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## Theory of Mind and Emotion Understanding Predict Moral Development in Early Childhood

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### Abstract

The current study utilized longitudinal data to investigate how theory of mind (ToM) and emotion understanding (EU) concurrently and prospectively predicted young children's moral reasoning and decision-making. One hundred twenty-eight children were assessed on measures of ToM and EU at 3.5 years- and 5.5 years-of-age. At 5.5 years, children were also assessed on the quality of moral reasoning and decision-making they used to negotiate prosocial moral dilemmas, in which the needs of a story protagonist conflict with the needs of another story character. More sophisticated EU predicted greater use of physical- and material-needs reasoning, and a more advanced ToM predicted greater use of psychological-needs reasoning. Most intriguing, ToM and EU jointly predicted greater use of higher-level acceptance-authority reasoning, which is likely a product of children's increasing appreciation for the knowledge held by trusted adults and children's desire to behave in accordance with social expectations.

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Social-cognitive capacities help us negotiate the social world by informing us about the people with whom we interact. Of these capacities, our understandings of others' thoughts and emotions are paramount. Theory of mind (ToM; Wellman, 1990) concerns our appreciation for people's cognitive states, such as beliefs and knowledge. Emotion understanding (EU) refers to our ability to identify overt emotional reactions, to predict others' emotional reactions, and to appreciate that people have both palpable and private emotional experiences (Denham, 1986; Pons, Harris, & de Rosnay, 2004). Young children's early understanding of emotions (e.g., basic affective perspective taking) and understanding of cognition (e.g., false-belief understanding) are initially distinct capacities (Cutting & Dunn, 1999), with different correlates (Dunn, Brown, Slomkowski, Tesla & Youngblade, 1991). However, ToM and EU are jointly necessary for mature social cognition; for example, an understanding of hidden emotions (Harris, Donnelly, Guz, & Pitt-Watson, 1986) requires a joint understanding of cognitive and affective states. Likewise, ToM and EU can be both uniquely and jointly influential in our reasoning and decision-making (Pons et al., 2004; Wellman & Banerjee, 1991).

During early childhood, children make great strides in their capacities to appreciate both emotional and cognitive states. Three-year-olds can identify basic emotional expressions (i.e., happy, sad, angry, and scared faces) and know that certain situations generally elicit certain emotions in others; for example birthday parties usually make people happy

(Denham, 1986). A more sophisticated understanding of others' emotions is evident in 3-year-olds' awareness that others may experience emotions that *differ* from those that they themselves would experience in a similar situation (Denham, 1986; Denham et al., 2003). As for ToM development, by 3-years of age, children appreciate that two individuals may hold different desires, and soon thereafter appreciate that individuals may hold different beliefs (Wellman & Liu, 2004). Around age 4, children evidence an emerging understanding that others can hold *false-beliefs* - that people can hold beliefs that are contrary to reality (Wellman & Liu, 2004). These developments in ToM have substantial implications for children's developing EU. For example, 3- and 4-year-olds understand that desires and beliefs may underlie certain emotional reactions, such as happiness, sadness, and surprise (Wellman & Banerjee, 1991). And, by 5-years of age, children typically demonstrate the ability to differentiate between apparent and real emotions; they understand that individuals may internally experience emotions that differ from those they intentionally display (Harris, et al., 1986). Though these capacities typically develop in a predictable sequence (Wellman & Liu, 2004), there is substantial variability in young children's social-cognitive understanding at a given age (Cutting & Dunn, 1999; Dunn et al., 1991). Collectively, these early developments in EU and ToM may be considered developments in affective and cognitive role-taking (Flavell, 1968) or perspective-taking (Selman, 1971a).

These perspective-taking capacities serve fundamental roles in our everyday moral judgment, decision-making, and reasoning. For example, in holding someone responsible for a moral violation, we appreciate that that person has desires and beliefs that guide their behavior (Wellman & Miller, 2008); and when deciding how to negotiate a moral dilemma, we may consider other people's emotional states (e.g., emotions resulting from physical pain). Further, a *coordinated* understanding of mental and emotional states is necessary to appreciate the relationship between how others perceive and think about one's actions (i.e., whether others consider one's actions to be socially appropriate) and their resulting emotions, such as approval and pride. Thus, we should expect children's emerging understanding of mind and emotions to influence their moral development. Indeed, a prime consideration in Piaget's (1932) early developmental theory of moral judgment was the extent to which children come to appreciate that others' perspectives may differ from their own; and recently Wellman and Miller (2008) proposed that the development of deontic judgment (that is, reasoning about social obligation and "ought tos") is part and parcel of ToM development. Central to the current investigation, enhancements in children's ability to take alternative cognitive and affective perspectives might contribute to developments in their moral *reasoning* and *decision-making*.

Focal to the current study is the reasoning that children use to negotiate prosocial moral dilemmas that require one to choose between gratifying one's own needs and attending to another in need (see Eisenberg-Berg, 1979). Children's reasoning on prosocial moral dilemmas has been proposed to reflect developments in social-cognitive perspective-taking (Eisenberg, 1986), and such dilemmas are particularly well-suited for studies of links between perspective-taking and moral reasoning in young children, as they reveal clear age-related trends in the moral reasoning of young children. For example, in a study of 4- and 5-year-olds, Eisenberg (Eisenberg-Berg & Hand, 1979) found that children most frequently responded to prosocial dilemmas using hedonistic reasoning (e.g., reasoning that the protagonist would be rewarded for helping someone) and needs-oriented reasoning (i.e., citing the physical, material, or psychological needs of another story character). Eighteen months later, this sample was administered the same moral dilemmas (Eisenberg-Berg & Roth, 1980), and use of approval-oriented reasoning (i.e., endorsing a certain behavior in order to gain another person's approval or acceptance) and needs-oriented reasoning had increased significantly, while use of hedonistic reasoning had decreased significantly. Other research indicates that such shifts in moral reasoning may occur at somewhat younger ages.

For example, Eisenberg and colleagues found increases in needs-oriented reasoning and decreases in hedonistic reasoning between 4- and 5-years of age (Miller, Eisenberg, Fabes, & Shell, 1996), and have found that some preschoolers even make reference to social norms in their reasoning (Eisenberg-Berg & Roth, 1980).

These results along with others provided the basis for Eisenberg's developmental theory of prosocial moral reasoning (Eisenberg, 1986; Eisenberg, Lennon, & Roth, 1983). According to this model, preschoolers' morality is initially self-oriented; children use reasoning in which the needs of the protagonist (i.e., hedonistic reasoning) and the needs of others whom the protagonist like (i.e., affectional relationship reasoning) dominate (Level 1 reasoning). Soon thereafter, young children employ more reasoning oriented towards the physical and psychological needs of others (Level 2 reasoning). Elementary-school-aged children typically employ more societally-oriented reasoning that appeals to social approval, social norms, and stereotypes (Level 3 reasoning). Eisenberg's developmental account progresses well into adolescence, but here we concentrate on the earlier stages and younger children. Given that substantial developments in perspective-taking and in moral cognition occur during the same period, and given that the capacity to appreciate others' emotions and thoughts seems necessary to support certain forms of moral thought, a plausible hypothesis is that the progressive unfolding of EU and ToM supports the development of moral cognition.

The available developmental work on the relationship between perspective-taking and moral cognition is informative but limited, focused primarily on children's moral judgment. Researchers have found that even preschoolers consider others' psychological perspectives when making moral judgments (e.g., Núñez and Harris, 1998; Wellman, Larkey, & Somerville 1979). For example, Núñez and Harris (1998) found that children as young as 3-years deemed that those who intentionally violated rules were naughtier than those who accidentally violated rules. Links between children's perspective-taking capacities and their moral judgments have also been demonstrated with tasks more traditionally used to gauge cognitive perspective-taking. Ittyerah and Mahindra (1990) found that 5- and 6-year-olds' cognitive perspective-taking (measured using Flavell's 7-picture task; 1968) was related to the severity with which they judged the actions of a deceitful story protagonist. Baird and Astington (2004) had 4- and 5-year-olds evaluate the actions of story characters who performed identical activities but each with a different motive (one with a "good" motive, and the other with a "bad" motive). Children's performance on a false-belief task (a more contemporary measure of cognitive perspective-taking) was significantly correlated with their evaluations of the "goodness" or "badness" of the characters' actions, respectively.

In contrast to this literature documenting a relationship between children's perspective-taking and their moral judgment, surprisingly little work has addressed how children's perspective-taking is related to their moral *reasoning*. Moral reasoning is often argued to be more telling than moral judgments, and in many ways ToM and EU might be especially involved in moral reasoning (rather than judgment) because judgments might merely reflect gut reactions, and not thoughtful consideration of moral matters. However, just a handful of studies have investigated the connection between perspective-taking and moral reasoning. For example, to test Kohlberg's (1963) assertion that development through his moral reasoning stages hinges upon the progressive ability to take others' perspectives, Selman (1971b) assessed 8- to 10-year-olds' cognitive perspective-taking via tasks that required children to consider another's ignorance (see Flavell, 1968). Selman found that better performance on these tasks related to children's employing more stage 3 and 4 (conventional level) moral reasoning, though this relationship only held for children in their middle-IQ group. In contrast, Eisenberg and Roth (1980) found that preschoolers' performance on one of Flavell's (1968) perspective-taking tasks was unrelated to the reasoning that they applied

to prosocial moral dilemmas. Using an adaptation of Kohlberg's dilemmas with 7-year-olds, Rubin and Schneider (1973) found that lower communicative egocentrism (gauged by measuring how well children described pictures to someone who could not see the pictures) was correlated with higher-level moral reasoning.

Even fewer studies have assessed the relationship between EU and moral reasoning. One exception is research on children's attribution of emotion to moral transgressors, which has revealed that 4-year-olds overwhelmingly attribute happiness to victimizers, whereas 6- and 7-year-olds evidence an emerging appreciation that victimizers might feel mixed or negative emotions (Arsenio, Gold, & Adams, 2006). What social-cognitive measures may tap such emotion understanding? Dunn, Brown, and Maguire (1995) asked 6-year-olds to take the perspectives of story protagonists who had transgressed, to report how they feel, and to justify why. Children's EU (measured using affective-labeling and perspective-taking tasks; Denham, 1986) at 40-months predicted their use of more sophisticated justifications at age 6, with greater reference to breaking social conventions and harming victims' feelings. More advanced measures of emotion understanding (e.g., that specifically tap children's understanding of conflicting emotions) have also proven useful in uncovering relationships between EU and moral development in school-age children (Arsenio et al., 2006).

While informative, studies on perspective-taking and moral reasoning are few, partly contradictory, and especially neglect the early childhood period, when perspective-taking develops so rapidly. Disparities in prior findings are likely a product of researchers' employing different types of perspective-taking and moral reasoning tasks. As noted, only a few studies have assessed relationships between affective perspective-taking (i.e., EU) and moral reasoning; which is surprising considering that moral dilemmas often deal with emotional matters (e.g., people getting hurt). Also, some moral reasoning tasks are more sensitive than others in gauging young children's moral reasoning. Of the available moral reasoning tasks, Eisenberg's (1979) prosocial moral dilemmas are among the most sensitive and appropriate measures of moral reasoning in early childhood. Thus, the current study utilized longitudinal data to investigate how both cognitive *and* affective perspective-taking concurrently and prospectively predict the quality of moral reasoning and decision-making that young children employ when faced with prosocial moral dilemmas.

## Hypotheses

We propose that children's emotional and cognitive perspective-taking will predict the quality of moral reasoning they employ. More specifically, understanding others' emotional and mental states is predicted to help children see beyond self-oriented needs, in order to focus more on the physical and psychological needs of others. A firm understanding of *both* cognition and emotion is proposed to motivate children to consider different social perspectives when faced with moral dilemmas—for example, considering the opinions, knowledge, or advice of trusted adults (i.e., societally-oriented reasoning). Thus, an interaction effect is also predicted: a sophisticated understanding of *both* mental *and* emotional states is expected to predict greater use of societally-oriented reasoning. Similarly, a measure of children's *coordinated* understanding of cognition and emotion is expected to predict more societally-oriented reasoning. Likewise, children who possess sophisticated understandings of mind and emotion should use less low-level, self-oriented reasoning. Less firm hypotheses were made in reference to decisions because children's social perspective-taking might motivate their making decisions in favor of helping another (i.e., prosocial decisions), or (given the automatic fashion with which moral judgments are often made) might be unrelated to their decisions.

## Method

### Participants

Children participated in the first two waves of the Michigan Longitudinal Study (MLS), designed to obtain information on young children's behavioral and cognitive development. Children were recruited through preschool centers, newspaper advertisements, and pediatrician referrals. Because one of the aims of the MLS is to study the development of externalizing behaviors, children represented the complete range of externalizing symptom severity as determined by the Parent version of Achenbach's (1992) Child Behavior Checklist (CBCL), and/or Achenbach's (1997) Caregiver/Teacher Report Form (CTRF) completed by preschool teachers. Thus, children who were rated medium-high to high on the Externalizing Problem subscale of the CBCL or CTRF were oversampled. In our final sample, however, only 2% of children scored within the 'high' range ( $T > 70$ ) on the CBCL (though 7 children did not have Wave 2 CBCL data). Children facing severe risk factors (e.g., cognitive impairments or serious health problems) were excluded from the pool.

Of the 204 children who participated in the first two waves of the MLS, 132 had complete data for all variables considered in the present investigation, including data for all three moral reasoning dilemmas. Four children were excluded because they did not comprehend one or more of the moral reasoning dilemmas, reducing the final sample to 128 children (70 boys). Compared with other children who participated at both waves, children in the final sample were older,  $t(202) = 2.01$ ,  $p < .05$ , and performed better on several tasks: inhibitory control,  $t(184) = 4.31$ ,  $p < .01$ ; Wave 2 IQ,  $t(190) = 2.38$ ,  $p < .05$ ; Wave 2 false-belief understanding (FBU),  $t(185) = 3.09$ ,  $p < .01$ ; and appearance-reality emotion understanding (AR-EU),  $t(171) = 2.08$ ,  $p < .05$ . A stepwise binary logistic regression analysis revealed that, after accounting for age and inhibitory control, the other three variables—false-belief understanding, appearance-reality emotion understanding, and IQ—no longer predicted children's inclusion in the final sample. Children in the final sample ranged in age from 32.23 to 46.80 months ( $M = 41.36$ ,  $SD = 1.95$ ) at Wave 1; and from 60.90 to 80.50 months ( $M = 69.35$ ,  $SD = 3.63$ ) at Wave 2.

### Procedures

Wave 2 data were collected approximately 2 years following Wave 1. For both waves, data were collected from children during laboratory sessions and from parents who completed surveys at home. Laboratory sessions took place in a preschool, and began with approximately 20- to 30-minutes of rapport building followed by 3- to 4-hours of tasks, interspersed with many breaks. Among those tasks were the measures of emotion understanding, theory of mind, and moral cognition that are central to this paper. Basic emotion understanding (EU) was assessed at Wave 1. Appearance-reality emotion understanding (AR-EU), inhibitory control, and moral reasoning and decision-making were measured at Wave 2. All other constructs were assessed at both waves of data collection.

### Measures

**Basic emotion understanding**—A common and valid measure of basic emotion understanding (EU) is that of Denham (1986), which assesses children's understanding of facial expressions and emotional perspective-taking. Specifically, children (a) identified and labeled four line-drawn faces: "happy," "sad," "angry," and "fearful," and (b) identified story character's affective reactions to various situations. For *a*, children earned two points for choosing the face that corresponded to each of the four words, and two points for correctly labeling each of the four faces. Children earned only one point for merely identifying a face as positive or negative (good or bad). Thus, children earned a maximum of 16 points for *a*. For *b*, an experimenter performed 10 vignettes with a puppet (gender-

matched to the child), while providing vocal and facial cues to indicate the puppet's emotional reaction to each situation. For four of the vignettes, the puppet exhibited an emotion typical of how most children would feel in a similar situation (e.g., acting frightened after having a nightmare); for the other six vignettes, the puppet emoted *contrary* to the way the child would feel in a similar situation, as reported by the child's mother. After each vignette, in response to "How does the puppet feel?", children identified the appropriate line-drawn face. Children earned two points for selecting the correct face, and one point for merely identifying the puppet's affect as being positive or negative (good or bad), for a maximum of 20 points for *b*. Denham (1986) reported that these tasks possess good internal reliability (for *a*,  $\alpha = .89$ ; for *b*,  $\alpha = .93$ ). EU was calculated by summing scores on parts *a* and *b*.

**False-belief understanding**—The most common measure of ToM during the preschool years, and one that shows good variance at 3–4 years (the age-range of the current sample at Wave 1), is children's understanding of false-beliefs. We measured false-belief understanding (FBU) with tasks that assessed children's understanding that individuals may hold false-beliefs and may act on these false-beliefs in order to fulfill their desires (Bartsch & Wellman, 1989). For four *false-belief explanation tasks* (three at Wave 2) experimenters asked children to explain why a protagonist, who was unaware of the actual placement of a desired object, looked in the wrong place for that object. For four *false-belief prediction tasks* (three at Wave 2) experimenters asked children to predict where a story protagonist with inaccurate information about a desired object's location would look for that object. For each wave, a false belief composite score (false belief understanding; FBU) was computed as the total number of stories for which the child correctly predicted or explained the protagonist's false belief, for a maximum score of 8 at Wave 1 ( $\alpha = .80$ ), and 6 at Wave 2 ( $\alpha = .68$ ).

**Appearance-reality emotion understanding**—Building on basic ToM and EU as assessed at Wave 1, at Wave 2 the MLS included appearance-reality emotion understanding (AR-EU) tasks to assess children's capacity to *coordinate* their understandings of the mind and emotions in order to predict others' behavior. Wellman and Liu (2004) showed that AR-EU sequences after an understanding of false-beliefs in developmental progressions of ToM, and Pons and colleagues (2004) showed that AR-EU develops after a basic understanding that situational factors influence others' emotions (our measure of EU). For AR-EU tasks children were read two stories in which the protagonist must hide an emotion from another story character (for stories, see Harris et al., 1986). Using line-drawn faces, children identified how the protagonist was trying to look and why (*apparent emotion* questions); and what emotion the protagonist was really feeling and why (*real emotion* questions). For each story, children earned a maximum of two points for correctly identifying how the protagonist was really feeling, two points for correctly explaining why the protagonist was feeling that way, three points for correctly identifying how the protagonist was trying to look, and two points for correctly explaining why the protagonist was trying to look that way, for a maximum of 18 points.

**Moral reasoning and decision-making**—Prosocial moral dilemmas were used to assess children's moral reasoning and decision-making. As mentioned, prosocial dilemmas can elicit diverse forms of moral reasoning from young children. At Wave 2, children were read three stories (accompanied by pictures) adopted from those used by Eisenberg and colleagues (e.g., Eisenberg-Berg, 1979; Eisenberg-Berg & Roth, 1980). These stories (see Appendix) posed a dilemma where the needs of a protagonist come into conflict with the needs of another story character (characters were gender-matched to participants). Following each dilemma, children were asked what the protagonist should do, a forced-choice decision

between an action that is prosocial and one that is not (termed *moral decision-making*); and of particular focus children were asked *why* the protagonist should act as decided (termed *moral reasoning*). After children supported their decision with initial reasoning, they were prompted for additional reasoning: “Are there more reasons why \_\_\_ should \_\_\_?” In an effort to gauge children’s reasoning capacity, and not just their initial reasoning, children were also asked for reasons why the protagonist should do the *opposite* of what the child decided: “Can you think of a reason why \_\_\_ should [opposite action]?” If children provided unclear or unelaborated reasoning, interviewers re-worded questions or asked open-ended probes (e.g., “What do you mean by \_\_\_?”). Children’s moral *decisions* for the protagonist were coded as either *prosocial* (i.e., in favor of the protagonist helping or comforting other story characters in need) or *not prosocial* (i.e., in support of the protagonist *not* helping or comforting other story characters in need).

As shown in Table 1, moral reasoning responses were coded into seven categories (which were organized into three levels as described below), similar to those identified by Eisenberg and colleagues (Eisenberg-Berg, 1979; Eisenberg-Berg & Hand, 1979), but adapted and amended given the nature and range of children’s answers in the current data. *Hedonistic* responses dealt with the protagonist gaining something material (e.g., being rewarded for helping) or referred to self-preservation (e.g., “He shouldn’t cross the street because he may get run over”). *Affectional relationship* responses referenced the existing relationship between the protagonist and another story character or the protagonist’s fondness of another (e.g., “Because he likes the hurt boy”). *Needs-oriented* responses were coded into two categories. *Physical- and material-needs* reasoning referenced other story characters’ physical needs (e.g., medical attention for an injury) or material needs (e.g., desired objects). *Psychological-needs* reasoning referenced the psychological needs or affective states of other story characters (e.g., “He should help because the boy is probably sad”). In prior studies, *stereotypical* and *social-normative* responses have been included in a single category, but to be conservative these responses were coded separately for these young children. *Stereotypical* responses were more rote, cryptic references to the (possibly social) valance of actions or outcomes (e.g., “It would be good to do that”). *Social-normative* responses made explicit reference to social norms or social obligations (e.g., “Because you’re supposed to help other people”). *Acceptance-oriented* responses were those in which the child expressed a concern with the protagonist gaining social approval from adults (“He wants to make his dad proud”) or meeting the expectations of another non-adult story character (e.g., “He doesn’t want to disappoint his friend”). *Authority-oriented* responses dealt with following the rules or advice of an authority figure or not upsetting or disappointing an authority figure.

Low-frequency responses that did not fall into any of the above categories were coded as *other*, and responses that did not contain enough information to categorize were coded as *unelaborated*.<sup>1</sup> To control for experimenters’ different interviewing styles and for child loquacity, only the first three responses to both moral reasoning questions (six responses total per dilemma) were coded for each child. Inter-rater reliability was good for the seven focal reasoning categories (Cohen’s  $\kappa$ s ranged from .73 to .90; see Table 1).

Each moral reasoning *category* was given a score based upon the number of stories for which the child used that category of reasoning (ranging from 0 to 3). Across the three dilemmas, authority-oriented reasoning was provided more often ( $M = .68$  out of 3.00,  $SD = .71$ ) than previously reported for children in this age range (see Eisenberg & Roth, 1980).

<sup>1</sup>*Pragmatic* responses provided practical reasons for helping (e.g., “He should help because he’s strong”). Pragmatic reasoning evidenced poor reliability in the current study ( $\kappa = .39$ ), as it has in other studies (e.g.,  $\kappa = .57$  in Eisenberg et al., 1983; .44 in Eisenberg-Berg & Roth, 1980). Because of poor reliability, pragmatic reasoning was not considered in the current investigation.

Furthermore, counter to Eisenberg's age-developmental model (which suggests that authority-oriented reasoning should decrease with age), use of authority-oriented reasoning was *positively*, though not significantly, correlated with age ( $r = .07$ ). Examination of children's authority-oriented responses in this sample revealed that children were typically not appealing to authority out of fear of punishment (Eisenberg's Level 0), but rather to authority figures' *knowledge* (i.e., knowing what is socially appropriate or knowing what is best for the protagonist) or *acceptance* (i.e., approving of the protagonist's actions). Thus, the "authority-oriented" reasoning used by these children resembled what Kohlberg (1963) termed "authority maintaining morality" (a concern with maintaining social order) which can be found within Kohlberg's Conventional Level of reasoning, along with acceptance and social-normative reasoning. Indeed, authority-oriented reasoning was highly correlated with acceptance-oriented reasoning ( $r = .38, p < .001$ ). Thus, the acceptance-oriented and authority-oriented categories were combined into a single *acceptance-authority* category.

Traditionally, to gauge the *development* of moral reasoning, scholars have relied upon measures of individuals' *level* of reasoning more than their use of specific categories of reasoning. Much like other moral development theorists, Eisenberg (1986) views her levels of prosocial moral reasoning as involving progressively more sophisticated cognitive capacities, which typically increase with age. For our purposes, and as captured in Table 1, moral reasoning categories were grouped into levels (similar to Eisenberg's levels), with each level reflecting a different social orientation: Level 1 reasoning is self-oriented, Level 2 is other-oriented, and Level 3 is societally-oriented. Moral reasoning *level* scores were computed as the number of dilemmas (ranging from 0 to 3) for which one or more of the subsumed reasoning categories (see Table 1) were used. As Eisenberg's model is age-developmental (Lapsley, 2006), the validity of these level scores depends on their relationship to age and do not presume internal consistency across the categories that compose a level. Children were also assigned a *modal reasoning level* score, which was operationalized as the reasoning level that each child invoked most often (i.e., 1 = Level 1 used most frequently; 2 = Level 2 used most frequently; 3 = Level 3 used most frequently).

**Control Measures**—To obtain estimates of moral reasoning that are more specific to morality, and not merely proxies for general capacities such as vocabulary and executive functioning, two additional measures were employed as analytic controls: IQ and inhibitory control. IQ was gauged at Waves 1 and 2 using an aggregate of children's scores on the Vocabulary and Block Design subtests of Wechsler's Preschool and Primary Scale of Intelligence-Revised (WPPSI-R; Wechsler, 1989). Wechsler (1989) reported reliability coefficients of .84 for Vocabulary and .85 for Block Design subtests, and reported the WPPSI-R to have sufficient construct and concurrent validity. Inhibitory control—the capacity to inhibit cognitive or behavioral responses to irrelevant stimuli in order to pursue certain goals—is correlated with ToM measures (Carlson & Moses, 2001), and is also predictive of decisions that children make for prosocial moral dilemmas (Kochanska, Murray, & Coy, 1997). In the current study, inhibitory control was assessed at Wave 2 using three widely-employed tasks—*Simon Says*, *Green-Red Signs*, and *Shapes*. For *Simon Says*, children were taught to perform movements that were verbally requested and demonstrated by the experimenter, but only when the command was preceded by the words "Simon says." For each of 10 inhibition trials, children earned a 0 for a completed movement, 1 for a partial movement, or 2 for an inhibited movement. For the first 10 trials of *Green-Red Signs*, children were told to raise the same hand as the experimenter, who was holding a green sign; for the second set of 10 trials children were told to raise the hand opposite the one the experimenter raised (who was holding a red sign). For a final set of 10 red sign trials, children earned a 0 if the wrong hand or neither hand was raised, 1 if the correct hand was raised after raising the wrong hand, 2 if the wrong hand was partially raised prior to raising the correct hand, and 3 if only the correct hand was raised. For *Shapes* the experimenter



showed children a series of large shapes, each embedded with a set of smaller shapes. For each large shape, children were instructed to name the smaller shapes that were inside. For each of 12 trials, children received a 0 if only the large shape was identified, 1 if the large shape was identified before the little shapes, 2 if only the little shapes were identified (for more details on all three tasks, see Kochanska et al., 1997). Kochanska and colleagues reported good reliability for each of the three tasks (Cohen's  $\kappa$ s range from .88 to 1.00). The total scores for the *Simon Says*, *Green-red Signs*, and *Shapes* tasks were standardized and averaged to create an inhibitory control composite.

## Results

For all analyses, children's total use of each moral reasoning category (i.e., reasoning provided for *and against* children's decisions) was assessed, and children's score for each category reflects the total number of vignettes (out of three) for which that category was used at least once. Initial zero-order correlations were computed for each of our focal analyses, providing suggestive background on relationships between perspective-taking and moral reasoning. However, these relationships are best assessed using hierarchical regression analyses which simultaneously include all focal perspective-taking predictors and which include relevant control variables. Thus, hierarchical regression analyses were employed to examine how well the perspective-taking variables from Waves 1 and 2 predicted children's moral decision-making and moral reasoning at Wave 2. In each regression, predictor variables were entered chronologically—Wave 1 perspective-taking variables were entered in the first step, followed by Wave 2 perspective-taking variables in the second step. Thus, coefficients for Wave 2 FBU correspond to change in FBU between Waves 1 and 2. Similarly, coefficients reported for Wave 2 AR-EU correspond to children's understanding of AR-EU over and above their earlier basic understanding of emotions (Wave 1 EU), as well as their earlier (Wave 1) and concurrent (Wave 2) FBU. For each set of analyses, regressions were run first without covariates, and were then run including IQ and inhibitory control as covariates. Our results are essentially identical if gender is entered as an additional covariate in the regressions; thus, gender was excluded from the reported analyses.

### Moral Decision-making

**Nature of children's moral decision-making**—Although moral reasoning is focal to the current investigation, children's moral decision-making may also relate to their social-cognitive perspective-taking. At Wave 2, 5- and 6-year-olds made prosocial decisions (in favor of attending to the needs of another) 77% of the time. Further, 98% of children made at least one prosocial decision across the three dilemmas. Although the spread of ages is modest at Wave 2 (61- to 81-months), age was positively correlated with the number of prosocial decisions children made ( $r = .22, p < .05$ ).

**Theory of mind and emotion understanding in relation to moral decision-making**—Initial zero-order correlations and subsequent hierarchical regression analyses revealed that none of the affective or cognitive perspective-taking variables predicted the number of prosocial decisions children made; nor did an interaction between Wave 1 EU and FBU predict prosocial decision-making. In these regressions, only inhibitory control at Wave 2 significantly predicted moral decision-making,  $\beta = .21, p < .05$ . This result is consistent with prior findings (e.g., Kochanska et al., 1997) revealing a positive relationship between inhibitory-control and prosocial decision-making.

## Moral Reasoning

**Nature of children's moral reasoning**—Focal to the current investigation is children's moral reasoning and how that reasoning is related to their social-cognitive perspective-taking. The mean scores and standard deviations for children's use of each moral reasoning level and category are shown in Table 2. At Wave 2, 5- and 6-year-olds used Level 1 (self-oriented) reasoning more often than Level 3 (societally-oriented) reasoning,  $t(127) = 2.45, p < .05$ ; but used Level 2 (other-oriented) reasoning most of all; more than Level 1,  $t(127) = 4.04, p < .001$ , and Level 3 reasoning,  $t(127) = 6.70, p < .001$ . Indeed, 95% of participants cited another's need for at least one of the three dilemmas.

Further validating the developmental nature of these categories and levels was the fact that, even within the limited age-range at Wave 2, there were age-related trends in children's moral reasoning usage. Age at Wave 2 was negatively correlated with Level 2 reasoning ( $r = -.19, p < .05$ ), and the directions of the remaining non-significant correlations (between age and Level 1 reasoning,  $r = -.12, ns$ ; between age and Level 3 reasoning,  $r = .10, ns$ ) suggest that these 5- and 6-year-olds were shifting from reasoning at Levels 1 and 2, to reasoning at Level 3.

### Theory of mind and emotion understanding in relation to moral reasoning—

Our primary objective was to assess how different forms of perspective-taking predict moral reasoning. First, we considered the relationships between perspective-taking and children's modal level of reasoning. Hierarchical regression analyses revealed that Wave 2 AR-EU (children's understanding of the interplay between cognition and emotion) significantly predicted children's modal level of reasoning ( $\beta = .26, p < .01$ ), and this remained true after controlling for IQ and inhibitory control. Thus, children with a more sophisticated, coordinated understanding of cognition and emotion were more likely to invoke higher-level moral reasoning.

Children's use of each moral reasoning *level* gives a richer and more accurate picture of their moral reasoning than does the overall modal score. Thus, in order to more precisely assess how perspective-taking predicts moral reasoning and do so from a developmental perspective, we examined the relationships between perspective-taking and each of the three moral reasoning levels. Table 3 shows these data in initial regression analyses without covariates. These analyses revealed that Wave 1 EU predicted greater use of Level 2 reasoning at Wave 2; while an interaction between Wave 1 FBU and EU predicted less use of Level 2 reasoning and (marginally) predicted less use of Level 1 reasoning. Follow-up analyses elucidating these interactions indicated that, the higher children's EU, the more predictive FBU was of *less* Level 1 and Level 2 reasoning. This suggests that children with a more mature understanding of *both* cognition and emotion are less likely to invoke needs-oriented and self-oriented reasoning. Additionally, Wave 2 AR-EU significantly predicted greater use of Level 3 (societally-oriented) reasoning, further suggesting that a mature, coordinated understanding of mind and emotion is related to more mature moral reasoning. These key relationships persisted after accounting for IQ and inhibitory control.

Because the categories that represent a level are not argued to cohere together structurally (see Eisenberg, 1986) and because children with more advanced perspective-taking may favor certain categories of reasoning over others within a given level, it was crucial to examine how well ToM and EU predicted the specific *categories* of reasoning that children invoked (see Table 4 for zero-order correlations). Again, hierarchical multiple regressions yielded a consistent pattern of relationships both initially and after covarying IQ and inhibitory control. For ease of understanding the results of these regressions, the significant relationships between the perspective-taking variables and moral reasoning category usage (betas derived from these regression analyses) are summarized in Figure 1.

As depicted in our figure, Wave 1 FBU predicted greater use of reasoning citing others' psychological needs (Level 2) at Wave 2. This seems a straight-forward relation between children's understanding of mental states and their tendency to consider others' mental states in their moral reasoning. In contrast, Wave 1 EU predicted greater use of reasoning citing others' physical and material needs (Level 2), but not their psychological needs. Particularly intriguing, an interaction between Wave 1 FBU and EU predicted less use of hedonistic reasoning (Level 1) and physical- and material-needs reasoning (Level 2). Follow-up analyses exploring this interaction revealed that the higher children's EU, the more predictive FBU was of *less* hedonistic and physical- and material-needs reasoning; suggesting that children with a more mature understanding of *both* emotions and cognition are less likely to invoke these less sophisticated (and less psychologically-saturated) categories of reasoning.

With regard to children's Level 3 reasoning, Figure 1 also illustrates how Wave 1 EU and ToM individually predicted less use of stereotypical reasoning; arguably the least sophisticated form of Level 3 reasoning. In contrast, Wave 2 AR-EU (the most sophisticated measure of social-cognitive perspective-taking, which requires children to *coordinate* their understandings of others' mental and emotional states) significantly predicted greater use of acceptance-authority reasoning—arguably the most sophisticated form of Level 3 reasoning. These relationships persisted after accounting for IQ and inhibitory control.

## Discussion

The current study reveals intricate relationships between children's theory of mind (ToM) and emotion understanding (EU) on the one hand and their moral reasoning and decision-making on the other. Sensibly, while basic EU at Wave 1—an understanding that certain situations elicit emotional reactions in others—predicted greater moral reasoning (at Wave 2) that cited characters' physical and material needs, ToM at Wave 1—an appreciation for others' desires and beliefs—predicted the use of moral reasoning that appealed to story characters' psychological needs. Most intriguingly, the data demonstrate that enhanced moral reasoning may entail that young children combine their understanding of cognitive states (ToM) with their understanding of emotional states (EU). This was apparent in several key predictive interactions between ToM and EU at Wave 1 and moral reasoning at Wave 2, as well as predictive associations between children's understanding of real versus apparent emotion (AR-EU) at Wave 2 and their concurrent moral reasoning.

First consider further children's moral *decision-making*. Children's social-cognitive perspective-taking (their understanding of others' psychological and emotional states) did not predict more prosocial decisions. This may indicate that (as expected) children's forced-choice decisions reflect a rote understanding of "right" and "wrong" courses of action (e.g., helping is good), and not their deeper moral reasoning or socio-moral perspectives. Yet prosocial decision-making increased with age and was related to inhibitory control. Why? Perhaps children's inhibitory control, which also increased with age, helped them inhibit their initial reactions to moral dilemmas, allowing them to forego the more personally rewarding decisions in favor of more prosocial (and socially acceptable) decisions. In this respect, our data are consistent with that of others (e.g., Kochanska et al., 1997) who have found positive relationships between inhibitory-control and prosocial decision-making.

More central to the current investigation was the question of whether ToM and EU predict children's moral *reasoning*. At a general level, we found that a higher *modal* level of reasoning was predicted by children's concurrent performance on the AR-EU task, which requires a coordinated understanding of both cognitive and emotional states. This result is consistent with previous work showing a general positive correlation between young

children's social-cognitive perspective-taking and higher-level moral reasoning (e.g., Rubin & Schneider, 1973). A series of additional analyses supported hypotheses about the *developmental* nature of the relationships between social-cognitive perspective-taking and the social orientation (i.e., level) of children's reasoning. Sophisticated EU at Wave 1 prospectively predicted greater use of other-oriented (Level 2) reasoning at Wave 2. However, the higher EU was, the more ToM was predictive of *less* Level 2 reasoning and (marginally) less Level 1 self-oriented reasoning. Thus, when considered together, better EU and ToM jointly predicted less use of "lower" levels of moral reasoning. Finally, AR-EU (the most sophisticated measure of perspective-taking, assessed at Wave 2) concurrently predicted greater use of Level 3 societally-oriented reasoning, the most sophisticated reasoning level coded. In sum, these results suggest that a sophisticated understanding of emotion alone may compel children to focus on others' needs. However, a mature understanding of *both* emotional and mental states may help children shift away from other-oriented reasoning towards societally-oriented reasoning.

Results concerning the relationships between perspective-taking and children's use of specific categories of reasoning helped to clarify and expand upon the above findings. Children's understanding of others' cognitive states at Wave 1 (gauged with FBU) predicted greater use of psychological-needs reasoning at Wave 2. EU, on the other hand, predicted greater use of physical- and material-needs reasoning, perhaps because children at this age are keenly aware of the connection between physical conditions (e.g., injury, pain) and related emotional experiences (Harris, 2006). Further, the higher EU, the more ToM was predictive, prospectively, of *less* physical- and material-needs reasoning and hedonistic reasoning. Notably, it was AR-EU (which required a coordinated understanding of emotional and mental states) that predicted greater use of Level 3 acceptance-authority reasoning; the most sophisticated reasoning category that was coded. These results (including that EU and ToM predicted less use of stereotypical reasoning, the least sophisticated Level-3 category) suggest that, even among children who invoke the same level of reasoning (e.g., Level 3 societally-oriented reasoning), individual perspective-taking capacities may influence the precise form of reasoning children will use within that level.

In sum, a greater understanding of emotional and mental states is related to children's increased consideration of others' emotional and mental states, respectively, in their moral reasoning. Moreover, a sophisticated appreciation for both emotional and mental states *jointly* predict greater use of societally-oriented reasoning; and in particular acceptance-authority reasoning. This result can be interpreted in two lights. The first regards children's appreciation for the information that others possess. Throughout the preschool years, children come to understand that different types of people (e.g., doctors) hold specialized information about certain domains (e.g., health), and are therefore good informants about those knowledge domains (Lutz & Keil, 2002). Children may consider parents to be particularly good sources of information about proper behavior, especially when children are confronted with new and difficult social dilemmas. This, teamed with children's tendency to prefer information provided by familiar adults (Corriveau & Harris, 2009), may account for why children with a sophisticated ToM and EU more often cited adults' (i.e., adults familiar to the protagonist) advice and proscriptions in their moral reasoning. Additionally, children with more developed social-cognitive perspective-taking placed greater emphasis on social approval in their moral reasoning. Children with a rich understanding of the mind and emotions are keenly aware of the relationships between their own actions, others' perceptions of those actions, and the emotional states (e.g., pleasure) and psychological states (e.g., approval) that may result from those perceptions. It is certainly sensible then that children who performed better on the AR-EU task (which measures children ability to coordinate all of these understandings) were more likely to invoke acceptance-authority reasoning.

There are several potential reasons why the current study revealed significant relationships between perspective-taking and moral reasoning in young children, whereas others (e.g., Eisenberg & Roth, 1980) failed to do so. The first reason concerns the perspective-taking tasks utilized. Moral dilemmas often contain emotional content (e.g., someone being hurt). Whereas others (e.g., Eisenberg & Roth, 1980) have used perspective-taking tasks that did not tap children's emotion understanding, the current study incorporated measures of children's appreciation of basic emotions (EU) as well as of more complicated emotional expression and inhibition (AR-EU). Indeed, the most powerful predictors of moral reasoning were the interaction between Wave 1 ToM and EU (a measure of children's comprehension of material independently in the emotional and cognitive domains) and AR-EU (a measure of individuals' ability to *coordinate* cognitive and emotional information; Wellman & Liu, 2004). Thus, these results underscore the importance of including both of these capacities in the current as well as in future research investigating relationships between perspective-taking and morality. Second, in most prior studies children reasoned only in *support* of their decision for each dilemma. Exploratory analyses with the current data that included just children's reasoning in support of their decisions revealed essentially no relationships between perspective-taking and moral reasoning usage, corroborating past findings. However, children in the present study were also asked to reason *against* their decisions. Including both forms of questioning gathered more comprehensive information on children's *capacity* to employ different forms of moral reasoning. When current analyses included reasoning for and against decisions, a series of relationships were found between children's perspective-taking and moral reasoning. This suggests that emerging perspective-taking abilities might be helpful, but not sufficient alone, for children's developing moral cognition.

While these results are informative and include comprehensive considerations of the relationship between emotional and mental understanding on the one hand and moral reasoning and decision-making on the other, several caveats are worth noting. First, moral reasoning and decision-making were only measured at one time point. Thus, using the current data, no firm claims can be made in reference to how perspective-taking relates to the specific *trajectory* of moral cognition during early childhood. Second, our results do not indicate that there is a *necessary* underlying cognitive structure to any one category or level of prosocial moral reasoning. For example, for some children, citing others' bodily needs in their reasoning may merely reflect an awareness of a physical problem, without any concern for the emotional states that might accompany that problem. Similarly, a sophisticated ToM or EU is not necessarily enough to motivate a child to employ other-oriented or societally-oriented reasoning. For example, for perspective-taking to promote psychological needs-oriented reasoning, a child must not only know what others think and feel, the child must *care* about those things, must inhibit other distracting factors, and so on. Finally, our sample included some children representing the higher range of externalizing behavior severity. Future studies can assess the extent to which these results hold in samples composed only of typically-developing children. Likewise, replication of these findings in other populations will test the extent to which these links between perspective-taking may vary across contexts.

Nonetheless, several important findings were established that are revealing in their own right and that can frame future efforts. In general, a sophisticated ToM and EU individually predicted reasoning about others' psychological and physical needs, and jointly predicted more advanced societally-oriented moral reasoning. This latter result is likely a product of children's developing appreciation for adults as trustworthy sources of social information, as well as children's increasing desire to maintain or gain the approval of trusted adults. Children with a rich understanding of the mind and emotions are better equipped to consider others' emotional and psychological reactions to someone's behavior; and children's

anticipation of these reactions may serve to motivate certain socially-acceptable forms of moral reasoning and behavior (e.g., to do the right thing in order to make someone proud of you) and to discourage less socially-approved reasoning and behavior.

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## Appendix Moral Reasoning Dilemmas (version for boys)

1. One day Tom was playing with his new toys in his yard. He looked across the street and saw his friend, Billy. Billy waved at Tom and started playing. Later, Tom looked across the street and saw an older and bigger bully push and tease his friend, Billy. There weren't any grownups around. Tom was usually not supposed to leave

his yard, but the older boy kept pushing his friend down every time he tried to get back up.

2. Have you ever been to a birthday party? So you know there are games, and ice cream, and cake. Well, one day, a boy named Mark was going to his friend's birthday party. Mark was walking very fast so that he wouldn't be late and hurt his friend's feelings. On his way he saw a boy who had fallen down and hurt his leg. Mark knows that he is supposed to help other people who need help. The boy asked Mark to get his parents so they could take him to the doctor.
3. One day Alex was watching his friends play an important soccer game. They were losing the game. Alex was a very good soccer player, so his friends asked him if he would join the team and help them win. His friends said they would lose the game for sure if Alex didn't play. The prize for the winning team was a trophy and a trip to Dairy Queen for ice cream. Suddenly, Alex remembered he was supposed to go home to help his Daddy wash the car and cook dinner.





**Figure 1.**

This figure provides a summary of the results from hierarchical regression analyses that assessed how well perspective-taking variables predicted children's moral reasoning. This is not a report of structural equation modeling; it is a descriptive summarization. In these regression analyses, predictor variables were entered chronologically—Wave 1 perspective-taking variables were entered in the first step, followed by Wave 2 perspective-taking variables in the second step. Regressions were run first without covariates, and were then run including Wave 1 IQ, Wave 2 IQ, and inhibitory in the first step. The interaction effect was entered as the final step of each regression. Numbers correspond to standardized beta weights (numbers in parentheses refer to standardized beta weights after accounting for Wave 1 IQ, Wave 2 IQ, and Wave 2 inhibitory control). Broken lines reflect negative relationships. † $p < .07$ , \* $p < .05$ , \*\* $p < .01$ .

Table 1

## Moral Reasoning Coding

Category	Description	Examples
<b>Level 1 (Self-oriented)</b>		
<b>Hedonistic</b> $\kappa = .90$	Concern for protagonist's own needs Selfish gain for protagonist Direct reciprocity	"So [protagonist] can get a present" "Helping his daddy will make [protagonist] stronger" "[Protagonist] should help because maybe her friend will help her later."
	Self-preservation -- avoidance of non- authoritative (non-adult) negative consequences for protagonist	"So [protagonist] won't get hurt by the bully." "So [protagonist] doesn't get run over"
<b>Affectional Relationship</b> $\kappa = .88$	The protagonist's identification with another  Interacting with others with whom the protagonist has an existing relationship with	"Because they're friends" "Because [protagonist] dad's in her family" "So [protagonist] can play with them."
<b>Level 2 (Other-oriented)</b>		
<b>Physical or Material needs</b> $\kappa = .88$	Concern for another's pain, physical ailment, or physical inability to do something.  Concern for the material desires of another	"Because [disabled child] is hurt" "Dad can't do it by himself" "Because they [the team] would lose the game if, if she wouldn't help them." "Because [other child] wants to go to the party"
<b>Psychological needs</b> $\kappa = .73$	Concern for the psychological needs and affective states of another person, without reference to the protagonist avoiding a negative reaction	"Because [other child] is sad" "So [protagonist] doesn't hurt his/her friend's feelings" "So his parents won't worry about him [hurt boy]"
<b>Level 3 (Socially-oriented)</b>		
<b>Stereotypical</b> $\kappa = .81$	Brief, stereotyped mention of the person or action as good or bad	"Because it's good to help" "Because it's nice"
<b>Social-normative</b> $\kappa = .81$	Social obligation / normative behavior Religious role-model	"Because that's what you're supposed to do" "That's what Jesus would do"
<b>Acceptance-authority</b> $\kappa = .78$	If the child wants to please somebody in order to gain or maintain approval or acceptance  Following orders or advice of an adult  If the child wants to avoid making a non-adult unhappy/disappointed with the protagonist.	"[Protagonist] wants to make his dad proud" "Because [Protagonist's] dad would like it." "He should listen to his mommy" "Because his Mom said he [protagonist] shouldn't do that" "Because his friends are waiting for him / counting on him"

**Table 2**

Means (and Standard Deviations) for Moral Reasoning Level and Category Usage

<b>Reasoning</b>	<b><i>M</i></b>	<b><i>(SD)</i></b>
Level 1 (Self-oriented)	1.53	(1.00)
Hedonistic	1.34	(1.02)
Affectional relationship	.36	(.60)
Level 2 (Other-oriented)	2.01	(.82)
Physical/material needs	1.91	(.84)
Psychological needs	.36	(.61)
Level 3 (Societally-oriented)	1.22	(1.03)
Stereotypical	.37	(.69)
Social-normative	.19	(.50)
Acceptance-authority	.89	(.92)

*Note.* Individual scores for each reasoning type range from 0 to 3. Values for *Level* of reasoning refer to the use one or more of the subsumed reasoning categories.

**Table 3**  
 Predictors of Prosocial Moral Reasoning Level Usage: Hierarchical Regression Analyses

Criterion	Level 1		Level 2		Level 3	
	B	(SE B)	B	(SE B)	B	(SE B)
<b>Predictors</b>						
Step 1						
Wave 1 FBU	-.01	(.04)	-.03	-.01	-.02	-.03
Wave 1 EU	.01	(.02)	.05	.03	.19 *	-.06
Step 2						
Wave 2 FBU	-.02	(.06)	-.04	-.07	.03	.05
Wave 2 AR-EU	.00	(.02)	.01	-.01	.06	.26**
Step 3						
Wave 1 FBU X EU	-.01	(.01)	-.18 †	-.01	-.20 *	-.03

Note. FBU = false-belief understanding; EU = basic emotion understanding; AR-EU = Appearance-reality emotion understanding; FBU X EU = Interaction between Wave 1 false-belief and emotion understanding.

†  $p < .10$ ,  
 \*  $p < .05$ ,  
 \*\*  $p < .01$ .

Table 4

Zero-Order Correlations between perspective-taking predictors and moral reasoning usage

Variables	Level 1			Level 2			Level 3		
	Hedonistic	Affectional relationship	Phys. and mater. needs	Psychological Needs	Stereotypical	Social- normative	Acceptance- authority		
Wave 1 FBU	-.03	-.07	.01	.19*	-.25**	-.01	.05		
Wave 1 EU	.01	-.04	.18*	.05	-.24**	.05	.04		
Wave 2 FBU	-.06	.06	-.14	-.04	-.09	.00	.14		
Wave 2 AR-EU	.01	-.04	-.05	.10	-.04	.15 †	.24**		

Note. Phys. and mater. = Physical and material; FBU = false belief understanding; EU = basic emotion understanding; AR-EU = Appearance-reality emotion understanding.

†  $p < .10$ ,

\*  $p < .05$ ,

\*\*  $p < .01$ .