 1984). Specifically, young children often make overly positive trait attributions about typical others (see Boseovski, 2010, for a review) and exceedingly negative attributions about atypical others (Klaczynski, 2008; Nowicki & Sandieson, 2002), although there are individual differences in this regard. The present study enabled us to examine the degree to which ToM, memory, and inhibitory control play a role in the nature of trait attributions and behavioural predictions about atypical others.

Three atypical characteristics were of central interest: obesity, physical disability, and foreign accents. Preschoolers often attribute meanness to overweight peers (Cramer & Steinwert, 1998; Klaczynski, 2008; Penny & Haddock, 2007; Rich et al., 2008) and peers with disabilities (see Nowicki & Sandieson, 2002, for a review). Although there is no published research on children's trait attributions about peers with foreign accents, children prefer to befriend peers without foreign accents (e.g., Kinzler et al., 2011; Kinzler et al., 2007), which suggests that they may associate accents with negative traits. These particular characteristics were of interest because they vary in two important ways that were expected to affect children's trait attributions. First, in contrast to foreign accents, obesity and physical disability are physically salient characteristics and are therefore more likely to be associated with stereotyped attributions (DIT; Bigler, 2013). Second, contact with out-group members tends to reduce bias (Pettigrew & Tropp, 2008). Based on prevalence statistics, it is assumed that most children have more experience with overweight peers (prevalence of obesity in 6- to 11-year-olds was 18% in 2012; Ogden et al., 2014) than peers with physical disabilities (prevalence of ambulatory disabilities in 5- to 15-year-olds was 0.6% in 2012; Erickson, Lee, & von Schrader, 2014). Thus, it is also possible that such interactions provide children with stereotype-inconsistent information that deters negative attributions that they might make based on physical salience (Bigler & Liben, 1993), particularly in the face of sufficient ToM skills.

Current Study

The present study assessed the contribution of ToM, memory, and inhibition skills to 3- to 6-year-olds' trait attributions (i.e., niceness and meanness) and behavioural predictions about characteristically stereotyped peers (i.e., overweight peers, peers with accents, and peers with physical disabilities) and typical peers. ToM skills were evaluated with two vignettes from the strange stories task, which assesses children's ability to recognize context appropriate interpretations of ambiguous situations (see Happé, 1994). In the white lie vignette, for example, an individual expresses gratitude for an undesirable gift, and children must reason that the individual wants to be polite.

The strange stories task was selected because it assesses children's inferences about contradictory mental and behavioural states, in contrast to appearance–reality and false belief tasks, which typically assess the understanding of factual knowledge (e.g., an incorrect belief about the actual location of an object; Gopnik & Astington, 1988; Hughes et al., 2005; Perner et al., 1987). The ability to make appropriate inferences about contradictory inner and outer states (e.g., false emotions; Halberstadt et al., 2001) may play a role in children's tendency to make positive trait attributions about peers, especially for those whose outward appearance may make them seem unlikely to behave positively. Consistent with social acumen theories of prejudice (Aboud, 2013; Nesdale, 2013; Rutland, 2013), children may also have to navigate conflict between their own personal beliefs and self-presentational demands to regulate explicit bias in interpersonal settings. Thus, children's ability to reason generally about such contradictions may be closely related to their ability to make positive attributions.

The strange stories task is typically used to assess ToM in older children; however, previous studies used a subsample of developmentally appropriate vignettes from the task with younger

children (Badenes, Estevan, & Bacete, 2000; Shaked, Gamliel, & Yirmiya, 2006). We selected the white lie and joke vignettes for this study, given that children as young as 3 years of age demonstrate considerable understanding of jokes and lies. For example, young children often tell novel jokes (Hoicka & Akhtar, 2012) and lies (Ahern et al., 2011; Chandler et al., 1989; Evans & Lee, 2013; Newton et al., 2000) and also reason appropriately about jokes (Angeleri & Airenti, 2014; Baron-Cohen, 1997) and lies told by others (Badenes et al., 2000; Talwar et al., 2002). The prevalence of these two situations in children's everyday lives provides support for the use of these stories with younger children.

An additional goal was to address a methodological limitation of past stereotyping research. Studies often employ forced-choice paradigms that require children to designate characters as ‘good’ or ‘bad’ (e.g., Bracegirdle, 1995). Moreover, in these paradigms, children cannot choose to designate more than one character as ‘good’. Thus, purported stereotyped responses may reflect a preference for the in-group rather than denigration of the out-group (see Cameron, Alvarez, Ruble, & Fuligni, 2001). The current method of attribution assessment enabled children to reason about a single character at a time and provided the option of a neutral response (i.e., children could describe each character as ‘nice’, ‘mean’, or ‘not nice or mean’).

Younger children were expected to make more negative judgements than older children, as negative attributions decrease with age during the preschool years (Boseovski, 2010; Fitzroy & Rutland, 2010; Sigelman & McGrail, 1985). Yet, ToM skills were expected to account for greater variability than age in children's trait attributions. We also expected discrepancies between children's trait attributions and behavioural predictions (Boseovski & Lee, 2008; Liu et al., 2007). For example, children might make a positive trait attribution and a negative behavioural prediction for the same character. This was expected for younger children in particular, as these children have a limited understanding that trait labels represent stable dispositions that predict behaviour over time and across situations (Rholes & Ruble, 1984). We also expected a stronger relation between ToM skills and trait attributions (as compared to behavioural predictions), as trait attributions may require greater reasoning about internal states than behavioural predictions, which can be externally based (Yuill & Pearson, 1998).

Based on the theoretical and empirical support for the close relation between ToM and trait attributions (Fitzroy & Rutland, 2010; Yuill & Pearson, 1998), we expected ToM to account for greater variability than inhibition or memory skills in children's attributions and predictions. This finding would suggest that ToM, although related to children's memory and inhibition skills, is a uniquely important skill to stereotype reduction. This finding would also provide further support for social acumen theories of prejudice. Importantly, the majority of research that supports social acumen theories has investigated links between ToM and attributions based on ethnic or racial characteristics (Aboud, 2013; Nesdale, 2013; Rutland, 2013). Thus, findings that advanced ToM skills are unrelated to negative attributions would suggest that this relation may be domain specific (i.e., restricted to judgements based on ethnic characteristics).

Finally, we made different predictions about the relation between ToM skills and children's judgements for different characters. Given that children are often overly positive to typical peers (Benenson & Dweck, 1986; Heyman & Giles, 2004), we predicted a weaker relation between

ToM and judgements of the typical character relative to the atypical characters. Similarly, children were expected to make more positive judgements about the character with a foreign accent as compared to the other atypical characters, as accents are not perceptually salient and are therefore less likely to result in negative attributions (Bigler, 2013). Thus, we expected a weak relation between ToM and judgements about this character. Conversely, ToM should be strongly related to judgements of overweight and physically disabled peers, as advanced ToM skills may allow children to reason that physical states (i.e., weight and disability) are not relevant to personality traits. Further, we predicted that ToM would be more strongly related to judgements of overweight peers relative to peers with physical disabilities. This prediction was informed by data indicating that children have greater experience with overweight peers relative to peers with physical disabilities. Contact with out-group members is thought to result in greater positive attributions because it engages perspective taking (Pettigrew & Tropp, 2008).

Method

Participants

There were 98 participants, with 51 3- to 4-year-olds ($M = 49.3$ months, $SD = 6.9$, 26 males) and 47 5- to 6-year-olds ($M = 72.1$ months, $SD = 7.7$, 23 males), who were recruited as part of a larger study on social cognition. Participants were tested in a child development laboratory in a mid-sized North American city. Participants were of varied ethnic and racial identities: 75% Caucasian, 11% African American, 2% Asian Americans, 1% Latino/Hispanic, and 5% who classified themselves as mixed. An additional 5% did not report ethnic or racial background. The majority of families were from upper-middle-class backgrounds.

Materials

To accompany the strange stories (Happé, 1994), participants were shown a single line drawing depicting various story scenes. For the social judgement task, there were line drawings of boy and girl actors that depicted an actor's interactions with a recipient. All story characters were matched in physical similarity except for minor differences (e.g., hair colour). The only characters that were visually distinct were the overweight character (i.e., differed in body size from the other characters) and the character with a physical disability (i.e., displayed seated in a wheelchair). The stories were broken down into three parts, each represented by a different picture. For the day/night stroop task (Gerstadt, Hong, & Diamond, 1994), there were 4 × 5 in. cards depicting a moon with stars on a black background and a sun on a white background.

Procedure

All participants were tested in a single session lasting approximately 30 min during which they completed several tasks in the following order: the day/night stroop task, strange stories task, forward digit span, and five trait attribution stories. It is an accepted practice to use a fixed task order in individual differences research (see Carlson & Moses, 2001).

Day/night stroop

Inhibitory skills were assessed with the day/night stroop task (Gerstadt et al., 1994). Participants were told that when they saw a picture of a moon and stars, they should respond with ‘day’, and when they saw a picture of the sun, they should respond with ‘night’. Participants were given two practice trials in which the experimenter explained the rules and had the child give the appropriate response. Participants then completed two test trials in which the experimenter held up the card and waited for a response. If participants responded incorrectly or said ‘I don't know’ on either of the first two test trials, the experimenter provided corrective feedback (e.g., ‘So remember, when you see this card I want you to say day’), and this was repeated a maximum of two times. If participants did not respond correctly to the two test trials by their second try, they did not receive the task proper and were given a score of 0. Participants who passed the test trials were given an additional 14 test trials during which no feedback was provided. Participants' inhibitory control was operationalized as the number of test trials in which they responded correctly; thus, the possible range of scores was 0–16 points.

Strange stories

Theory of mind skills were assessed with Happé's (1994) strange stories. The original task consisted of 12 stories presented in order of increasing difficulty. As in previous studies with children as young as 4 years of age (Shaked et al., 2006) and older (Devine & Hughes, 2013; Lecce et al., 2010; Ronald et al., 2006), the present study used a subset of the stories. The second and fourth stories were selected as the most developmentally appropriate for children in the current study. Participants heard one story in which a child tells a joke and one in which a child lies. In each case, the story character made a statement that was contradictory to his or her actual mental state (e.g., saying they love their Christmas present when they really hate it). After each story, participants were asked ‘Is it true what [character] said?’ If participants responded yes, they received a score of 0, and if they responded no, they received a score of 1. Thus, this question required little verbal ability to respond appropriately. Next, participants were asked to provide a justification for their response (i.e., ‘Why did [character] say this?’). Participants received a 0 for an incorrect justification (e.g., ‘because she actually wanted the book’) and a 1 for a correct justification (e.g., ‘because she's being polite’). Scores for the two stories were combined; thus, the range of scores was 0–4 points. One rater coded all of the participants' responses, and a second coded 25% of the responses to establish interrater reliability. The raters were reliable for both the joke ($\alpha = .92$) and the white lie ($\alpha = .95$) vignettes.

Forward digit span

The forward digit span task was used to assess children's memory span. Participants were told that they were going to play an echo game in which they should repeat exactly what the experimenter says when the experimenter pointed to them. Participants first received a practice trial in which the experimenter pointed to herself and stated ‘2, 3’ and then pointed to the participant and waited for their response. If participants responded incorrectly, the experimenter provided corrective feedback (i.e., ‘I said “2, 3” so you should say “2, 3” just as I did’). Upon passing the practice trial, participants received up to 22 additional trials in which the digit span increased from two digits to nine digits. There were three trials for each digit span. The task was terminated when participants incorrectly responded to three trials in a row. Participants received

1 point for each trial in which they responded with the exact digits provided by the experimenter in serial order. Thus, the possible range of scores was 0–22 points.

Trait attribution task

To assess participants' trait attributions and behavioural predictions about different social groups, participants heard four stories about an interaction between an actor and a recipient of their own gender. For example,

This is [Actor]. She uses a wheelchair. She has to use a wheelchair because she can't walk like the other kids in class. [Actor] is at school right now and it is playtime. [Actor] decides to color a picture. [Recipient], another girl in the class, wants to color a picture too. [Recipient] asks [Actor] if she will share her crayons.

This story format of trait attribution assessment is standard in the field for children of this age (Benenson & Dweck, 1986; Boseovski, 2010; Cain et al., 1997; Heyman & Gelman, 1998). Each story followed a similar format, and all of the stories were matched closely for complexity, content, and length. The actor was described as being in a situation in which he or she could behave either positively or negatively towards the recipient. Three of the actors displayed typically stigmatized characteristics: being overweight, having an accent, and using a wheelchair. The fourth story, in which only the actor's clothing was described, displayed a typical character and served as a comparison story. After each story, participants were asked a behavioural prediction question, first in an open-ended format, ‘What do you think happens next in the story?’ This was followed by the forced-choice question, ‘Do you think (actor) will help (recipient) or that (actor) will not help (recipient)?’ The order of the forced-choice options was randomized. Participants received 1 point for responding that the actor would help the recipient and 0 points for responding that the actor would not help the recipient irrespective of whether they responded spontaneously or by forced choice.

Participants were then asked ‘What kind of girl/boy is (actor)?’ to assess trait attributions of the actor. This was followed up with the forced-choice question ‘Do you think (actor) is nice, mean, or not nice or mean?’ The order of the responses ‘nice’ and ‘mean’ was randomized, and the response ‘not nice or mean’ was always presented last. Participants received 1 point for positive or neutral responses (i.e., ‘Nice’ or ‘Not nice or mean’) and 0 points for negative attributions (i.e., ‘Mean’). This combination of positive and neutral responses is typical in studies of children's trait attributions (Boseovski et al., 2013). Additionally, given that children received little information about the story characters, we considered a neutral or positive response to be appropriate and a negative response to be inappropriate.

Results

We conducted hierarchical logistic regression analyses to estimate the contribution of the independent variables (age, memory, inhibition, and ToM) to performance on each of the dependent variables (trait attributions and behavioural predictions). In each analysis, age was entered in the first block, memory and inhibition were added in the second block, and ToM was added in the third block (see Table 1 for task intercorrelations and Table 2 for means and

standard deviations). The change in Nagelkerke R^2 (ΔR_N^2) is reported for each block. Potential gender effects were also examined for each model. Because there were no significant effects or interactions involving gender on either dependent measure, it was excluded from the final models.

Table 1. Correlations between age, theory of mind (ToM), memory, and inhibition

Variable	Age	ToM	Memory	Inhibition
1. Age	—	.700**	.618**	.365**
2. ToM		—	.636**	.379**
3. Memory			—	.431**
4. Inhibition				—

**p < .01.

Table 2. Task performance means and range by age (standard deviations in parentheses)

Age in years	ToM		Task Inhibition		Memory	
	Mean	Range	Mean	Range	Mean	Range
3–4	1.53 (1.72)	0–4	10.29 (5.60)	0–16	6.76 (2.12)	0–13
5–6	3.02 (1.07)	1–4	13.49 (3.53)	2–16	9.38 (2.27)	5–14

Descriptive Statistics

For descriptive statistics, see Table 3. In response to the overweight, wheelchair, and accent stories, older children made more ‘Help’ predictions than expected by chance, whereas younger children responded at chance levels. For the control story, both age groups were more likely than expected by chance to make a ‘Help’ prediction. This same pattern of results was also found for ToM scores.

Table 3. Proportion of positive/neutral behavioural predictions and trait attributions by age, theory of mind (ToM), and story (standard errors in parentheses)

	Overweight		Wheelchair		Speech		Control	
	Pred.	Attrib.	Pred.	Attrib.	Pred.	Attrib.	Pred.	Attrib.
Total								
	.65** (.05)	.86** (.04)	.59† (.05)	.79** (.04)	.71** (.05)	.87** (.03)	.66** (.05)	.78** (.04)
Age								
3–4	.54 (.07)	.84** (.05)	.45 (.07)	.74** (.06)	.59 (.07)	.82** (.06)	.63* (.07)	.80** (.06)
5–6	.76** (.06)	.89** (.05).	.74** (.07)	.82** (.06).	.85** (.05)	.93** (.03)	.70** (.07)	.75** (.06)
ToM								
0	.23** (.12)	.71 (.13)	.43 (.14)	.71 (.13)	.36 (.13)	.64 (.13)	.64 (.13)	.79* (.11)
1–2	.66* (.07)	.88** (.05)	.37† (.08)	.63 (.07)	.71** (.07)	.90** (.05)	.54 (.08)	.71** (.07)
3–4	.76** (.07)	.90** (.05)	.86** (.05)	.95** (.03)	.83** (.06)	.93** (.04)	.79** (.06)	.85** (.06)

For behavioural prediction (i.e., Pred.), the table shows the proportion of 'Help' responses. For trait attributions (i.e., Attrib.), the table shows the proportion of 'Nice' and 'Not nice or mean' responses. Proportions marked with asterisks are significantly greater or less than expected by chance.

† p<.10.

** p<.05.*

*** p<.01.*

For trait attributions, both age groups were more likely than expected by chance to make positive or neutral trait attributions in response to all stories. Children with high ToM scores (i.e., scores of 3 or 4) made uniformly positive or neutral trait attributions across stories, all at greater than chance levels. The pattern of results was similar for children who had moderate ToM scores (i.e., scores of 1 or 2). In contrast, children who earned a score of 0 responded at chance levels except on the control story, for which they showed greater than chance performance.

Overweight Story

For behavioural predictions, the overall regression model was significant, $\chi^2 = 14.82$, $p = .005$, Nagelkerke $R^2 = .20$ (see Table 4). Children were more likely to make 'Help' predictions with increasing ToM scores. There was no significant effect of age, memory, or inhibition. There was a trend toward significance for the trait attribution model, $\chi^2 = 6.92$, $p = .14$, Nagelkerke $R^2 = .13$.

Children were significantly more likely to make positive or neutral trait attributions with increasing ToM scores. There was also a marginally significant effect of memory such that children made fewer positive or neutral responses with increasing memory scores. There was no significant effect of age or inhibition.

Table 4. Hierarchical logistic regression models of behavioural predictions and trait attributions for the overweight story

Variables	Behavioural predictions				Trait attributions			
	β	*SE*	Wald	ΔR_N^2	β	*SE*	Wald	ΔR_N^2
Step 1				.13**				.00
Age	0.05	.02	8.11*		0.01	.02	0.14	
Step 2				.00				.02
Age	0.04	.02	3.85		0.03	.03	0.69	
Inhibition	0.02	.05	0.09		0.02	.07	0.07	
Memory	0.05	.13	0.16		−0.16	.17	0.91	
Step 3				.07*				.11*
Age	0.02	.03	0.42		−0.01	.04	0.15	
Inhibition	0.01	.05	0.02		0.01	.07	0.00	
Memory	−0.05	.14	0.11		−0.30	.19	2.69†	
Theory of mind	0.59	.26	5.08**		0.84	.36	5.34*	
Model χ^2	14.83**				6.92			
Model R_N^2	.20				.13			

SE, standard error

† p<.10.

** p<.05.*

*** p<.01.*

Wheelchair Story

The overall regression model for behavioural predictions was significant, $\chi^2 = 25.68$, $p < .001$, Nagelkerke $R^2 = .31$ (see Table 4). Children were marginally more likely to make 'Help' predictions with increasing ToM scores. There was no significant effect of age, memory, or inhibition. The trait attribution model was also significant, $\chi^2 = 15.64$, $p = .004$, Nagelkerke $R^2 = .23$. ToM predicted significantly more positive or neutral trait attributions. There was also a marginally significant effect of inhibition such that children made fewer positive or neutral attributions with increasing inhibition scores. There was no significant effect of age or memory.

Accent Story

The behavioural prediction model was significant, $\chi^2 = 16.86$, $p = .002$, Nagelkerke $R^2 = .23$ (see Table 5). Children were more likely to make 'Help' predictions with increasing age. There was no significant effect of ToM, memory, or inhibition. The trait attribution model was marginally significant, $\chi^2 = 8.55$, $p = .07$, Nagelkerke $R^2 = .16$. Children made more positive or neutral attributions with increasing ToM scores. There was no significant effect of age, memory, or inhibition.

Table 5. Hierarchical logistic regression models of behavioural predictions and trait attributions for the wheelchair story

Variables	Behavioural predictions				Trait attributions			
	β	*SE*	Wald	ΔR_N^2	β	*SE*	Wald	ΔR_N^2
Step 1				.23**				.04
Age	0.07	.02	14.43**		0.03	.02	2.42	
Step 2				.05				.08†
Age	0.06	.02	6.18**		0.01	.03	0.21	
Inhibition	−0.07	.05	1.86		−0.10	.06	2.44	
Memory	0.24	.13	3.37†		0.28	.14	3.78*	
Step 3				.03†				.11**
Age	0.04	.03	1.97		−0.03	.03	0.96	
Inhibition	−0.08	.05	2.35		−0.12	.07	3.03†	

Variables	Behavioural predictions				Trait attributions			
	β	*SE*	Wald	ΔR_N^2	β	*SE*	Wald	ΔR_N^2
Memory	0.16	.14	1.44		0.16	.15	1.06	
Theory of mind	0.48	.26	3.30†		0.82	.31	6.87**	
Model χ^2		25.68**				15.64**		
Model R_N^2		.31				.23		

SE, standard error

† p<.10.

** p<.05.*

*** p<.01.*

Control Story

The overall regression model for behavioural predictions was not significant, $\chi^2 = 4.17$, $p = .38$, Nagelkerke $R^2 = .06$ (see Table 6). There was no significant effect of age, ToM, memory, or inhibition. Similarly, the overall regression model for trait attributions was not significant, $\chi^2 = 5.93$, $p = .20$, Nagelkerke $R^2 = .09$. Children made more positive or neutral attributions with increasing ToM scores. Notably, children with both low and high ToM scores made more positive or neutral attributions than expected by chance, $t(14) = 2.51$, $p = .03$, ($M = .78$, standard error (SE) = .11) and $t(41) = 6.33$, $p < .001$, ($M = .85$, $SE = .06$), respectively (see Table 7). Additionally, children with higher inhibition scores made marginally fewer positive or neutral attributions. There were no significant effects of age or memory.

Table 6. Hierarchical logistic regression models of behavioural predictions and trait attributions for the accent story

Variables	Behavioural predictions				Trait attributions			
	β	*SE*	Wald	ΔR_N^2	β	*SE*	Wald	ΔR_N^2
Step 1				.20**				.06†
Age	0.07	.02	11.88**		0.04	.03	2.77†	
Step 2				.01				.00

Variables	Behavioural predictions				Trait attributions			
	β	*SE*	Wald	ΔR_N^2	β	*SE*	Wald	ΔR_N^2
Age	0.08	.03	8.07**		0.05	.03	2.41	
Inhibition	−0.03	.05	0.27		−0.02	.07	0.04	
Memory	0.01	.13	0.01		−0.06	.17	0.12	
Step 3				.02				.10*
Age	0.06	.03	4.07*		0.01	.04	0.11	
Inhibition	−0.03	.05	0.37		−0.03	.07	0.12	
Memory	−0.05	.14	0.15		−0.21	.19	1.18	
Theory of mind	0.35	.27	1.73		0.83	.38	4.77*	
Model χ^2		16.86**				8.55†		
Model		.23				.16		

SE, standard error

† p<.10.

** p<.05.*

*** p<.01.*

Table 7. Hierarchical logistic regression models of behavioural predictions and trait attributions for the control story

Variables	Behavioural predictions				Trait attributions			
	β	*SE*	Wald	ΔR_N^2	β	*SE*	Wald	ΔR_N^2
Step 1				.05†				.00
Age	0.03	.02	3.12*		0.00	.02	0.04	

Variables	Behavioural predictions				Trait attributions			
	β	*SE*	Wald	ΔR_N^2	β	*SE*	Wald	ΔR_N^2
Step 2				.00				.04
Age	0.03	.02	1.36		0.01	.02	0.23	
Inhibition	−0.01	.05	0.04		−0.01	.06	2.23	
Memory	0.05	.11	0.21		0.03	.13	0.06	
Step 3				.01				.06*
Age	0.02	.02	0.37		−0.01	.03	0.23	
Inhibition	−0.01	.05	0.07		−0.11	.07	2.75†	
Memory	0.02	.12	0.02		−0.06	.14	0.18	
Theory of mind	0.21	.25	0.70		0.53	.28	3.60†	
Model χ^2		4.18				6.40		
Model		.06				.10		

SE, standard error

† p<.10.

** p<.05.*

*** p<.01.*

Discussion

This study examined how ToM, memory span, and cognitive inhibition relate to children's trait attributions and behavioural predictions about typically stigmatized groups. Three main findings emerged. First, as expected, better ToM skills above and beyond age were related to greater positive or neutral trait attributions and greater positive behavioural predictions about typically stereotyped characters. Indeed, there was only one major age-related effect: older children as a group reliably made positive behavioural predictions about typically stigmatized characters, while younger children responded at chance levels. The lack of systematic behavioural predictions by the younger children may reflect greater difficulty generalizing traits to behaviours (Boseovski & Lee, 2006; Rholes & Ruble, 1984). Second, the relation between ToM

and children's judgements varied based on the type of character and judgement. Finally, contrary to expectations, memory and inhibition had little to no relation to children's trait attributions or behavioural predictions.

The current study provides additional evidence for the relation between ToM and children's social judgements. Yet, it is important to acknowledge alternative explanations for the findings. Both the strange stories task and the trait attribution task involved the administration of short narratives. It is possible that the relation between performances on the two tasks is due to children's general ability to reason about story characters rather than mental states *per se*. Also, due to the verbal nature of both the ToM and trait attribution tasks, these associations could be explained by children's verbal ability (Devine & Hughes, 2013; Hughes et al., 2000, 2005).

Although these interpretations are plausible, they are unlikely to account entirely for the results for many reasons. First, ToM was not reliably related to children's judgements of the typical character. If language or narrative skills alone accounted for the relation between ToM and children's social judgements, then we would expect that ToM would also be related to children's judgements for the typical character, as all of the stories required similar levels of verbal and narrative reasoning. Second, children's response to the first question in the ToM task only required a 'yes' or 'no' response, which entailed limited verbal demands. Third, the strange stories used were relatively short and dealt with situations familiar to children of this age (i.e., joking, Hoicka & Akhtar, 2012, and lying, Evans & Lee, 2013). Fourth, children's comprehension of the narratives was supported through the use of pictorial stimuli throughout the task (see Gambrell & Jawitz, 1993).

We propose that a direct relation between ToM skills and children's attributions is the best explanation for our findings. The present findings suggest that children's ability to make inferences about contradictory mental and behavioural states is related to their social judgements about stigmatized individuals. ToM skills may enable children to appreciate that physical traits (e.g., being overweight) are unrelated to antisocial desires (e.g., not wanting to help a peer; see Yuill & Pearson, 1998). Children with strong ToM skills may also take into consideration others' emotions to a greater degree and err on the side of caution when making evaluative judgements. It is also possible that self-presentational ToM skills (e.g., Banerjee & Yuill, 1999) were engaged in this context and resulted in more sensitivity to socially desirable responses (i.e., positive or neutral responses) in the presence of the experimenter, particularly for the older children. This interpretation is consistent with previous research (Fitzroy & Rutland, 2010), as well as social acumen theories of prejudice (Aboud, 2013; Rutland, 2013).

Relation between Theory of Mind and Trait Attributions and Behavioural Predictions

Importantly, and as expected due to the limited information that we provided, even children with the lowest ToM scores (i.e., zero) reliably labelled the typical character as nice. This finding suggests that strong ToM skills are unnecessary in situations where children are asked to reason about typical peers in benign contexts. Indeed, children's ToM scores were largely unrelated to their performance on the comparison story. Although other research has found benefits of strong ToM skills in children's reasoning about typical peers, these benefits have been noted in the

consistency, rather than the positivity, of trait attributions and behavioural predictions (Yuill & Pearson, 1998).

In contrast, when reasoning about typically stigmatized characters, participants who scored zero on the ToM task made notably more negative trait attributions and behavioural predictions than children with higher ToM scores. These children seem to represent a qualitatively different group who may have difficulties with interpreting social information or regulating bias. Even children with minimal ToM skills (i.e., scores of 1 or 2) made relatively positive attributions, but higher ToM scores (i.e., scores of 3 or 4) were related to increasingly positive trait attributions and behavioural predictions. Inspection of the scores indicated that the majority of children who scored a 1 or a 2 on the ToM measure were able to identify correctly that the statements in the strange stories task were not meant to be literal; however, they did not provide appropriate justifications as to why this was the case. Thus, children who scored a 3 or 4 on the ToM measure may also represent a unique group who not only recognize that context is essential to interpreting someone's intentions but also integrate this context into their explanations of others' behaviour.

As mentioned above, the relation between ToM and children's attributions varied based on the particular judgement that children were asked to make (i.e., behavioural prediction versus trait attribution). As a group, children's behavioural predictions and trait attributions were both reliably above chance; however, advanced ToM was more consistently related to variations in trait attributions than behavioural predictions. It is possible that behavioural predictions generally require fewer inferences about internal or mental states than trait attributions (Rholes & Ruble, 1984; Yuill & Pearson, 1998). For example, children in the current study only predicted a single instance of a behaviour, not behavioural regularities over time (e.g., predicting the character will *always* share). This type of prediction may rely more on global evaluative inferences (e.g., whether they believe an individual is good or bad), which are believed to occur with limited cognitive demands, as opposed to dispositional inferences *per se* (Alvarez, Ruble, & Bolger, 2001). Unlike trait attributions, behavioural predictions may also be more dependent on automatic processes rather than mental state inferences (Tesser & Martin, 1996; Trope & Higgins, 1993).

Consistent with our predictions, the relation between ToM and children's judgements was stronger for those characters with physically salient attributes. Specifically, ToM was strongly related to the behavioural predictions of the overweight character, marginally related to the behavioural predictions of the character with a physical disability, and unrelated to the behavioural predictions of the character with a foreign accent. As physically salient characteristics are most likely to result in negative attributions (DIT; Bigler, 2013), ToM skills may be particularly important in prompting children to reflect on the relevance of these external characteristics to their judgements.

In contrast, one explanation for the lack of relation between children's ToM and predictions of peers with foreign accents may be that the character's accent, as presented here, was not perceptually salient. Inspection of the data revealed that children's behavioural predictions about this character were somewhat more positive (~72% positive predictions) than the behavioural

predictions of the overweight character (~65% positive predictions) and the character with a physical disability (~59% positive predictions). Coupled with limited information about the character, the lack of perceptual salience of the atypical characteristic may have given children little reason to make a negative judgement. Had we provided auditory stimuli that highlighted the accent, it is possible that differences in ToM skills would have been associated systematically with children's response patterns.

Also consistent with our predictions, we found that ToM was more closely related to behavioural predictions for overweight peers as compared to peers with physical disabilities. Although ToM skills are advantageous when reasoning about both of these atypical groups, children's more extensive contact with overweight peers (Ogden et al., 2014) may result in increased perspective taking about this particular group (see Pettigrew & Tropp, 2008). Moreover, contact with atypical groups may interact with emerging ToM skills to reduce bias.

Relation between Memory, Inhibition, and Children's Judgements

Contrary to our predictions, memory and inhibition had no significant influence on children's behaviour predictions, and both of these skills had a limited impact on children's trait attributions. Interestingly, better memory skills were associated with greater negative trait attributions about the overweight character. This finding is consistent with DIT and clarifies conditions under which memory can increase bias. When children are not given any stereotype-relevant information, as in the current study, memory skills may support recall of group labels and schemas (Bigler, 2013; Bigler & Liben, 2006). Even strong ToM skills or extensive personal contact with overweight peers may not be enough to override the pervasiveness of antifat stigma to which children are exposed (e.g., media; Himes & Thompson, 2007).

It is likely that other types of memory that were not assessed here play a greater role than memory span in children's social judgements. In particular, working memory skills support the maintenance and manipulation of multiple pieces of information (Carlson, 2005). These skills may enable children to compare previously obtained social information (e.g., schemas) with current information about an individual (e.g., benign information, as in the current study) to decide which is more relevant to the judgement at hand.

As noted above, inhibitory control skills were also largely unrelated to children's trait attributions. Although high inhibitory skills were associated with more negative trait attributions for the character in a wheelchair, even children with the highest inhibition scores made very positive trait attributions. Thus, the relation was weak and did not account for meaningful variability in children's responses. This is contrary to our predictions based on the HCSM. However, given that trait attributions were relatively positive overall, inhibitory control skills may not have been necessary in this context. Inhibitory control may be more closely related to children's social judgements in contexts in which children have strong habitual response patterns. For example, inhibitory control may be more closely associated with children's judgements about gender information, as gender stereotypes and norms are robust even early in childhood (Gettys & Cann, 1981). Children tend to believe that an individual's gender is related to their knowledge and expertise in a particular area (e.g., beliefs that males are more knowledgeable about cars than

females; Levy et al., 2000). Inhibitory control may enable them to reflect on the legitimacy of such beliefs when making social judgements (e.g., attributions of expertise).

Limitations and Future Directions

Although preliminary, the current study could initiate a new line of research, as it is the first to show that ToM skills are associated with the positivity of children's judgements about a variety of atypical groups. Greater understanding of this link could be achieved by addressing the limitations of this study. In particular, given the correlational design used, the direction of effects is unclear. Longitudinal studies that assess whether children's ToM at a young age predicts attributions at an older age, or vice versa, would begin to address this limitation. In addition, a single task was used to assess ToM ability in this study. A more fine-grained analysis of the way in which different aspects of ToM (e.g., role-taking competence, Chandler & Helm, 1984; Lagattuta et al., 2010, and understanding of false emotions, Gross & Harris, 1988) are related to children's attributions within and across ages could provide greater insight about the skills implicated in these social judgements. For example, in the current study, it is unclear whether children who made positive attributions did so because they are better able to take into account internal rather than external characteristics when judging others or because they have stronger self-presentational skills. Documentation of the amount of contact with these stigmatized groups at different ages is also important to consider, as it is likely to interact with ToM skills and schemas to determine the nature of children's social judgements. This type of information could ultimately be used in the development of age-appropriate interventions aimed at reducing social biases.

Another limitation of the current study is that verbal abilities were not assessed. Given that ToM performance is related to language skills (Devine & Hughes, 2013), future studies should control for effects of language. Although the strange stories were selected based on theoretical interest, future studies should include tasks that are less verbally demanding as part of a ToM test battery. One particularly promising task is the silent films task, which assesses the same type of ToM skills as the strange stories task but is less reliant on verbal skills (Devine & Hughes, 2013). Although the silent films task has only been administered to children 8 years of age and older, it could be adapted for use with younger children if familiar situations were used.

The general response patterns obtained here may inform methodology for future stereotyping assessment and research. Although previous studies found that preschoolers assign negative trait labels to overweight peers (Cramer & Steinwert, 1998; Klaczynski, 2008; Penny & Haddock, 2007; Rich et al., 2008) and peers with physical disabilities (Nowicki & Sandieson, 2002), the current data showed a very different pattern (i.e., the majority of children provided positive trait labels and older children also made largely positive behavioural predictions). In our study, children could assign positive, negative, or neutral traits to the focal characters. In previous research (e.g., Bracegirdle, 1995), children had to choose to assign a positive trait either to an in-group or to an out-group member but not to both characters. Thus, selection of the in-group character may have reflected a preference for familiarity rather than denigration of out-group members (Cameron et al., 2001). It is important to consider these

methodological issues when designing new tasks and interpreting discrepant results across studies.

In sum, the current study provides evidence that ToM skills are related to children's social judgements about a variety of atypical individuals. This research highlights the importance of ToM for children's social reasoning skills, and in particular, for judging peers with typically stigmatized characteristics in an equitable manner. Consistent with previous research (Banerjee & Watling, 2005; Choe et al., 2013; Dunn & Cutting, 1999), these results suggest that ToM is critical to children's successful navigation of their social world. Future research could investigate whether these findings extend to children's behaviour in interpersonal settings, such as the willingness to befriend atypical peers.

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