

## ABSTRACT

Title of Thesis:                   STORYTELLING, EMOTION  
  UNDERSTANDING, AND  
  KINDERGARTNERS' SOCIAL  
  COMPETENCE

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Interpreting others' emotions is theoretically foundational for children's social competence, yet little research contrasts Emotion Understanding (EU) types against their theoretical correlates. This study investigated kindergartners' situationistic EU (attributing emotions based on external events) and mentalistic EU (attributing emotions from others' mental states) in relation to Theory of Mind (ToM) and social skills, as rated by parents and teachers. The EU measures were expected to have low associations with one another and to relate differently to ToM and select social skills. Mentalistic EU was expected to be an important predictor of teacher-rated social skills. Results supported the hypothesis that mentalistic EU and situationistic EU are distinct constructs. However, both relate to ToM. Furthermore, while ToM and situationistic EU variables were included in the regression model, only vocabulary and mentalistic EU were significant predictors for teacher-rated social skills. Results

indicate the importance of mentalistic EU in aspects of kindergartners' social competence.

STORYTELLING, EMOTION UNDERSTANDING, AND KINDERGARTNERS'  
SOCIAL COMPETENCE

by

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## Chapter 1: Introduction

Social competence is vital to the level of development that a child needs to be able to adequately learn through formal instruction and perform successfully in a classroom environment (Carlton & Winsler, 1999; Denham, 2006). Among kindergartners in particular, research has shown that children who are high in social competence have positive attitudes about adjusting to school, and that they receive higher grades than their low-social-competence counterparts (Birch & Ladd, 1997; Ladd, Birch, & Buhs, 1999). Furthermore, social-emotional indicators such as positive interactions with teachers, emotion regulatory abilities, social skills, and non-rejected peer status uniquely predict academic success, even when earlier academic success is controlled for (Buhs & Ladd, 2001; Izard et al., 2001; Pianta, Steinberg, & Rollins, 2009). In contrast, kindergartners who are victimized by peers or are aggressive have less school adjustment and are at risk for a potential cascade of problems, including school difficulties, delinquency, and drug abuse (Gagnon, Craig, Tremblay, Zhou, & Vitaro, 1995; Kochenderfer & Ladd, 1996).

Identifying and utilizing factors that predict successful developmental paths in the social arena play an important role in preventing these negative outcomes and maladaptation. Emotion understanding (EU)—the ability to identify, represent, describe and predict another person’s emotions—is considered a prerequisite to social competence and a component of social cognition (Ornaghi, Brockmeier, & Grazzani, 2014). How different types of EU relate to social competence, however, has not been well studied. Another recognized component of social cognition is theory of mind (ToM), or the ability to represent others’ mental states. These socio-perceptual and

socio-cognitive components are expected to predict social competence in young children as well as to relate to each other (Wang, Liu, & Su, 2014).

### **Emotion Understanding and Theory of Mind**

EU has been conceptualized as belonging to two categories: situationistic-type and mentalistic-type (Rieffe, Terwogt, & Cowan, 2005). In situationistic EU tasks, emotions are caused by an external event or inferred from basic knowledge of emotions. Situationistic EU tasks ask the child to predict a character's emotions based on an event that transpired during a story. For example, "Jimmy's parents take him to get ice cream. Jimmy drops his ice cream cone. How does Jimmy feel?" These EU tasks do not require the child to use a character's specific mental state to answer how the character is feeling. Rather, the child may use social scripts, how they themselves would feel in that situation, or personal schemas (conceptual frameworks derived from past experiences that shape interpretation of present experiences) to predict the character's emotions. Another example of situationistic EU is when children are asked to identify a person's emotion based on their facial expression alone. This requires knowledge of what facial expression is linked to a specific emotion, but does not require the child to interpret the internal causes of the emotion. In contrast, mentalistic-type EU requires emotions to be linked to internal causes—such as the character's thoughts, desires, or beliefs (ex. "Jimmy and Martha are siblings. Jimmy likes ice cream and Martha does not. Jimmy and Martha's parents bring back ice cream for dessert. How does Jimmy feel? How does Martha feel?"). Research indicates that at around age 5, children are able to predict others' emotions when

there are different desires/beliefs between two characters in a story or even between a character in a story and themselves (Rieffe et al., 2005).

Developmental data from Pons and colleagues (2004) suggest that situation-type EU develops first and is necessary and possibly sufficient for continuing on to mentalistic type EU. Yet, how mentalistic versus situationistic EU relate to social competence and other external correlates is less understood. Theoretically, situationistic and mentalistic tasks require different demands and involve distinct social aspects: situation-type EU should require accessing social knowledge (i.e., accurate knowledge of social information such as pairing an emotion with a facial expression or a common situation). Mentalistic EU, although it involves some social knowledge, also requires mental understanding processes and socio-cognitive skills (attributing someone's emotions to the interplay between the external event and that person's thoughts, desires, or beliefs). Notably, both situationistic EU and mentalistic EU are components of socio-perception (i.e., perceiving and interpreting social scenes to infer why a peer might be angry). It is what drives these perceptions (knowledge vs. cognitive-emotional processing) that suggest these two types of emotion understanding are distinct (Wang et al., 2014).

In support of this distinction, some research has shown that situationistic EU and mentalistic EU do not relate to each other, and that they relate differentially to external correlates such as ToM (Weimer, Sallquist, & Bolnick, 2012). Weimer and colleagues (2012) implemented several EU tasks using the vignette-style paradigm (adapted from the Test of Emotion Comprehension; Pons, Harris, & Rosnay, 2004), where a child is read a story and asked how the character feels based on a given

expression, event, or reminder of an event (which are examples of situationistic EU tasks) or given the belief, desires or hidden emotions of the character (examples of mentalistic EU tasks). Results indicated that EU tasks that were situationistic did not relate to EU tasks that were mentalistic among 4.5- to 6-year-old participants. This provides preliminary evidence that situationistic and mentalistic EU are distinct constructs that may relate differently to external correlates. More specifically, the Weimer and colleagues (2012) study found that the external cause EU task (which is considered a situationistic-type EU task) related to ToM, as measured by false-belief tasks, while other, more mentalistic type EU tasks did not relate to ToM.

From a theoretical standpoint, this last finding is surprising. ToM abilities of representing others' mental states (such as desires and beliefs) should feed into one's mentalistic EU ability to predict emotions based on these mental states (Rieffe et al., 2005), more so than their situationistic EU ability (Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003). While Weimer and colleagues' (2012) study found the opposite of this theoretical standpoint, it is difficult to ascertain if this pattern of correlation is an actual phenomenon or an artifact of the EU "vignette-paradigm," which provides children all the cues, context, and interpretation needed to provide the "right" answer and may not reflect more nuanced real-world EU demands. We discuss the issue of the vignette paradigm and alternative forms of EU measurement in chapter 2.

In order to enhance the construct clarity of EU, this study compared a novel mentalistic storytelling EU task that aligned well with the theoretical demands of mentalistic EU to a popular, vignette-style EU task that has more situationistic-type

demands, while investigating their differential relationships to several external correlates such as ToM and social competence. In the broadest sense, this study sought to identify differences between mentalistic and situationistic EU by investigating whether the expected relationship to social competence persists with both mentalistic- and situationistic-type tasks, and by investigating how mentalistic-type EU (as measured by a storytelling task) relates to ToM.

### **The Target Age Group**

Research suggests the capacity for mentalistic emotion understanding develops at around 5 years of age (Wellman, Cross, & Watson, 2001). Wang, Liu and Su (2014), in a longitudinal study on the developmental trajectory of preschoolers' emotion understanding (happiness, sadness, anger, and fear) and false-belief understanding (a type of ToM task discussed further in chapter 2) measured 3- and 4-year-olds' performance, four times, at approximately half-yearly intervals (2014). Results showed that children's ability to understand emotions via a situationistic task and ability to represent mental states via false-belief tasks increased significantly at each time point in the first year and a half, but no significant increases were found in the last 6 months (above 6 years of age) (Wang et al., 2014). In order to measure EU and ToM performance in a population with a variation of ability and because onset of these abilities are expected during this time frame, 5 to 6 year olds were the target age group of this study.

## **Research Questions**

In this study, the theorized developmental precursors of social competence, situationistic EU, mentalistic EU, and ToM were examined. This study investigated how these constructs relate to each other, to overall social competence, and to subcategories of social competence in kindergartners, when vocabulary is controlled.

The research questions were as follows:

- 1) Are situationistic EU and mentalistic EU distinct constructs? How do they relate to each other and to external correlates, such as ToM and subcomponents of social competence?
- 2) When taken together, do situationistic EU, mentalistic EU, and ToM predict a significant amount of variation in teacher ratings of social competence when controlling for vocabulary?
- 3) Will mentalistic EU remain a significant predictor of teacher-rated social competence in a model that includes, situationistic EU and ToM, controlling for vocabulary?

## Chapter 2: Overview of the Literature

### Background

**Social Competence.** Social competence is a broad construct with a long history of research in the developmental psychology field. Broad definitions of social competence include adaptive behaviors, social skills, and peer acceptance, and require a range of measurement options: from observation of social behaviors, to peer-likeability ratings, to comprehensive behavioral scales completed by the child, parent, or teacher. The definition of social competence used for this study involved how specific elements of social competence related to social skills. In this study, social competence is defined as children's pro-social behavior, peer relationship interactions, quality of social skills (i.e., communication, assertion, responsibility, self-control, empathy, engagement, etc.), and frequency of problem behaviors (externalizing and internalizing) (Gresham, Elliott, Vance, & Cook, 2011).

The socio-perceptual skills of EU (understanding and recognizing another person's emotions) and socio-cognitive skills of ToM (ability to understand and represent another person's belief state) are thought to be prerequisites or components of the social competence construct, as they relate to the overall social efficacy of the child (Ornaghi et al., 2014). Krebs and Sturup (1982) found that preschoolers' performance on cognitive role-taking tasks was significantly correlated with altruistic behavior in the classroom and with teachers' ratings of prosocial behavior and cooperativeness. Similarly, Iannotti (1985) found that preschoolers' emotional role-taking ability was related to sharing and total overall prosocial behaviors in free play.

These studies highlight the potential impact that mental state understanding and emotion understanding can have on acquiring social competence skills.

**Emotion Understanding.** Simple forms of emotion understanding can be found in infants as young as 3 months old, with reports of infant distress when a caregiver is impassive or has a non-responsive facial expression, which suggest that infants can recognize others' emotions (Ekman & Oster, 1979). More formal components of emotion understanding are thought to develop between 3–4 years of age. They involve the skills of emotion identification, or labeling emotions based on facial expressions, in both schematic drawings and photographs. Other rudimentary EU skills involve situation knowledge, or predicting emotions of agents based on the external events of a story (Pons, Harris, & Rosnay, 2004). While these “situationistic” skills of emotion identification and situation knowledge form a vital foundation towards successful emotion understanding across development, they are also “simplistic” in that they do not necessarily require a child to understand or represent mental states in order to arrive at a label or prediction of emotion. Rieffe, Terwogt, and Cowan (2005) discussed how children's emotion understanding goes beyond the ability to represent emotions as the “mechanical product of the situation” but also entails “understanding that emotions can be a consequence of the interpretation of a situation as well” (p. 1). Understanding and then using a subjective representation of situations to predict others' emotions involves a) representing mental states, such as beliefs and desires (ToM) and b) interpretation, or using those perceived mental states as causal elements of emotional reactions.

**Advanced emotion understanding.** These more “mentalistic” forms of emotion understanding among young children were of interest to this study—predicting emotions based on a person’s perceived mental state from a perceived social context. ToM literature places the understanding of others’ mental states, specifically the ability to understand that desires and beliefs are subjective, at around five years of age (Rieffe, Terwogt, Koops, Stegge, & Oomen, 2001). Yet, whether or not children are apt to use this understanding of mental states to predict emotions, under what circumstances, and at what age they do so, is still under investigation. A study involving 3–5 year olds found that around age five, children use the fact that people have different desires and beliefs to predict others’ emotions accordingly, even if they find those desires undesirable (Rieffe et al., 2001). Another study by Rieffe and colleagues (2005) looked at the circumstances under which mental states were used to predict emotions. The experiment involved 4-, 6-, and 10-year-olds whom were told stories and asked to explain typical (expected) and atypical (unexpected) emotional reactions depicted by the characters in the story. Because atypical emotional reactions are unexpected, it was hypothesized that children would be more likely to refer to mental states, such as desires and beliefs, in explaining atypical emotional reactions, than when explaining typical emotions. Findings confirmed that both age and type of emotional reaction affected use of mental states to explain emotions. However there was an interaction effect involving the type of emotion, with anger, happiness, and sadness mainly evoking references to desire as an explanation, and fear evoking more references to belief, even in four-year-olds. This research shows that children as young as 4 years old are capable of using mental

states to explain emotions (especially if they are atypical) although younger children are overall more likely to explain an emotion based on an external cause/situation than based on a character's mental state (Rieffe et al., 2005). Pons and colleagues (2004) investigated the developmental periods and hierarchical organization of several components of emotion understanding across 3 to 11 year olds. Based on a sample of 100 children (20 in each age group), the percentage of children succeeding by component and age was calculated. For the emotion understanding components of "desire" (understanding that two people have different emotions about the same situations because of their different desires) and "belief" (understanding that a person's beliefs, whether false or true, will determine their emotional reaction to the situation), five-year-olds succeeded at a rate of 55% and 40% respectively while seven year olds succeed at a rate of 75% and 85% respectively (Pons et al., 2004). This shows five-year-olds' propensity to use desires (over beliefs) to explain emotions and that around half of five-year-olds are able to successfully answer emotion understanding tasks involving mental states. Notably, for the EU tasks described by Pons et al. (2004), the character's internal state (their desires/beliefs) are explicitly stated (given) in the story. These tasks may differ from real-world emotion understanding, where a child must notice cues and context by themselves and guess the internal state of the person (emotions and thoughts) from cues in the environment.

**Theory of mind.** ToM, or the ability to make inferences about another person's mental state, is considered an important element for functioning successfully in the social world (Weimer & Guajardo, 2005). Because both EU and ToM involve understanding others' perspectives, interventions targeted at increasing EU have been

found to increase ToM level as well (Ornaghi et al., 2014). Measurements of ToM often involve false-belief (FB) tasks; a child must represent two states of reality and make a prediction of a character's behavior based on that character's belief state. An example of a false-belief task is the *Unexpected Contents* task, where a child is shown a box marked by some descriptor (such as a Band-Aid box) and is asked what she thinks is inside the box (Band-Aids). The experimenter then opens the box and reveals an unexpected object (such as rubber bands) instead. The rubber bands are returned to the box and then the child is asked what her friend, who has never looked inside the box, will think is in the box (Wimmer & Perner, 1983). What most FB tasks attempt to tap into in the ToM development progression is the acquisition of "meta-representational reasoning" which usually develops between 4–5 years of age, and involves the ability to contrast the reality of an object or event with how the object appears to be or how it appears to another person (Lucariello, Durand, & Yarnell, 2007).

Overall, ToM research often extends beyond these "first order" false belief tasks into higher-order tasks (an inference about a belief about a belief) and can become further complicated by introducing emotions as caused by false beliefs (Liddle & Nettle, 2006). The administration and form of ToM tasks are similar to EU tasks in that they usually involve a vignette, with pictures or props. Similar to EU tasks, false belief tasks are also ability-focused, structured performance measures. However, instead of asking the child what the character feels at the end of the story, the child is asked what the character believes/thinks.

Notably, while false belief tasks are a common measure of ToM (almost all the studies reviewed below utilize a false belief task to represent ToM) some researchers suggest that the false belief tasks are overused in the ToM literature and only delineate one aspect of the vast ToM construct. Additionally, false belief tasks often entails more than mental state understanding. As Bloom and German (2000) discuss,

Even if children understand that beliefs can be false...to solve it, the child has to follow the actions of two characters in a narrative, has to appreciate that Sally could not have observed the switching of the chocolate, has to remember both where the chocolate used to be and where it is at the time of the test, and has to appreciate the precise meaning of the question (for instance, that it means where will Sally look, not where she should look. (p. B27)

Furthermore, there are other tasks that can reveal understanding of the minds of others (e.g., vignettes that ask you to explain a characters actions given the context clues). Therefore, this study utilized the NEPSY-II ToM subtest, which not only includes several false belief tasks, but also broader ToM-related items that also tap into children's mental understanding of others.

### **Social Competence and Emotion Understanding**

Several studies have shown a relationship between rudimentary emotion understanding and positive peer relationships (a component of social competence) (e.g., Custrini & Feldman, 1989; Waiden & Field, 1990). For example, emotion identification abilities (identifying emotion expressions) have been shown to relate to peer competence, peer likeability and peer social acceptance (Izard, Schultz, Fine,

2000). Additionally, Izard and colleagues (2001) found that emotion identification abilities at age 5 were positively correlated with cooperation and negatively correlated with hyperactivity and internalizing behaviors at age 9. In another study, Weimer and colleagues (2005) asked 3–5 year olds to describe what makes them, a friend, and their parents, happy, sad, angry, and scared, to determine if the quality of the child’s response to the open-ended question related to parent and teacher measures of social skills. Results showed that neither teachers’ nor parents’ overall ratings of children’s social skills significantly correlated with the composite emotion understanding scores. However, the quality of response to the open-ended EU task related significantly to certain social competence subscales. For example, how well 3- to 5-year-olds described what makes them or a friend, happy, sad, angry, and scared related to teacher ratings of the social skills on the expressivity subscale (which measures sympathy, confidence, understanding of feelings, and an enjoyment of talking) when controlling for age and language. This finding suggests that, at least for children between ages 3 and 5, there are some distinct components of EU that relate to distinct components of social skills, and that an open-ended EU task (such as the storytelling task that is used in this study) can relate to teacher-rated social skills.

Despite evidence for the relationship between situationistic EU and social competence components, there is less research on how mentalistic EU relates to social competence. The Weimer and colleagues (2005) study discussed above, can be thought of as both situationistic and mentalistic—because the question “What makes your (subject) happy?” allows the participant to use either an external cause or internal cause for a friend, a parent, or their own emotions. However, because of the

young age group (3–5 year olds) in this study, Weimer and colleagues (2005) reported mostly “situationistic-type” answers from the participants (e.g., “I am happy when it is my birthday”) that were related to an external event. A similar task given to an older age group, who are theoretically able to construct stories with desire and beliefs as well as with external causes, may produce different results.

In summary, EU, specifically situationistic EU, relates to peer relationships among 3 to 5 year olds, specifically when measured by teacher raters. Teacher reports of children’s expressiveness (assessments of the likelihood that the child displayed such behaviors as sympathy, confidence, understanding of feelings, and an enjoyment of talking) related to EU as measured by children’s abilities to identify causes of their own and a friend’s emotions. Similarly, in a study by Cassidy, Werner, Rourke, Zubernis, and Balaraman (2003) on children ranging from 3–5.5 years, those with higher EU scores were more likely to be observed receiving praise, comfort, help, sharing, or an apology from a peer.

While situationistic EU seems to correspond with the facets of social competence that involve positive peer interactions, the relation between mentalistic EU and social competence is less studied. There is evidence that children as young as 4 are able to use mental states of desire and belief as causes of emotion. How this ability relates to or predicts components of social competence, however, is less understood (Weimer & Guarjardo, 2005). One goal of the current study was to clarify how mentalistic EU related to components of social competence in kindergarten-age children. The expansive literature on ToM provides clues about how MEU might relate to components of young children’s social competence and

supports a expectation that the relationship between mentalistic EU and social competence will somewhat mirror the relationship between ToM and social competence. The review below highlights implications of the current literature on how understanding of mental states relates to more nuanced facets of social competence.

### **Social Competence and Theory of Mind**

Liddle and Nettle (2006) reported a positive correlation between teacher-rated child social competence and first- and second-order ToM performance among 10- and 11-year-old children. Lalonde and Chandler (1995) found that individual differences in FB tasks correlated with teacher ratings of socioemotional maturity, specifically for intentional positive social behaviors (such as playing cooperatively or engaging in make-believe play). However, there was no correlation between these false-belief tasks and conventional positive behaviors (e.g. saying ‘please’ and ‘thank you’ and taking turns) (Lalonde & Chandler, 1995). These results suggest that conventional positive behaviors that rely on social scripts or parental instruction may not involve representing mental states. Therefore, ToM may not be a useful predictor for social outcomes that rely on knowledge of social scripts (conventional social competence) but may be a good predictor of interpreting social scenes correctly. Additionally, Cassidy and colleagues (2003) found that children with higher ToM scores were considered more popular by their peers. Meanwhile, having a higher situationistic EU was not related to peer popularity. Social skill items that warrant more nuanced social interactions (successful playtime, peer popularity) may therefore relate better to ToM and potentially mentalistic EU, and be more readily observable by peers, whereas

social competence items that involve more conventional social skills—like being polite, taking turns and following structured, specific rules—may relate more to situationistic EU, be more readily observable to teachers, and involve positive peer interactions.

As discussed above, the subcategories and types of social competence are important details to consider when determining the relationship between ToM and social competence. Another important consideration is potential confounding variables, such as language development, that have been shown to correlate highly with EU and Social Competence. One weakness of many early ToM and social competence studies is that they ignored the role of language in ToM success (Cassidy et al., 2003). A meta-analysis on the effects of language on false belief understanding indicates a moderate-to-large effect size of language on false belief understanding remains significant when controlling for age (Milligan, Astington, & Dack, 2007). Cassidy and colleagues' (2003) study shows an example of this language effect: preschoolers' ToM, emotion understanding, and prosocial behavior across multiple raters (observers, teachers and peers) were investigated. The ToM score was determined by combining FB change-of-location and unexpected-contents task scores. Social competence was measured via the Social Skills Rating System (SSRS) completed by teachers, and by a global rating scale of children's social skills, completed by research observers. Classmates also provided peer-likeability scores by rating their peers in the classroom. Their results indicated that when language was controlled for, teachers' and observers' ratings of children's social skills were not related to theory of mind and emotion understanding variables. However, in 3- to 5-

year-olds, children's ToM (according to FB tasks) continued to predict peer ratings of likeability, suggesting that children preferred peers with higher ToM scores to peers with less ToM understanding.

In contrast to the findings that global social skills were not related to ToM as rated by teachers and observers (Cassidy et al., 2003), Watson and colleagues (Watson, Nixon, Wilson, & Capage, 1999) found 3- to 6-year-olds' false-belief understanding to be related to teachers' assessment of children's overall social competence with peers, even after controlling for the effects of age, language comprehension ability and talkativeness. These dissonant findings could be due to the older age group involved in Watson's study, which included 5- to 6-years-olds, compared to Cassidy and colleagues' study, which that involved young children no older than 5 years. This may point to older children's social competence being more salient to teachers and younger children's competence being evident only for peer ratings (Cassidy et al., 2003). Mixed findings could also stem from the type of social competence measure used. While both the Watson et al. (1999) and Cassidy et al. (2003) studies used measures that asked about peer relations—a feature connected with ToM—they asked in different ways. Watson and colleagues (1999) used a 7-item measure that asked teachers to compare and contrast general social skills of the child with other children their age (e.g., “Compared to other children this child's age, this child has very good social skills” vs. “Compared to other children this child's age, this child does not have very good social skills”). After choosing between the contrasts, the teachers were then asked to indicate if the statements were “sort of” or “really” true. This approach is similar to peer-likeability ratings which also are shown

to relate to ToM, and which require the rater (in this case the actual child) to compare another child to their peers. In contrast, Cassidy and colleagues used the SSRS, which asks teachers to rate the frequency (never, sometimes, often) of the child's socially competent and adaptive behaviors (e.g. "Makes friends easily, helps you without being asked, accepts peers' ideas for group activities, and invites others to join in activities.") While this approach may feature items involving quality peer relations, it does not force the rater to actively compare the child in question to their peers. Reporting the frequency of the social behavior does not equate to a report on its level of quality.

Despite inconsistencies associated with the SSRS, the Social Skills Improvement System or SSIS (a revised version of the SSRS) was used in the study for two reasons. First, there are an abundance of social competence measures in the current literature that use frequency (never, sometimes, always) to rate dimensions of social competence, and some of these types of measures have been shown to yield relations to ToM (Weimer and Guarjardo, 2005). Furthermore, practical consideration made it difficult to include peer measures that asked teachers to compare children to peers (e.g., some schools are uncomfortable with comparing students to one another). Additionally, the SSIS provides parallel forms for parents and teachers, who are important informants of social skills for this age group and can provide different perspectives and information on students' behavioral strengths and weaknesses. Still, not having another form of social competence measure is a weakness of this study. We discuss other explanations for the dissonant findings of the relationship between ToM and social competence and our expected results below.

To further explain mixed findings in the social competence literature, some researchers have investigated whether the type of FB task matters when relating ToM to social competence; that is, whether different FB tasks relate differentially with children's social skills. Weimer and Guajardo (2005) found that in an array of FB tasks (*viz.*, Unexpected Change, Deception, Unexpected Contents, and Active Deception), only preschoolers' (3 to 5 years old) performance on the Unexpected Contents correlated with teachers' ratings of children's social skills, even when language ability was controlled—positively correlating with compliant behavior and negatively correlating with ratings of disruptive behavior. There were no significant correlations between ToM tasks and parent ratings of social competence, with and without language controlled. Social competence was measured by frequency of social behaviors (never, sometimes, often) as perceived by teachers (e.g. “helpful” or “shares”). This measure did not ask raters to compare the child to peers nor did the measure differentiate between conventional and intentional social competence items.

In summary, when analyzing the relationship between ToM and social competence, it is important to control for vocabulary/language, as correlations to more global indicators of social competence tend to disappear, leaving significant correlations to only a select few social indicators, such as peer likeability, for children under 5 years of age (Cassidy et al., 2003). In contrast, for older children (ages 5–6,) when age and language are controlled, ToM tasks are still related to global social competence and social skills (Watson et al., 1999). These findings may point to older children's social competence being more salient to teachers and younger children's competence being evident in peer ratings. However, these findings may also be an

artifact of the social competence measure used. Global social competence items that are worded as a comparison to peers and targeted at general interpersonal effectiveness and quality of behavior may show a relation to ToM. Other measures (such as the SSIS) that ask for frequency of social behaviors and social skills (as a manifestation of broader social competence), may not relate to ToM. However this conjecture still needs to be tested. Similarly, items worded as conventional vs. intentional social competence may relate differently to ToM (Annotti and Teglassi, in press). Overall, there is evidence that not all ToM tasks are created equal in relation to social competence—as 3–5 year old children who do well on the unexpected-contents task specifically seem more likely to be compliant and less likely to be disruptive, compared to children who succeed in other FB tasks (Weimer & Guajardo, 2005). This study includes ToM, as measured by several false belief tasks (“ToM False Belief”) and ToM as measured by other tasks (ToM Non-False Belief), such as the ability to abstract a mental state based on a picture or saying (e.g., identifying that a man is thinking based on a picture or interpreting a persons’ statement in a non-literal way based on the context), imitation (using joint attention and imitation to play a copy game together), and understanding that characters in a story have very different perspectives and being able to explain characters’ actions based on these differing perspectives. Also included is a composite ToM measure (ToM Verbal) that combined items from both ToM False Belief and ToM Non-False Belief tasks of the NEPSY II.

Overall, situationistic EU, ToM and mentalistic EU were expected to show different patterns of relations with various components of social competence; ToM

tasks and mentalistic EU were expected to positively relate to the social competence subscales involving popularity with peers and successful free play (i.e., engagement and responsibility subscales), higher rates of compliance (i.e., responsibility and externalizing problem subscales), and subscales related to noticing social nuances (i.e., empathy). Situationistic EU was expected to relate to subscales involving positive peer interactions of the conventional social competence nature—such as scripted interactions (i.e., communication subscales), rule following (i.e., cooperation subscale) and to negatively correlate to internalizing behavior.

### **Emotion Understanding and Theory of Mind**

ToM and emotion understanding are theoretically related constructs, as the ability to represent other's mental states (such as desires and beliefs) feeds into one's ability to predict and understand emotions (Ornaghi et al., 2014). Furthermore, Rieffe and colleagues (2005) posit that ToM may be a pre-requisite step for advanced emotion understanding, where children predict emotions based on the mental states of desires and beliefs that cause them. However, correlational studies that investigate the connection between ToM and general EU show mixed results. Some researchers have found that among 3–5 year olds, ToM and emotion understanding (measured with situationistic EU tasks) appear uncorrelated (Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003; Cutting & Dunn, 1999; Dunn, 1995). For example, the situationistic EU task used by Cassidy and colleagues with 3- to 5-year-olds involved the presentation of a series of 8 stories, enacted with a puppet followed by a request match the correct emotional response (happy, sad, angry, afraid) given the details of the story. The stories were designed so there were instances where the puppets should

experience emotions similar to what the child felt (typical) and instances where the puppet would feel differently from what the child felt (atypical). An example of atypical situation would be: “Jamie is going to the doctor to get a shot. Jamie loves to get shots because the doctor gives Jamie a lollipop when she is done.” At the end of the story, the child is asked how Jamie, the puppet, feels and is asked to place the appropriate expression on the puppets face. Results found no significant correlation between the EU task and ToM (measured via FB) after controlling for children’s vocabulary and socioeconomic status.

In contrast, others have shown positive relations between general emotion understanding and ToM, even with controlling for age and language abilities (Weimer et al. 2012; Hughes & Dunn, 1988). Weimer and Guajardo (2005) required 3- to 5-year-old children to describe what makes a friend happy, sad, angry or afraid and found that the quality of response correlated positively with overall FB knowledge (as measured via a range of FB tasks), independent of age and vocabulary ability. Similarly, Weimer and colleagues (2012) found that the composite EU score (assessed using both situationistic and mentalistic EU tasks) related to the composite ToM score, among 4.5- to 6.5-year-olds, when controlling for age.

Several researchers have tried to make sense of these mixed findings by positing that the “type” of emotion understanding task matters in investigating correlations with ToM. Weimer and colleagues (2012) expected to find that more advanced emotion understanding abilities (such as predicting an emotion the protagonist is trying to hide, or predicting the current emotional state of the protagonist who is reflecting on an emotionally laden past event) as opposed to less

advanced emotion understanding abilities (such as a situation knowledge task) would predict children's FB score in 4.5- to 6.5-year-olds. In contrast, they found that only children's understanding of external causes (situationistic EU task) predicted FB performances.

Harwood and Farrar (2006) posited that these mixed results of the correlation between ToM (represented via FB tasks) and emotion understanding may be due to conflating very different types of emotion understanding tasks as similar; namely emotion understanding items that reflected a child's ability to understand conflicting emotions (either internally or between two people) and items where there were no conflicting emotions present. In support of their theory, they found that when children, 3–5 years of age, were presented with vignettes where they and a friend either had matching emotional reactions (sad–sad or happy–happy) or different emotional reactions (sad–happy or happy–sad), FB tasks were only significantly related to vignettes of the “different emotions” type. The authors postulate that the “different emotions” task required children to predict another person's internal state when it differed from his or her own—similar to demands of the FB tasks. These findings suggest that the type of emotion understanding task matters; if one expects to find a correlation between EU and ToM, each task must have similar demands (Harwood and Farrar, 2006).

In summary, the relationship between ToM and emotion understanding is still under investigation. While theoretically, these constructs are related and one may even be a prerequisite for the other, research does not provide a robust account for their relationship. One reason may be that the type of EU task must reflect the

demands of the ToM task in order to see a correlation (Harwood & Farrar, 2006). One example of an appropriate type of EU task that may be related to ToM, is one that involves some form of *emotional tension*, where the child must represent different emotions or desires for different characters in a story. (See Narrative Measurements of Emotion Understanding section for how the mentalistic measure used in this study uses tensions and conflicts of desires in the stimuli). Weimer, Sallquist and Bolnick (2012) showed that situationistic tasks related to false-belief tasks whereas mentalistic-type tasks did not, this finding is surprising and should be further investigated. Another possible reason for these mixed results is the age group of study—several studies that found no correlation between ToM and Emotion Understanding, used primarily 3–5 years olds. An older population may be more adept at tapping into their mental understanding abilities than younger populations (Cassidy et al., 2003).

### **Issues in Measurement**

#### **Traditional measurements of emotion understanding and theory of mind.**

Several measures have been developed to assess the construct of EU. Most measures employ a vignette paradigm, where the proctor reads a short story and asks if the character feels happy, sad, mad, scared or has no feeling. The scenarios are highly prototypical and familiar to the child (going to get ice cream, playing a game, eating food). Traditionally, situationistic EU tasks and mentalistic EU tasks have a similar form and administration despite the varying levels of complexity and task demands. These similarities include a) a structured performance task, where there is a correct and incorrect answer, the instructions are clear and cues provided to guide

participants to the correct answer; b) 2–3 sentence vignette stories presented to the child featuring one or several characters; information about an external event, internal desire or belief or thought is given in the story; c) a multiple choice prompt of whether the character/characters in the story feels happy, sad, mad, scared or no feeling; d) associated props or picture books to illustrate the stories; e) scoring of children's answers as either right or wrong, with some scoring including partial credit for the correct valence; f) gender-specific or gender-ambiguous stories; and g) correcting pre-requisite information such as a false-belief state or past feeling that was answered incorrectly, before asking the main emotion question of how the character is feeling. (For a general overview of different EU tasks, descriptions and age of onset, see Appendix A).

**Situationistic EU measurement.** Situationistic EU can be measured by considering emotion recognition and external cause, respectively.

***Emotion recognition.*** Emotion recognition is a component of emotion understanding that involves an ability to recognize and label emotion in facial expressions and social situations (Izard, Schultz, & Fine, 2000). Onset of this skill occurs at approximately 3-4 years of age (meaning children less than 3 years old are unlikely to show mastery of this skill). Several studies have found a connection between emotion recognition and aspects of social behavior, such as peer competence, peer likeability, and peer social acceptance (Izard, Schultz, & Fine, 2000).

**External cause.** Emotion situation knowledge involves the ability to match emotion labels with events (Schultz, Izard, Ackerman, & Youngstrom, 2001). Literature in this paradigm is usually based on Denham's (1986) work, which assesses a child's acknowledgement of feelings experienced by an agent in a certain situation. For example, children are shown a puppet, presented with several stories about the puppet and are given a score based on whether the child's identification of an emotion matches the events of the story (ex. a child anticipates sadness of a character in a vignette who has lost their favorite toy) (Cassidy et al., 2003; Garner & Estep, 2001). Being able to understand how external causes affect the emotions of others is shown to have an onset age of 3–4 years old.

**Mentalistic EU measurement.** Measures of mentalistic EU involve methods of measuring emotions as related to the understanding of desire and belief states.

**Desire.** With onset between 3–5 years, children are able to predict a person's emotional reactions depending on the character's desire. This task can involve a single character being disappointed in a situation where his or her desire was not met or may involve two people feeling a different emotion due to a difference of desires (Pons, Lawson, Harris, & Rosnay, 2003).

**Belief.** Onset is between 4-6 years of age. Children understand that they can use a person's beliefs (whether false or true) to predict the emotional reaction in a given situation. Usually, the person's mental state/beliefs are provided to the child (Pons, Lawson, Harris, & Rosnay, 2003).

**Theory of mind measurement.** ToM is typically approached through false-belief tasks with common tasks include the unexpected change of locations tasks and unexpected contents tasks. However, as previously discussed, these measures should not be considered the end-all for ToM measurement—any measure that taps into understanding other’s mental states can be thought of as ToM, with false-belief tasks being one-of-many ToM options (Bloom & German, 2000). Recent updates of a popular neuropsychology assessment, the Developmental NEuroPSYchological Assessment, 2<sup>nd</sup> edition (NEPSY-II; Korkman, Kirk, & Kemp, 2007) included both false belief task and non-false belief tasks, with the latter tapping into advanced ToM. Specific ToM tasks, as pertinent to the study are discussed below.

***Unexpected change of location.*** False-belief (FB) tasks are the most common ToM tasks found in the literature. They involve acknowledgment of a state of reality that differs from one’s own (or another agent’s) belief state and often ask for predictions of behavior based on that belief state. This classic FB task was created by Wimmer and Perner (1983) and involves a story where an object is placed in one location by the agent and then consequently moved to another location by another character in the story while the agent is unaware. After listening to the story, the child is asked where the agent will look for the object, in location 1 (where the agent left it last) or location 2 (where the secondary character moved the object to). Modifications to this task involved acting out the change of location using a puppet that places a favorite toy in box 1 for safekeeping, and while the puppet is away the experimenter moves the toy to box 2. The child is then asked where the puppet will look, box 1 or box 2.

***Unexpected contents or deceptive contents.*** Usually adapted from Perner, Leekam, and Wimmer (1987) or (Wimmer & Perner, 1983), in an unexpected contents task, the child is shown a box marked by some descriptor (such as a Band-Aid box) and is asked what she thinks is inside the box (Band-Aids). The experimenter then opens the box and reveals an unexpected object (such as rubber bands) instead. The rubber bands are returned to the box and then the child is asked what her friend, who has never looked inside the box, will think is in the box.

***Non-False belief ToM tasks.*** Non-false belief tasks can be verbal, pictorial, or both and involve asking questions about the given scenario or pictures, whose answers reveal an understanding of the mental states or the characters' point of view. Baron-Cohen (1989) developed several first-order theory of mind tasks that are still used in major measures of children's cognitive functioning (e.g., NEPSY-II). In *appearance-reality* task, participants are tasked with using their own mental states to judge their environment by distinguishing between appearance and reality. One example of this task, from the NEPSY-II ToM subtest, is a pictured teakettle that looks like an apple. Children are then asked what the object is (a correct answer being a tea-kettle). Another ToM task is the *mental-physical distinction*, where the participant must differentiate between different mental states (i.e., thoughts, dreams, pretense and memories) and their connection to a physical phenomena. On the NEPSY-II ToM subtest, an adaptation of this task entails that the child is read a story about three different girls who are dreaming about, reading about, or live near, dolphins. Then child is then asked "who can hug the dolphin in real life?" Another ToM task is called *concept of the brain*, which tasks the participant with describing a

mental function instead of a behavior function. Another task type on the NEPSY-II ToM, the child views a picture of a man that looks like he is thinking and is asked “what is the man doing?”. If the child answers with a behavior, such as “putting his hand on his chin” or “staring” they would not receive full credit. But if they recognize the man is thinking, they have identified a mental state from a pictured stimulus. Other ToM tasks involve tasks of abstraction, where the child must go beyond the literal (such as literal statement or pictured behavior) and apply contextual clues to decipher the person’s meaning or thoughts.

**Limitations.** For the emotion understanding measures described above, most are structured measures with a clearly defined correct answer that are designed to measure the potential *ability* within the child to reach stages of EU. In contrast to these structured measures are unstructured measures, which tap into every day demonstrations of the internal ability and real-world performance. The demands of the maximal-type tasks (which aim to measure maximal ability) may not transfer to real-world demands in predicting other’s emotions—especially when predicting the emotions involves inferring a person’s mental state. Indeed, traditional measures of EU involve prototypical situations, where the external events and mental states (like the characters thoughts or states) are given (read aloud to the child). In real life, social situations may be much more ambiguous, with an incomplete “story” known to the child; a child may not be “given” details of a situation before being told to predict a person’s emotions, but instead, must *notice* social cues, context and the environment in real time and construct their own story of what is happening in order to predict an agent’s emotions (Rieffe et al., 2005). In other words, emotion understanding in the

real world may involve children's interpretations of what their classmates are thinking or feeling based on cues in the environment.

**Narrative measurements of emotion understanding.** Novel measures of EU that involve similar task demands to EU utilization in the real world involve addressing children's propensity to notice cues and context and make appropriate emotion attributions. Answers given during storytelling tasks, such as the Thematic Apperceptions Test (TAT), involves interpreting ambiguous social scenes, reveal aspects of a person's thinking and problem solving in real-life social situations. The TAT has been used in research to distinguish emotionally disabled children from non-emotionally disabled children (McGrew & Teglasi, 1990) and in investigating social information processing and teacher ratings of aggression (Simcox, 2009).

Traditionally a projective measure, in this study, the TAT is used as a performance measure that calls for the narrator to relate the behaviors they describe with inner states that they attribute to story characters. In this storytelling task, children are shown a series of black-and-white pictures depicting a social scene and must size up social cues and reason about the social situation. Oftentimes there is implied tension or conflict in the stimuli, where it is clear that two characters have different beliefs, desires or thoughts (ex. characters are turned away from each other with neutral or ambiguous expressions). The instructions for the TAT ask respondents to construct a complete story by sharing (Murray, 1943): What is happening in the picture? What happened before? How are people (persons) in the picture feeling? What are they thinking? How does everything turn out at the end? These story components are relevant to social cognitive theories, incorporating the various elements of social

information processing involved in social problem solving (Teglasi, 2010).

Participants' responses can be coded using a myriad of scales/categories, however the categories of "level of abstraction," and "perceptual integration" were chosen for this study given their connection to mentalistic emotion understanding.

Level of abstraction involves how well a child can "interpret" the social scene beyond what is pictured in the scene. Coding is done across four levels, with the lowest level corresponding with a highly "externally organized" story (where emotions and other elements of the story are only elicited and tied to what is seen in the picture) and the highest coding level corresponding to an "internally organized" story (where elements of the story go beyond what is pictured, and is tied to character's thoughts, desires, and long-term plans). Perceptual integration, similarly, identifies the presence of a character's inner and outer worlds, but focuses on the integration of the two, and the presence of social causality in the story (Annotti & Teglasi, in press). Coding is done across five levels. Perceptual integration not only requires noticing the emotional and interpersonal cues in the picture (e.g., facial expressions, posture, location relative to other characters) and the context of the picture (objects, background, clothing), but it also entails producing a reasonable conceptual framework of the social scene (e.g., thoughts, desires, expectations, and schemas) that integrates these details into a story. For example, the posture and facial expression of one character in the card may suggest they feel upset, while the other character, which has a softer facial expression or a different posture, may not feel the same way. In order to get a higher score, the child must then create a contrast between

these two characters and integrate the context details in order to provide a realistic reason and outcome for the conflict.

### **Summary of Purpose**

This study aimed to investigate the use of situationistic EU, mentalistic EU and ToM in children 5–6 years of age, in relation to social competence and to each other. The focus was on how all these components predict social competence when taken together and considered in isolation, when controlling for vocabulary. This study was novel in its investigation of the relationship between EU and social competence, in that it specifically distinguished between mentalistic EU and situationistic EU and looked at their differential relationship to social competence.

Furthermore, this study sought to clarify EU theory by distinguishing between mentalistic EU and situationistic EU as separate constructs in relation to ToM. This study sought to avoid common pitfalls of other studies that have compared mentalistic EU with ToM, by using a novel mentalistic EU task that required similar task demands to ToM false beliefs—showcasing characters that are in conflict and have different desires, thoughts and feelings from one another. To the extent that both EU and ToM tasks tap into the meta-representation skills of this age group, scores should be correlated. In contrast, a traditional EU measure of situationistic skills that does not require mental state understanding was not expected to correlate with ToM. To this researcher’s knowledge, few studies have used a narrative task to tap into mentalistic EU abilities and relate those to ToM and situationistic EU ability. An exception is one study by Symons, Peterson, Slaughter, Roche, and Doyle (2005) that investigated the relation between “spontaneous mental state discourse” (e.g.,

“they are thinking,” “they want...” and ToM performance of 5–7-year-old children during a story-telling task. Results indicated the child’s propensity to use cognitive and desire state language (but not emotional or behavioral language) correlated significantly with a mentalistic EU measure, a change of location ToM measure and a combined ToM measure, even when controlling for age, receptive language, and socioeconomic status. Furthermore, when children were shown pictures of different scenarios, but were just told to tell a story (open question responses) children who commented on thoughts, dreams, and feelings of story characters when creating a narrative story were more likely than their peers of comparable age and verbal ability to pass standard false belief tasks. These findings support the ability of a storytelling task to tap into mentalistic-type emotion understanding and to relate to ToM.

This study used several measures of emotion understanding: 1) The Emotion Comprehension Test (ECT; unpublished) a measure of situationistic EU knowledge that employed both emotion identification and a vignette paradigm, both popular to emotion understanding literature and 2) the TAT, used in this study as a storytelling task that measures mentalistic EU by requiring children to size up the tensions depicted in pictures, to recognize emotions, and to connect these emotions to both external and internal causes. Select items from The Developmental NEuroPSYchological test, 2<sup>nd</sup> edition (NEPSY-II; Korkman, Kirk, & Kemp, 2007) ToM subtest was used as a measure of ToM. Items included several false belief tasks as well as broader measures of children’s mental state understanding. This study related these EU and ToM measures to each other and to social skills questionnaires

as rated by both parents and teachers. (See Appendix B for a table of constructs and their corresponding measures and Appendix C for a description of each measure).

### **Hypotheses**

1) Situationistic and mentalistic EU are distinct constructs.

1a). There is a low or non-significant correlation between situationistic and mentalistic EU.

1b). Situationistic and mentalistic EU have distinct relations to external correlates— mentalistic EU relates to ToM but situationistic EU does not.

1c). Mentalistic EU and situationistic EU relate differently to various subcategories of social competence within the SSIS. Mentalistic EU relates to the Engagement, Empathy, Responsibility, and Externalizing subscales on the SSIS, whereas situationistic EU relates to the Communication, Cooperation and Internalizing subscales.

2) When taken together, mentalistic EU, situationistic EU and ToM predict a significant amount of variation in social competence for teachers, even when controlling for vocabulary.

2a). Mentalistic EU, situationistic EU and ToM account for a significant amount of variance in teacher-rated social competence when controlling for vocabulary.

3) Mentalistic EU remains a significant predictor of teacher-rated social competence in a model that includes situationistic EU and ToM, controlling for vocabulary.

## **Chapter 3: Research Methods and Research Designs**

### **Participants**

This study was part of a larger research project conducted by Dr. Hedy Teglasi and a team of graduate students. The current study made use of a subset of available data, including performance measures of emotion understanding and ToM and parent and teacher ratings of social competence. Only participants who had two of the three major independent variable measures (e.g., TAT, ToM, and ECT) and at least one rater for the SSIS were included. From the larger study sample (N=109) 71 participants met this criteria. Power analyses using G\*Power (Faul, Erdfelder, & Buchner, 2009) were conducted to determine that a sample size of N = 66 would be needed for a regression analyses predicting teacher-rated SSIS scores in order to detect an  $R^2$  of .15 or an  $f^2$  effect size of .18 increase from step 1 to step 2, with at least .80 level of confidence given the number of predictors in the study (predictors in Step 1 = 1, predictors in Step 2 = 3).

The sample was comprised of 71 kindergarten children between 5 to 7 years of age, their parents, and their teachers, recruited from six schools in the DC metro area, one school in the Chicago area, and one school in the New York area. All schools showed similar levels of diversity. Of the schools participating in the study, six were private Christian schools, one was a public school, and one was a laboratory school under a public research university. Classroom size ranged from 15-25 students with participation rates per classroom ranging from 30-60%. The sample included 41 males and 30 females (Mean Age = 69.50 months; Age range = 60 to 78 months).

The sample size was moderately diverse but the majority of children were White (60.6 % White, 15.5 % Black, 9.9 % Latino, 11.3 % Asian, and 2.8 % Unknown).

### **Measures**

**SSIS parents and teachers.** Parents and teachers rated children's social and academic competence using the Social Skills Improvement System (SSIS; approximate completion time is 10 minutes)—a widely used, normed measure appropriate for children aged 3–18 that assesses a range of social elements. The test is made up of four distinct scales: social skills (made up of assertion, responsibility, self-control, communication, cooperation, empathy, and engagement subscales), problem behaviors (made up of externalizing, internalizing, bullying, hyperactivity, and autism spectrum subscales), and an academic competence scale (only for the teacher version) (Gresham et al., 2011). The research team hand-scored this measure using standardized scoring procedures. Norms based on age were used to produce a total social skills score. As reported by Gresham et al., 2011, the internal consistency and test-retest reliability for both parent and teacher SSIS scales and subscales are reasonably robust. Specifically, the coefficient alphas for both the teacher-and parent-rated social skills and externalizing and internalizing scales are all in the mid- to upper-.90s. The subscales in each category have median reliabilities in the mid- to high-.80s on both the parent and teacher forms. All the Cronbach's alpha coefficients for individual subscales are equal to or exceed .70. Furthermore, the test-retest indices for total social skills were .82 for the teacher form and .84 for the parent form (Gresham et al., 2011).

**Theory of mind.** Children were administered the ToM subtest from the Developmental NEuroPSYchological Assessment, 2<sup>nd</sup> edition (NEPSY-II; Korkman, Kirk, & Kemp, 2007) with an approximate testing time of 10 minutes, to assess participants' ability to understand that others have thoughts, ideas, and feelings that may be different from one's own. The ToM subtest is standardized and normed with adequate reliability. Internal reliability is above .80 for the ToM subtest for the age group of 5–6 years of age. Test-retest reliability for ToM total score in 5–6 years of age group is .77 (Brooks, Sherman, & Strauss, 2009).

The ToM subtest involved two parts—a Contextual part and a Verbal part. In the Contextual part, children viewed a pictured scenario (e.g., a girl on a rollercoaster) and pointed to several facial expressions to denote what the girl must be feeling. This part of the ToM task was excluded from the study due to its similarity to the ECT Emotion Situations task.

The ToM Verbal score was computed by summing the child's performance across 15 items. Notably, while the NEPSY-II ToM subtest provides the ToM Verbal score, the researcher further subdivided this subpart into a "ToM False Belief" score and "ToM Non-False Belief" score. The researcher calculated the ToM False Belief score from the child's performance on four false belief tasks and the ToM Non-False Belief score based on the remaining items that made up the ToM Verbal score. The False Belief score was made up of several traditional false belief tasks (*viz.*, an unexpected change of location vignette, two unexpected contents tasks, and one second order ToM task). The remaining tasks (used for the Non-False Belief score) included additional vignettes, pictures, and activities, which prompted children to

indicate they understood a characters' mental state. For example, for several items, the child had to provide a reason for a character's actions in a story that required an understanding of a difference of perspectives between characters. For other items, the child had to go beyond the literal meaning of a statement to interpret what the person must mean given the context of the situation. The child also participated in imitation activities and utilized abstraction skills to interpret what an object was or what a person was doing in a concrete picture

**Situationistic EU.** Children were administered the Emotion Comprehension Test (ECT), developed by Dr. Hedy Teglassi and her research team (unpublished; approximate testing time of 20 minutes) for children in the preschool and kindergarten age range. This test is an adaptation of the widely used Assessment of Children's Emotion Skills (ACES; Schultz et al., 2004) a non-standardized, non-normed performance measure. The test consists of three subparts: a) the Emotion Identification subtest, b) the Emotions Situations subtest, and d) the Emotion Behaviors subtest. Only the first two subparts (Emotion Identification subtest and the Emotions Situations subtest) were used for the purposes of this study and were combined to form a 36-item measure of situationistic emotion understanding (referred to as "ECT-combined" test). The Emotion Identification subtest (21 items) required the participant to say whether a series of pictured children were happy, mad, sad, scared or had no feeling. The child was then administered the Emotion Situations subtest (15 items), where the participants listened to vignettes acted out by puppets that provided situational cues to what the character was feeling. After listening to the story, the participants were asked if the character felt happy, mad,

sad, scared or no feeling. (Ex. “Green let Red play with Green’s favorite toy. Red plays with the toy and then it breaks. Do you think Green feels happy, sad, mad, scared, or no feeling?”). The directions for the vignettes were clear and in a language appropriate for a three to six year old (See Appendix C for the ECT Emotions Situations test). The ECT utilized a 3-point scoring system that differentiated between the correct emotion (ex. mad would receive 3 points), an answer with the incorrect emotion but with the correct valence (ex. sad or scared would receive 2 points) and an incorrect emotion (ex. happy or no feeling would receive 1 point). The correct answer for each picture/vignette was determined by a team of researchers and pilot tested on a group of adults. For some items, more than one answer was thought to be appropriate. In those cases, more than answer could receive full credit. If there was one clear primary emotion and a likely secondary emotion, only the primary emotion was considered as correct. Previous research had shown that internal consistency of the Emotion Identification (EID) test ( $\alpha = .80$ ) and the Emotions Situations test ( $\alpha = .81$ ) (reported in Gustafson, 2009) were acceptable according to the commonly used guideline of a Cronbach’s Alpha of .70 or higher.

**Mentalistic EU.** Children were administered the TAT (administration time approximately 15 minutes). The TAT is a non-standardized, non-normed performance measure that gives insight into social scripts, schemas and perception utilized by the participant. There were seven black and white cards, each with a different social scene. For example, in one card a man angrily looks forward as a woman has her hand on his shoulder and tries to hold him back. In another card, a

girl on a farm looks off into the distance with books in her hands, while people work on the farm behind her. In another card, a girl holds a baby or doll and looks away from an adult that is beside her. Children were asked to “tell a story about what is happening in the picture. Tell me what happened before, what the characters are thinking and feeling and how it all turns out in the end.” If a child missed an element of the story they were prompted to tell about the element missed (e.g. “And what are the characters feeling?”).

Participants’ stories were coded for level of abstraction (level 1 to level 4) and perceptual integration (level 1 to level 5) with higher levels indicating more well developed and adaptive schemas (as discussed in Chapter 2). Abstraction and perceptual integration were chosen as codes for mentalistic EU due to their reliance on acknowledging and processing the emotions of the characters in the stories and integrating those feelings into a larger framework of different thoughts and actions across characters. With training and practice, coders have shown inter-rater reliability in each of these coding parameters to be .80 or higher (Blankman, Teglasi, & Lawser, 2002). The researcher and an expert in the TAT field coded these stories. For each participant, an average score for each category (Abstraction and Perceptual Integration) was calculated based on an overall sum score divided by the number of cards, for each category. These two averages were then averaged together to determine the total TAT mean score.

**Vocabulary.** The Wechsler Preschool and Primary Scale of Intelligence, 3<sup>rd</sup> edition (WPPSI-III) vocabulary subtest was administered as a proxy for a language measure. The WPPSI-III comprises of 25 words arranged in order of increasing

difficulty and administration takes around 10 minutes. The child is asked to explain the meaning of each word (e.g., “What is a \_\_\_?” or “What does \_\_\_ mean?”) (Kaufman & Lichtenberger, 2000). This measure was chosen due to its excellent reliability coefficient (25 items;  $\alpha = .89$ ) and because of its wide use and targeted assessment of young children’s verbal ability (designed specifically for ages 2:6 to 7:3). All measures and their corresponding constructs are provided in Appendix B.

### **Procedure**

**Procedure for recruitment.** These procedures were part of a larger study that spanned from Spring 2012 to the present. IRB approval was obtained to conduct a human research study. School administration was contacted to gauge interest in schools’ participation. Researchers met in person with teachers and/or parents when possible—The research team made presentations to parents and teachers attending a Back to School night, explaining the purpose of the study and requirements of parents and children who chose to participate. A letter detailing the study, including Institutional Review Board information, as well as a consent form, was placed in the parent mailbox of children attending the kindergarten class.

Procedures spanned from the fall to the spring semester of each academic year until all participants were tested. Data collection began in late fall to ensure the teachers knew students well enough in order to rate their behavior and that students’ behaviors were typical. Questionnaires were sent to parents’ home using the parent mailbox and hand-delivered to the teachers’ classrooms. Parents completed questionnaires and returned them to the classroom teacher in the provided packet. The researchers then collected both parent and teacher rating forms from the classroom

teacher. Children were taken out of the classroom during free time for 20–30 minute testing sessions until they had completed all performance measures (approximately 40–50 minutes total administration per subject).

Graduate research assistants underwent training in administration of all performance measures. Training consisted of the research assistant reviewing instructions, items, responses, and stimulus materials under the guidance of an experienced research assistant prior to assessing child participants. Research assistants then observed an experienced researcher administering the assessment to a child participant, prior to administering the assessment independently.

**Procedure for analyzing results.** Due to data being nested across various schools and classrooms, multilevel modeling was suspected as a necessary statistical analysis procedure. ICC’s between School and SSIS teacher were calculated to determine the need for a multi-level model. Notably, ICC’s were not run with the teacher variable because of several classrooms that only had one student (see Table 1).

Table 1

*Student Frequency by School*

| School | Teacher | Student |
|--------|---------|---------|
| A      | A1      | 15      |
|        | A2      | 4       |
|        | A3      | 3       |
|        |         | N = 22  |
| B      | B1      | 4       |
|        | B2      | 1       |
|        | B3      | 1       |
|        |         | N = 6   |

|   |    |        |
|---|----|--------|
| C | C1 | 5      |
|   | C2 | 6      |
|   | C3 | 2      |
|   | C4 | 3      |
|   |    | N = 16 |
| D | D1 | 1      |
|   | D2 | 1      |
|   | D3 | 1      |
|   |    | N = 3  |
| E | E1 | 1      |
|   |    | N = 1  |
| F | F1 | 3      |
|   | F2 | 1      |
|   |    | N = 4  |
| G | G1 | 6      |
|   |    | N = 6  |
| H | H1 | 4      |
|   | H2 | 3      |
|   | H3 | 6      |
|   |    | N = 13 |

The intraclass correlation can be estimated from the mean square in the ANOVA table. Due to unequal student sample sizes within schools, an unbalanced ANOVA was used to determine the ICC using the following formula as the ICC estimate:

$$ICC = \frac{MS_B - MS_W}{MS_B + (n' - 1)MS_W}$$

Where the quantity  $n'$  is estimated by the formula below:

$$n' = \frac{1}{n - 1} \left[ \sum_{i=1}^n n_i - \frac{\sum_{i=1}^n n_i^2}{\sum_{i=1}^n n_i} \right]$$

Where  $n$  is the number of sampled schools, and  $n_i$  is the number of sampled students in school “ $i$ ”. This quantity can be interpreted as the average  $n_i$  in the case of an unbalanced one-way, random effects ANOVA.

ICC's that are close to zero suggest a negligible effect of variance accounted for by the independent variable (e.g., school). Results of the ICC indicated that the school the child attended did not have a significant effect on the teacher's rating of his or her total social competence score or social competence subscale scores. Exceptions were the engagement subscale, which showed an ICC of .13 (indicating 13 percent of the variance in engagement could be accounted for by the school the child attended) and the internalizing subscale, which showed an ICC of .16, indicating 16 percent of the variance in internalizing behavior could be accounted for by the school the child attended.

The overall lack of cluster effects at the school level may be a result of the homogeneity among schools. Several schools that participated in this study were private, religious-based institutions. Additional ICC's also indicated that school did not account for a large amount of variation on the independent variables of ECT, TAT, or ToM Verbal score. These data support the use of an ordinary least squares (OLS) regression as an appropriate statistical analyses, as the nested nature of the data does not seem to interfere with variation in the outcome measure of interest (e.g., SSIS-T total score). Table 2 shows the ICC between School and SSIS-T and between School and other independent variables of interest.

Table 2

*Intraclass Correlation Coefficients\**

| Scale            | ICC: School |
|------------------|-------------|
| SSIS-T           | .03         |
| Engagement       | .13         |
| Empathy          | -.06        |
| Responsibility   | -.03        |
| Externalization  | -.00        |
| Communication    | .08         |
| Cooperation      | .00         |
| Internalizing    | .16         |
| ECT              | -.04        |
| TAT              | .02         |
| ToM Verbal Score | .08         |
| Vocabulary       | -.08        |

\*Data were excluded from the analysis if there was only one child with complete data from that school. The dataset for this analysis includes 7 schools and 19 teachers ( $n=69$  children).

***Determining control variables through exploratory analysis.*** An exploratory analysis using zero-order correlations gave guidance to variables that should be controlled for in later multiple regression analyses (e.g., vocabulary, age in months, school or gender). Correlations among the potential control variables (e.g., vocabulary, age and gender) with TAT, ToM, ECT, and SSIS-T and SSIS-P are shown in Table 3. The alpha level of .05 was used for all statistical tests. All analyses were conducted with the outlier case (which was 3 standard deviations from the mean on the ECT measure) removed. Vocabulary showed significant correlations across all independent variables and teacher-rated social skills. Specifically, vocabulary correlated with the EID subtest ( $r(66) = .49, p < .001$ ), ECT Emotion Situations ( $r(66) = .45, p < .001$ ), ECT-combined subtest ( $r(66) = .56, p < .001$ ), the TAT mean score

( $r(68) = .40, p = .001$ ), the Level of Abstraction score ( $r(68) = .39, p = .001$ ), Level of Perceptual Integration score ( $r(68) = .37, p = .002$ ), ToM Verbal score ( $r(68) = .30, p = .01$ ), ToM False Belief score ( $r(68) = .461, p = .000$ ), and SSIS-T,  $r(67) = .44, p < .001$ . Vocabulary also approached statistical significance with ToM Non-False Belief,  $r(68) = .22, p = .069$ . However Vocabulary did not relate to SSIS-P,  $r(57) = .03, p = .81$ . Age in months only showed significant correlations for the TAT mean score ( $r(68) = .38, p = .001$ ), Level of Abstraction ( $r(68) = .32, p = .008$ ), Level of Perceptual Integration ( $r(68) = .42, p < .001$ ), ToM Verbal score ( $r(68) = .31, p = .009$ ) and ToM Non-False Belief,  $r(68) = .33, p = .005$ ). Spearman correlations of gender were non-significant across all variables. Additionally, Vocabulary showed non-significant correlations to Age in months,  $r(68) = .12, p = .336$  and Gender,  $r_s(68) = -.00, p = .981$  (not shown in table). A t-test on race (white vs. non-white) on teacher-rated social skills ( $t(50) = -.65, p = .521$ ) and parent-rated social skills ( $t(42) = -.02, p = .985$ ) showed non-significant effects for both raters.

Table 3

*Pearson and Spearman Correlations of Vocabulary, Age, and Gender with Select Independent and Dependent Variables*

|                           | Vocabulary | Age in months | Gender |
|---------------------------|------------|---------------|--------|
| ECT-combined <sup>a</sup> | .56***     | -.05          | .03    |
| EID                       | .49***     | -.11          | .01    |
| Emotion Situations        | .45***     | .07           | .07    |
| TAT                       | .40**      | .38***        | .08    |
| Abstraction               | .39***     | .32**         | .09    |
| Perceptual Integration    | .37***     | .42***        | .05    |
| ToM Verbal                | .30*       | .31**         | .12    |

|                      |        |       |      |
|----------------------|--------|-------|------|
| ToM False Belief     | .46*** | .14   | -.14 |
| ToM Non-False Belief | .22    | .33** | .20  |
| SSIS-T               | .44*** | .14   | .21  |
| SSIS-P               | .03    | .09   | .03  |

<sup>a</sup> Combined all items from the ECT Emotion—Identification test and ECT Emotion—Situations test

\*\*\*. Correlation is significant at the .001 level (2-tailed).

\*\*. Correlation is significant at the .01 level (2-tailed).

\*. Correlation is significant at the .05 level (2-tailed).

The exploratory analysis suggested that vocabulary, as measured by the WPPSI-III, should be controlled for in a regression analysis due to its relationship to both independent and dependent variables of interest. In contrast, age in months, while relating to several independent variables (e.g., TAT and ToM) did not relate to the outcome variable of SSIS-T. The SSIS-T is a normed measure that accounts for age of participant in the standard score, therefore, the influence of age in months for teacher rated SSIS scores was expected to be negligible. A preliminary MR analysis ( $R^2 = .21$ ,  $F(2, 66) = 8.50$ ,  $p = .001$ ) of both vocabulary and age predicting SSIS-T scores supported this claim. While vocabulary,  $\beta = .432$ ,  $p < .001$ , was a significant predictor in the model, age was not,  $\beta = .096$ ,  $p = .387$ . For this reason, only vocabulary was controlled for in the multiple regression analyses, discussed below.

**Major Analyses.** Descriptive statistics were run on the data using SPSS. Mean scores and ranges on all variables are reported in the results section (see Table 4). Zero-order correlations and partial correlations (with vocabulary controlled for) were run between the TAT and ECT-combined test. Partial correlations between ToM (as measured by the NEPSY-II ToM Verbal subpart, ToM False Belief Score and ToM Non-False Belief Score) and mentalistic EU (TAT total score) and ToM and

situationistic EU measures (ECT-combined test) were also run. Zero-order and partial correlations were also run between subcategories of the SSIS (parent and teacher versions) and ECT-combined, EID, ECT Emotion Situations, TAT total score, Abstraction, Perceptual Integration, ToM Verbal score, ToM False Belief score, and ToM Non-False Belief variables.

A multiple regression (MR) was used to understand how much variability in social competence was accounted for by the mentalistic EU, situationistic EU, and ToM, as well as what measures accounted for a unique amount of variance in the model. Step one of the analyses included vocabulary as a control variable and step two included the TAT, NEPSY-II ToM Verbal Score (total of FB and non-FB), and the ECT-combined subtest. Appendix E lists all variables used in the analyses and provides a summary of preliminary analyses, research questions and hypotheses, and corresponding analyses.

## Chapter 4: Results

### Procedure for Missing Data

Of the 71 participants (N = 70 when the outlier case was removed) there were a total of 67 complete cases for the teacher data set and 57 complete cases for the parent data set. There were no missing items reported for the TAT or ToM measures. One participant was missing the SSIS teacher measure (N = 69), twelve participants were missing the SSIS parent measure (N = 58), and two participants were missing the ECT-combined measure (N = 68). For the ECT-combined test only 3 of the 70 (4.2%) participants had missing items. Notably, no participant had greater than a 7% rate of missing items on the ECT. Scores for these missing items were determined by averaging the participants' scores across the ECT-combined test and inserting this average for the missing item. Participants who gave multiple answers (e.g., scared and mad) and did not indicate a single answer when prompted, received a score based on an average of their two answers.

### Internal Consistency and Reliability

The internal consistency was established for the Emotion Identification test, the Emotion Situations test and the combined ECT measure. Researchers often consider Cronbach's Alpha of .70 or higher to be in the acceptable range. However, Devellis (1990) considered alphas of .60 as undesirable but not unacceptable. With the outlier case included, the internal consistency of the Emotion Situations subtest (15 items;  $\alpha = .67$ ), the Emotion Identification subtest (21 items;  $\alpha = .71$ ), and the

ECT-combined subtest (36 items;  $\alpha = .80$ ) was all within the acceptable range. However, after removing the outlier, the internal consistency of the Emotion Situations subtest alone (15 items;  $\alpha = .42$ ) was below the acceptable range while the internal consistency of the Emotion Identification subtest (21 items;  $\alpha = .67$ ) was undesirable but not unacceptable. These two measures were combined to form the ECT-combined test for several reasons: a) emotion understanding literature considers both emotion identification and situation-vignette tasks to be “situationistic-type” EU, b) adding the more reliable items from the EID could improve the internal consistency issue, and c) the Emotion Situations subtest and Emotion Identification subtest showed a statistically significant correlation,  $r(66) = .39$ ,  $p = .001$ , and did not indicate a redundancy. The combined ECT measures’ internal consistency, with the outlier case removed, was considered to be in the acceptable range (36 items;  $\alpha = .71$ ). The frequency of correct vs. incorrect answers for the EID and ECT-Situations is reported in Appendix D.

All other measures of internal consistency and reliability were calculated with the outlier case removed (N = 70). The internal consistency for the WPSI-III Vocabulary subtest was considered adequate (25 items;  $\alpha = .81$ ). The internal consistency for the TAT Abstraction (6 items;  $\alpha = .90$ ) and the TAT Perceptual Integration (6 items;  $\alpha = .83$ ) was calculated and found to be adequate. Inter-rater reliability was also calculated for the TAT. Due to the archival nature of the data, inter-rater reliability for the first half of the participants was already calculated from a previous study for Abstraction (ICC (2,1) = .90) and Perceptual Integration (ICC (2,1) = .89) and both were adequate. An updated inter-rater reliability was calculated

between the researcher's ratings and a TAT expert's ratings. Both raters independently coded the same 60 cards (30 Abstraction and 30 Perceptual Integration). The two way random effects ICC for absolute agreement for Abstraction (ICC (2,1) = .86) and Perceptual Integration (ICC (2,1) = .90) revealed acceptable inter-rater reliability statistics. Additionally, Abstraction and Perceptual Integration were highly correlated with each other ( $r(68) = .85, p < .001$ ).

The internal consistency for SSIS-T (46 items;  $\alpha = .95$ ) and SSIS-P (46 items;  $\alpha = .91$ ) was high. For the teacher measure, the subscales for Communication (7 items;  $\alpha = .85$ ), Cooperation (6 items;  $\alpha = .88$ ), Responsibility (6 items;  $\alpha = .79$ ), Empathy (3 items;  $\alpha = .68$ ), Engagement (6 items,  $\alpha = .86$ ), Externalizing (12 items;  $\alpha = .90$ ), and Internalizing (7 items;  $\alpha = .81$ ) were all within adequate ranges. For the SSIS-P measure, the subscales for Communication (7 items;  $\alpha = .69$ ), Cooperation (6 items;  $\alpha = .83$ ), Responsibility (6 items;  $\alpha = .67$ ), Empathy (6 items;  $\alpha = .83$ ), Engagement (7 items;  $\alpha = .73$ ), Externalizing (12 items;  $\alpha = .80$ ), and Internalizing (10 items;  $\alpha = .72$ ) were also all within adequate ranges.

The internal consistency of the full NEPSY ToM subtest (21 items;  $\alpha = .80$ ; full test not used in this study) and the ToM Verbal subpart (15 items;  $\alpha = .73$ ) were adequate. The select items from the ToM Verbal test that were non-FB related ("ToM Non-False Belief"; 11 items;  $\alpha = .66$ ) showed adequate reliability. However the select items from the ToM Verbal test that were false belief tasks ("ToM False Belief"; 4 items;  $\alpha = .45$ ) did not have acceptable internal consistency. A Spearman-Brown prophecy formula was used to predict the anticipated reliability of a longer test (8 items) given the current Cronbach's alpha from the 4-item ToM False Belief

measure. The new Cronbach alpha calculated for an 8-item ToM False Belief test was in the undesirable but not unacceptable range ( $\alpha^{\text{new}} = .66$ ). Notably, the ToM False Belief and ToM Non-False Belief items that form the ToM Verbal subpart correlated with each other,  $r(68) = .54$ ,  $p = .000$ .

### **Descriptive Statistics**

Descriptive statistics for the main constructs and their respective measures, including Means, standard deviations, and ranges, are summarized in Table 4. Although EID, ECT- combined and ToM subtests were all negatively skewed, and the SSIS-T subscales of externalization and internalization had a larger positive skew, all skew values in the data set were within  $\pm 2.0$ , which is considered relatively normal (Lomax and Hahs-Vaughn, 2012). Notably, the SSIS subscales of externalization and internalization means and standard deviations were comparable to the normative sample reported in the SSIS manual. Analyses revealed one outlier participant whose score on the ECT measure was more than 3 standard deviations below the mean. This case was excluded from the analyses (unless otherwise stated). Descriptive statistics also revealed a considerable amount of missing parent data ( $N = 57$ ) such that there was inadequate power to perform a multiple regression analyses with the parent data set. Therefore, parent data were only included for correlational analyses. After removing outliers and excluding cases with missing data, there were a total of 67 complete cases for the teacher data set and 57 complete cases for the parent data set.

Table 4

*Descriptive Statistics*

|                           | <i>n</i> | <i>M</i> | <i>SD</i> | Range     |         | Skew |
|---------------------------|----------|----------|-----------|-----------|---------|------|
|                           |          |          |           | Potential | Actual  |      |
| Vocabulary                |          |          |           |           |         |      |
| WPSI Vocab                | 70       | 11.64    | 2.66      | 1-19      | 5-16.0  | -.37 |
| Age in Months             | 70       | 69.46    | 4.64      | 60-78     | 60-78   | .18  |
| SEU                       |          |          |           |           |         |      |
| EID                       | 68       | 56.43    | 4.95      | 21-63     | 42-63   | -.93 |
| Emotion Situations        | 68       | 38.23    | 2.73      | 15-45     | 31-44   | -.48 |
| ECT-combined <sup>a</sup> | 68       | 94.65    | 6.52      | 36-108    | 73-105  | -.94 |
| MEU                       |          |          |           |           |         |      |
| TAT Mean Score            | 70       | 2.50     | .68       | 1.0-4.5   | 1.0-3.8 | -.01 |
| Abstraction               | 70       | 2.43     | .66       | 1.0-4.0   | 1.0-4.0 | .10  |
| Perceptual Integration    | 70       | 2.57     | .76       | 1.0-5.0   | 1.0-3.7 | -.14 |
| ToM                       |          |          |           |           |         |      |
| ToM Verbal                | 70       | 12.04    | 4.05      | 0-22      | 0-20    | -.84 |
| ToM False Belief          | 70       | 2.73     | 1.09      | 0-4       | 0-4     | -.54 |
| ToM Non-False Belief      | 70       | 9.26     | 3.35      | 0-18      | 0-16    | -.65 |
| Social Competence         |          |          |           |           |         |      |
| SSIS-Parent               | 59       | 97.88    | 12.98     | 1-145     | 77-128  | .50  |
| Engagement                | 59       | 15.03    | 3.20      | 0-21      | 8-21    | .29  |
| Empathy                   | 59       | 13.10    | 3.34      | 0-18      | 3-18    | -.37 |
| Responsibility            | 59       | 12.22    | 2.70      | 0-18      | 5-18    | .31  |
| Externalization           | 59       | 7.78     | 4.40      | 0-36      | 0-19    | .72  |
| Communication             | 59       | 16.42    | 2.70      | 0-21      | 11-21   | -.05 |
| Cooperation               | 59       | 13.07    | 2.43      | 0-18      | 8-18    | .60  |
| Internalizing             | 59       | 4.12     | 3.21      | 0-21      | 0-12    | -.48 |
| SSIS-Teacher              | 69       | 99.03    | 13.52     | 1-145     | 70-130  | .09  |
| Engagement                | 69       | 14.90    | 3.43      | 0-21      | 5-21    | -.41 |
| Empathy                   | 69       | 11.86    | 3.27      | 0-18      | 4-18    | -.29 |
| Responsibility            | 69       | 12.62    | 3.21      | 0-18      | 5-18    | -.20 |
| Externalization           | 69       | 5.25     | 5.36      | 0-36      | 0-21    | 1.06 |
| Communication             | 69       | 15.33    | 3.39      | 0-28      | 6-21    | -.36 |
| Cooperation               | 69       | 12.35    | 3.80      | 0-24      | 4-18    | -.27 |

|               |    |      |      |      |      |      |
|---------------|----|------|------|------|------|------|
| Internalizing | 69 | 2.26 | 2.72 | 0-30 | 0-13 | 1.57 |
|---------------|----|------|------|------|------|------|

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*Note.* SEU = situationistic Emotion Understanding; MEU = mentalistic Emotion Understanding

<sup>a</sup> Combined all items from the ECT Emotion Identification test and ECT Emotion Situations test

**RQ1) Are situationistic EU and mentalistic EU distinct constructs? How do they relate to each other and to external correlates?**

Hypothesis 1a predicted that there would be a small-to-negligible, non-significant correlation between situationistic and mentalistic EU. A Pearson correlation between the TAT and ECT-combined measures showed a small, positive correlation,  $r(66) = .35, p = .003$ . However, *when controlling for vocabulary*, the correlation was weak and non-significant,  $r(65) = .17, p = .158$ . Therefore Hypothesis 1a was supported.

Hypothesis 1b predicted that situationistic and mentalistic EU would have distinct relations to external correlates when controlling for vocabulary. Specifically, mentalistic EU would relate to ToM but situationistic EU would not. *Without controlling for vocabulary*, Pearson's correlation showed a moderate, positive, significant correlation between the TAT mean score and the ToM Verbal score ( $r(66) = .44, p < .001$ ), ToM False Belief score ( $r(66) = .27, p = .02$ ), and ToM Non-False Belief Score,  $r(66) = .45, p < .001$ . The correlation between the ECT and ToM Verbal ( $r(66) = .39, p = .001$ ), ToM False Belief ( $r(66) = .308, p = .011$ ), and ToM Non-False Belief ( $r(66) = .37, p = .002$ ) also showed positive and statistically significant correlations. *With controlling for vocabulary*, both the TAT ( $r(67) = .37, p = .002$ ) and the ECT-combined ( $r(65) = .28, p = .021$ ) continued to show a significant, albeit

smaller, correlation to the ToM Verbal measure. A similar pattern was observed for the ToM Non-False Belief with the TAT ( $r(67) = .41, p = .001$ ) and the ECT-combined ( $r(67) = .30, p = .012$ ). No significant correlations were observed for ToM False Belief with the TAT ( $r(67) = .13, p = .36$ ) or the ECT-combined,  $r(67) = .07, p = .585$ . Overall, Hypothesis 1b was not supported.

Hypothesis 1c predicted that mentalistic EU and situationistic EU would relate differently to various subcategories of social competence within the SSIS. Mentalistic EU was expected to relate to the Engagement, Empathy, Responsibility, and Externalizing subscales on the SSIS, whereas situationistic EU was expected to relate to the Communication, Cooperation and Internalizing subscales. Hypothesis 1c was partially supported—across raters, the TAT related to several SSIS subscales, even after vocabulary was controlled for, however, the ECT did not relate to any SSIS subscales. Relations between EU and specific scales are described next.

**Teacher-rated SSIS subscales.** Mentalistic EU, as measured by the TAT mean score, showed statistically significant positive correlations to all teacher-rated SSIS subscales of interest, including engagement ( $r(67) = .32, p = .007$ ), empathy ( $r(67) = .28, p = .018$ ), and responsibility ( $r(67) = .49, p < .001$ ), and a negative correlation to externalizing ( $r(67) = -.46, p < .001$ ), *without vocabulary controlled for*. Although it was not hypothesized, the TAT mean score positively correlated with communication ( $r(67) = .33, p = .005$ ) and cooperation ( $r(67) = .46, p < .001$ ), and negatively correlated with internalizing,  $r(67) = -.24, p = .051$ . Similarly, Abstraction correlated with all SSIS subscales and Perceptual Integration correlated with all subscales except for internalizing SSIS-T subscale. *With vocabulary controlled for*,

engagement ( $r(66) = .24, p = .047$ ), responsibility ( $r(66) = .39, p = .001$ ), externalizing ( $r(66) = -.38, p = .001$ ), and cooperation ( $r(66) = .36, p = .003$ ) maintained their significant correlations to the TAT. *With vocabulary controlled for*, Abstraction correlated with the same subscales, with the addition of a small correlation with the communication subscale. Perceptual Integration only correlated with the responsibility, externalizing, and cooperation subscales. Furthermore, Abstraction showed stronger correlations to SSIS-T subscales overall compared to Perceptual Integration, with and without vocabulary controlled for. The TAT mean score, as well as the Abstraction and Perceptual Integration category correlations, are reported in Table 5.

The ToM Verbal Scale of the NEPSY-II correlated with several teacher-rated SSIS subscales, approaching statistical significance with engagement ( $r(67) = .23, p = .06$ ), showing statistical significant correlations with responsibility ( $r(67) = .29, p = .017$ ), a negative correlation to externalizing ( $r(67) = -.34, p = .004$ ), and a positive correlation to cooperation ( $r(67) = .36, p = .003$ ), *without vocabulary controlled*. The ToM False Belief items also correlated with engagement ( $r(67) = .30, p = .011$ ), responsibility ( $r(67) = .24, p = .047$ ), externalizing ( $r(67) = -.24, p = .052$ ), and cooperation ( $r(67) = .29, p = .015$ ). The ToM Non-False Belief measure correlated with responsibility ( $r(67) = .26, p = .03$ ), externalizing ( $r(67) = -.33, p = .006$ ), and cooperation,  $r(67) = .32, p = .008$ . *With vocabulary controlled*, only externalizing ( $r(66) = -.27, p = .026$ ) and cooperation ( $r(66) = .27, p = .026$ ) subscales maintained their statistical significance with ToM Verbal. Similarly, the Non-False Belief score also correlated with externalization ( $r(66) = -.28, p = .023$ ) and cooperation,  $r(66) =$

.26,  $p = .033$ . No SSIS subscales related to ToM False Belief when vocabulary was controlled for.

Situationistic EU as measured by the ECT-combined test showed non-significant correlations across the selected SSIS-T subtests *with* and *without* vocabulary controlled for. Subtests of the ECT-combined test also showed non-significant correlations across SSIS-T subtests, with one exception: the Emotions Situations subtest correlated with the SSIS-T scale of cooperation ( $r(65) = .24$ ,  $p = .047$ ) but was not significant when vocabulary was controlled,  $r(65) = .08$ ,  $p = .521$ .

**Parent-rated SSIS subscales.** *Without vocabulary controlled for*, mentalistic EU as measured by the TAT showed statistically significant, positive correlations to parent-rated SSIS subscales of responsibility ( $r(57) = .26$ ,  $p = .045$ ), externalization ( $r(57) = -.34$ ,  $p = .009$ ), and cooperation,  $r(57) = .27$ ,  $p = .040$ . Abstraction correlated with responsibility and externalization subscales and Perceptual Integration correlated with responsibility, externalization, and cooperation. *With vocabulary controlled*, responsibility ( $r(56) = .26$ ,  $p = .045$ ), externalization ( $r(56) = -.34$ ,  $p = .008$ ), and cooperation ( $r(56) = .27$ ,  $p = .040$ ) maintained their statistically significant correlations. Additionally, internalization ( $r(56) = -.31$ ,  $p = .016$ ) showed a statistically significant correlation to the TAT when vocabulary was controlled. Similarly, Abstraction and Perceptual Integration showed correlations to these same subscales, with the exception of Abstraction and the responsibility subscale, which only neared statistical significance,  $r(56) = .25$ ,  $p = .060$ .

*Without vocabulary controlled*, the ToM Verbal measure related to empathy, ( $r(57) = .30$ ,  $p = .022$ ) and approached statistical significance for responsibility,  $r(57)$

= .25,  $p = .060$ . ToM False Belief also related to empathy ( $r(57) = .26$ ,  $p = .046$ ), externalizing ( $r(57) = -.27$ ,  $p = .041$ ), and communication,  $r(57) = .30$ ,  $p = .025$ . The ToM Non-False Belief measure only correlated with empathy,  $r(57) = .28$ ,  $p = .033$ . *With vocabulary controlled*, ToM Verbal continued to relate to empathy ( $r(56) = .31$ ,  $p = .016$ ) and approached a statistical significant correlation to cooperation,  $r(56) = .25$ ,  $p = .062$ . ToM False Belief also continued to relate to empathy ( $r(56) = .30$ ,  $p = .023$ ) and externalizing ( $r(56) = -.27$ ,  $p = .041$ ), and approached a statistically significant correlation with communication,  $r(56) = .26$ ,  $p = .052$ . ToM Non-False Belief also continued to relate to empathy,  $r(56) = .286$ ,  $p = .029$ .

*With and without* vocabulary controlled for, there were no significant correlations between parent-rated SSIS subscales and situationistic EU, as measured by the combined ECT measure. For the Emotion Identification and Emotion Situations subtests of the ECT, all correlations were also non-significant, although for Emotion Situations and the SSIS Communication subscale, the correlation approached statistical significance,  $r(54) = -.26$ ,  $p = .058$ . Table 5 (teacher SSIS subscales) and Table 6 (parent SSIS subscales) summarize the correlations between select SSIS subscales and the TAT and ECT and ToM NEPSY subtest.

Table 5

*Correlations between Teacher SSIS subscales and the TAT, ToM, and the ECT*

|                           | Engag.          | Emp.          | Resp.              | Extern.              | Comm.            | Coop.              | Internalizing   |
|---------------------------|-----------------|---------------|--------------------|----------------------|------------------|--------------------|-----------------|
| TAT score                 | .32**<br>(.24)* | .28*<br>(.18) | .50***<br>(.38)*** | -.46***<br>(-.38)*** | .33**<br>(.20)   | .46***<br>(.36)**  | -.24*<br>(-.19) |
| Abstraction               | .37**<br>(.30)* | .30*<br>(.19) | .51***<br>(.41)*** | -.46***<br>(-.39)*** | .38***<br>(.26)* | .49***<br>(.40)*** | -.24*<br>(-.19) |
| Perceptual<br>Integration | .25*<br>(.16)   | .25*<br>(.15) | .43***<br>(.32)**  | -.42***<br>(-.35)**  | .25*<br>(.11)    | .38***<br>(.28)*   | -.22<br>(-.17)  |
| ToM Verbal                | .23<br>(.16)    | .18<br>(.09)  | .29**<br>(.17)     | -.34**<br>(-.27)*    | .18<br>(.06)     | .36**<br>(.27)**   | -.06<br>(-.01)  |
| ToM FB                    | .30*<br>(.20)   | .19<br>(.05)  | .24*<br>(.04)      | -.24<br>(-.10)       | .19<br>(-.01)    | .29<br>(.13)       | .01<br>(.10)    |
| ToM Non-<br>FB            | .17<br>(.11)    | .16<br>(.09)  | .26*<br>(.18)      | -.33**<br>(-.28)*    | .15<br>(.06)     | .32**<br>(.26)*    | -.08<br>(-.04)  |
| ECT-comb.                 | .06<br>(-.12)   | .10<br>(-.11) | .20<br>(-.07)      | -.16<br>(.03)        | .13<br>(-.15)    | .26<br>(.04)       | -.10<br>(-.01)  |
| EID                       | .04<br>(-.13)   | .05<br>(-.14) | .20<br>(-.06)      | -.15<br>(.02)        | .13<br>(-.12)    | .20<br>(-.00)      | -.09<br>(-.00)  |
| Emotions<br>Situations    | .07<br>(-.06)   | .13<br>(-.02) | .14<br>(-.08)      | -.11<br>(.04)        | .07<br>(-.16)    | .24*<br>(.08)      | -.09<br>(-.17)  |

Note. Parenthesis “( )” indicates vocabulary was controlled for.

\*\*\*. Correlation is significant at the .001 level (2-tailed).

\*\* . Correlation is significant at the .01 level (2-tailed).

\*. Correlation is significant at the .05 level (2-tailed).

Table 6  
*Correlations between Parent SSIS subscales and TAT, ToM, and the ECT*

|                           | Engag.         | Emp.           | Resp.          | Extern.            | Comm.          | Coop.          | Internalizing   |
|---------------------------|----------------|----------------|----------------|--------------------|----------------|----------------|-----------------|
| TAT score                 | .06<br>(.10)   | .20<br>(.22)   | .28*<br>(.26)* | -.34**<br>(-.34)** | .18<br>(.13)   | .27*<br>(.30)* | -.15<br>(-.31)* |
| Abstraction               | .07<br>(.10)   | .17<br>(.19)   | .26*<br>(.25)  | -.30*<br>(-.28)*   | .20<br>(.15)   | .24<br>(.27)*  | -.16<br>(-.32)* |
| Perceptual<br>Integration | .05<br>(.09)   | .21<br>(.23)   | .28*<br>(.26)* | -.38**<br>(-.38)** | .14<br>(.10)   | .28*<br>(.20)* | -.14<br>(-.29)* |
| ToM Verbal                | .04<br>(.07)   | .30*<br>(.31)* | .25<br>(.23)   | -.23<br>(-.21)     | .17<br>(.14)   | .23<br>(.25)   | .13<br>(.04)    |
| ToM FB                    | .10<br>(.15)   | .26*<br>(.30*) | .23<br>(.22)   | -.27*<br>(-.27*)   | .30*<br>(.26)  | .20<br>(.23)   | .17<br>(.03)    |
| ToM Non-FB                | .02<br>.04     | .28*<br>.29*   | .23<br>.22     | -.20<br>-.19       | .12<br>.09     | .22<br>.23     | .10<br>.03      |
| ECT<br>Combined           | -.10<br>(-.07) | -.02<br>(-.02) | .10<br>(.07)   | -.06<br>(-.02)     | .04<br>(-.05)  | .02<br>(.02)   | .20<br>(.04)    |
| EID                       | .00<br>(.06)   | .04<br>(.06)   | .21<br>(.21)   | -.13<br>(-.11)     | .15<br>(.10)   | .10<br>(.13)   | .13<br>(-.04)   |
| Emotions<br>Situations    | -.18<br>(-.17) | -.12<br>(-.13) | .02<br>(-.02)  | .06<br>(.10)       | -.16<br>(-.26) | .00<br>(.00)   | .27<br>(.15)    |

Note. Parenthesis “( )” indicates vocabulary was controlled for.

\*\*\*. Correlation is significant at the .001 level (2-tailed).

\*\*. Correlation is significant at the .01 level (2-tailed).

\*. Correlation is significant at the .05 level (2-tailed).

**RQ2) When taken together, do situationistic and mentalistic EU and ToM predict a significant amount of variation in social competence as rated by teachers even when controlling for vocabulary?**

Prior to conducting a hierarchical multiple regression, the relevant assumptions of this statistical analysis were tested. Residual and scatter plots of independent variables (ECT-combined, TAT, and ToM Verbal) and the dependent variable (SSIS-T) indicated that the assumptions of normality, linearity, and homogeneity of variance were met. Collinearity statistics were all within accepted limits (e.g., tolerance was greater than .10 and the variance inflation factor was less than 10 across independent variables), and examinations of the Mahalanobis and Cooke's distance scores indicated no multivariate outliers. The Durbin-Watson statistic was computed to evaluate independence of errors and was 1.90, which is considered acceptable and suggests that the assumption of independent errors was also met.

Hypothesis 2 stated that a model with ECT-combined, TAT, and ToM Verbal would predict a significant amount of variance in teacher-rated social competence when controlling for vocabulary. A hierarchical multiple regression was used, where the WPSSI-III Vocabulary subtest was entered in step 1 and ECT, ToM Verbal, and the TAT were entered together in step 2. Results of the hierarchical multiple regression analysis revealed that at step 1, Vocabulary contributed significantly to the regression model ( $F(1, 65) = 15.32, p < .001$ ) and accounted for 19.1% of variation in SSIS-T. Introducing ECT-combined, ToM, and the TAT variables explained an

additional 12.1% of the variation in SSIS-T and this change in  $R^2$  was significant,  $F$  Change (3, 62) = 3.63,  $p = .018$ . Together, all four independent variables accounted for 31.2% of the variance in SSIS-T.

**RQ3) Will mentalistic EU remain a significant predictor of teacher-rated social competence in a model that includes situationistic EU and ToM, controlling for vocabulary?**

Hypothesis 3 stated that mentalistic EU would be a significant predictor in the model described in research question 2. When all four independent variables were included in the regression model, neither ECT-combined ( $\beta = -.201$ ;  $t = -1.46$ ,  $df = 62$ ,  $p = .148$ ) nor ToM Verbal ( $\beta = .103$ ;  $t = .84$ ,  $df = 62$ ,  $p = .406$ ) were significant predictors of SSIS-T. Both Vocabulary ( $\beta = .398$ ;  $t = 2.98$ ,  $df = 62$ ,  $p = .004$ ) and the TAT mean score ( $\beta = .329$ ;  $t = 2.65$ ,  $df = 62$ ,  $p = .010$ ) were significant predictors in the full model. Table 7 displays results of the hierarchical multiple regression analyses. Table 8 displays a summary of research hypotheses and results.

Table 7

*Hierarchical Multiple Regression Analyses Predicting Teacher rated Social Competence from Situationistic Emotion Understanding, Theory of Mind, and Mentalistic Emotion Understanding*

| Predictor               | SSIS-T       |         |
|-------------------------|--------------|---------|
|                         | $\Delta R^2$ | $\beta$ |
| Step 1                  | .19***       |         |
| Vocabulary <sup>a</sup> |              | .44***  |
| Step 2                  | .12*         |         |
| Vocabulary              |              | .40**   |
| ECT-combined            |              | -.20    |
| ToM Verbal              |              | .10     |
| TAT                     |              | .33**   |
| Total $R^2$             | .31***       |         |

Note. N=67

a. Control Variable

\*\*\* $p < .001$ . \*\* $p < .01$ . \*  $p < .05$ .

Table 8  
*Summary of Hypotheses and Results*

| Hypotheses  | Results  |
|---|--|
| H1a) There is a low or non-significant correlation between situationistic and mentalistic EU.   | <b>Supported.</b> Situationistic EU and mentalistic EU did not correlate to each other once vocabulary was controlled for.   |
| H1b) Mentalistic EU relates to ToM but situationistic EU does not.  | <b>Not Supported.</b> Both EU types related to Non-FB ToM with vocabulary controlled for.  |
| H1c) Mentalistic EU relates to Engagement, Empathy, Responsibility, and Externalizing subscales on the SSIS, whereas situationistic EU relates to the Communication, Cooperation and Internalizing subscales. | <p><b>Partially Supported.</b> Mentalistic EU related to:</p> <ul style="list-style-type: none"> <li>• Teacher rated SSIS for Engagement, Responsibility, Cooperation, and Externalizing subskills.</li> <li>• Parent rated SSIS for Responsibility, Cooperation, Externalizing, and Internalizing subskills.</li> </ul> <p>Situationistic EU did not relate to any SSIS subscales across raters and with vocabulary controlled for.</p> |
| H2) Mentalistic EU, situationistic EU and ToM account for a significant amount of variance in teacher-rated social competence when controlling for vocabulary.  | <b>Supported.</b> The full model was significant.  |
| H3) Mentalistic EU will be a significant predictor in the model of teacher rated social competence.   | <b>Supported.</b> Only Vocabulary and mentalistic EU were significant predictors in the full model.  |

## Chapter 5: Discussion

This study sought to clarify emotion understanding theory by investigating how mentalistic and situationistic EU relate to each other, to ToM, to overall social competence, and to subcategories of social competence. This study used a novel storytelling task as its mentalistic EU measure. This task is thought to require similar demands to ToM tasks, as both showcase inner states (desires, thoughts, and perspectives) that can differ across individuals. Therefore, a correlation between mentalistic EU and ToM scores was expected. Results supported this relationship between mentalistic EU and ToM, with and without vocabulary controlled for, but only for the ToM Verbal and ToM Non-False Belief tasks—which are considered a broader measure of ToM. In contrast, the more traditional EU measure of situationistic EU skills, which did not necessarily require mental understanding, was not expected to correlate with ToM. However, results showed that situationistic EU had a significant, albeit small, correlation to ToM Verbal and ToM Non-False Belief tasks, with and without vocabulary controlled. Situationistic and mentalistic EU, as hypothesized distinct constructs, were also expected to correlate to different aspects of social competence, as rated by teachers and parents. Results partially supported this; mentalistic EU (as measured by the TAT mean score) related to more social skill categories than proposed, across raters and even with vocabulary controlled for. In contrast, situationistic EU (when measured by the ECT-combined measure) did not relate to any of the expected social skill subgroups across raters. Furthermore, mentalistic EU and ToM showed some overlap in correlations to select social skills

among teacher raters (*viz.*, they both related to responsibility, externalization, and cooperation without vocabulary controlled for and externalization and cooperation with vocabulary controlled for). This pattern was not shown in parent raters. However, ToM did relate to parent-rated empathy. Lastly, mentalistic EU, being a more advanced form of social processing, was hypothesized to be an important predictor of kindergartners' social competence. Results supported this hypothesis. While a model with Vocabulary, situationistic EU, mentalistic EU, and ToM accounted for a significant amount of the variance in teacher-rated social skills, only Vocabulary and mentalistic EU were significant predictors in this model. General conclusions are that mentalistic EU is distinct from situationistic EU but that both Emotion Understanding types are related to general ToM skills. Additionally, mentalistic EU relates to specific social competence skills, and is an important predictor of kindergartners' overall social competence, as rated by teachers. A detailed discussion of these findings and emerging patterns are discussed below within the context of the major research questions.

### **Relationships Among Constructs**

Research question 1 investigated whether situationistic EU (as measured by a combined emotion identification and vignette-style task) and mentalistic EU (as measured by a storytelling task) were distinct constructs and how they related to each other and to external correlates. While results are not conclusive, the study findings support the hypothesis that situationistic and mentalistic EU are distinct constructs that relate to different social information processing abilities. As expected, when vocabulary was controlled for, situationistic and mentalistic EU showed a non-

significant correlation with each other. Unexpectedly, both mentalistic and situationistic EU did show a statistically significant, medium correlation with ToM Verbal and ToM Non-False Belief, even when vocabulary was controlled for. One explanation is that situationistic EU does not exclude the kind of mental understanding that is inherent in ToM tasks. Rather, situationistic EU—exercising knowledge and understanding of the effects of external events on someone’s emotions—may feed into ToM development. Notably, neither situationistic nor mentalistic EU related to the False Belief component of the ToM measure. Instead, results indicate that the correlation between emotion understanding tasks and the composite ToM Verbal measure was largely driven by the ToM Non-False Belief items. This distinction is explored further below.

**ToM false belief vs. ToM non-false belief.** This study attempted to pair the storytelling measure of mentalistic EU with ToM tasks that were based on similar task demands. The study found that Non-False Belief ToM was the best correlate to emotion understanding. Instead of contrasting opposite beliefs, or knowledge states, such as in the False Belief ToM, items of the Non-False Belief ToM involved realizing, in general, that others have different perspectives, being able to move away from literal interpretations of pictures and statements, and using mental language (e.g., identifying when someone is thinking). These ToM skills represent a high level of social reasoning and mind understanding and are not as narrow as false belief measures. The relationship between ToM Non-False Belief and both Emotion Understanding types suggests that broader measures of ToM should be used with

broader measures of EU (such as storytelling) in order to appropriately match task demands between each measure of the construct.

Notably, results from the literature on ToM and Emotion Understanding studies partially mirror the results of this study. In Weimer and colleagues' (2012) study, they found that mentalistic EU did not relate to ToM *as measured by False Belief tasks*. This finding was consistent with the current study, but contrasts with the current study's finding that mentalistic EU related to non-False Belief ToM. Therefore, future work in relating ToM and mentalistic understanding should consider the wider range of ToM skills involved in mental state understanding.

Results also hold implications for users of the NEPSY-II ToM subtest. The false belief items on the NEPSY-II ToM subtest showed only a moderate correlation to the non-false belief items, which together comprised the ToM Verbal subpart. Additionally, these subcomponents of the ToM Verbal subpart differentially related to social skills and emotion understanding. Practitioners should therefore consider the breadth and diversity of the ToM construct when using the NEPSY-II subtest and when considering the implications of a child's ToM score. Practitioners may want to look at these false belief items separately from the rest of the measure, as they represent a distinct form of ToM that may indicated different aspects of a child's social skill aptitude.

**ToM and social skills.** ToM showed some similarity to mentalistic EU, in that both related to select social skill subcomponents. Specifically, both ToM Non-False Belief and mentalistic EU related to externalizing (e.g., items related to self-control) and cooperation (i.e., items related to rule-following) on the teacher-rated

SSIS, even after vocabulary was controlled for, while situationistic EU (as measured by the ECT-combined scales) did not relate to these subscales. One explanation is that while situationistic EU involves knowledge of social information (e.g., rules, information, and cues), both ToM and mentalistic Emotion Understanding involve ongoing cognitive-emotional processes that require connecting outside events (such as rules) to inside events (such as thoughts and self-control). In this way, mentalistic understanding and other mind understanding skills, may actually be a better indicator for cooperation than situationistic Emotion Understanding, but only among teacher raters. Teachers must implement many routines, oversee classroom rules, and give directions to students for assignments, activities, and transitions between classes. However, parents may not find children's rule-following as salient in the home context, which may not have the same structured routines as school.

However, there were select SSIS subscales unique to only parent raters. For example, ToM (both the Verbal score and the False Belief score) and empathy were only correlated for parent raters, even when vocabulary was controlled. Empathy items included the frequency with which the child tried to comfort others, forgave others, and tried to understand how others feel—all skills that are expected to relate to mental state understanding and perspective taking. Furthermore, overall, False Belief scores (as compared to Non-False Belief) was a stronger correlate to other SSIS subscales for parents, as compared to teachers. Where for teachers ToM (specifically, only the Non-False Belief task) related to externalizing and cooperation, for parents, only False Belief ToM related to externalization and communication (e.g., saying please and thank you, taking turns in conversations, and speaking in an appropriate

tone of voice). Why parents would find stronger connections between empathy and ToM and why False Belief relates to externalization and communication among parents but not teachers is still unclear. Parents may be more sensitive to their child's empathic behavior: parents are well-situated to either view, or be part of, one-on-one conversations and intimate social interactions, where a child can show their developing empathic skills. Similarly, the SSIS subscale of communication also involves, or is best observed, in one-on-one interactions with the child and a peer/adult. Again, these dialogues may be more readily observed in a home context. A school context, by contrast, might involve several students and multiple conversations occurring in the classroom, making observations of nuanced social interactions difficult.

**Emotion understanding and social skills.** Overall results of comparing mentalistic EU and situationistic EU to social skill components showed that mentalistic EU related to more social skill categories than situationistic EU, after vocabulary was controlled, for both parent and teacher raters. As expected, mentalistic EU positively related to social competence subscales that involved popularity with peers and successful free play (e.g., the engagement subscale), but for teacher-ratings only. Mentalistic EU also positively related to responsibility and negatively related to externalizing problems, as rated by both parents and teachers, even when controlling for vocabulary. Unexpectedly, mentalistic EU, which was proposed to relate to noticing social nuances, did not relate to the empathy subscale once vocabulary was controlled for across raters. Furthermore, as discussed in the *ToM and Social Skills* section above, mentalistic EU unexpectedly related to rule-

following (i.e., the cooperation subscale), for both parent and teacher raters.

Additionally, the TAT mean score related to internalizing behavior; however, this association held only when vocabulary *was not* controlled for teacher ratings of SSIS and only when vocabulary *was* controlled for parent-rated SSIS. Overall, parent and teacher ratings showed similar results across SSIS scales, with the exception of engagement (only teacher raters, with and without vocabulary controlled, showed a correlation) and internalizing (only parent raters showed a correlation, when vocabulary was controlled). Results pertaining to mentalistic EU, situationistic EU, and each SSIS subscale are reviewed in further detail below.

Mentalistic EU's relationship to the SSIS-T engagement scale suggests that children who can readily infer others' emotions from ambiguous social scenes are more likely to interact well with other children, start conversations with peers and adults, and make friends easily. Notably, only teacher raters perceived engagement as relating to children's mentalistic EU. This may be due to teachers' increased likelihood of witnessing and observing broad social interactions with peers in the classroom and with teachers being able to compare a student's social behavior to the wide range of social behaviors they witness in their classroom and over the course of their teaching career. Additionally, while the connection between engagement and mentalistic EU supports a role for mentalistic EU's in *exhibiting* prosocial behavior, research has also shown that children's capacity to understand others' feelings may also help them to be more effective in *eliciting* prosocial behavior from others. Studies have shown that peer ratings of popularity on sociometric measures were positively related to children's understanding of mind (Howes & Matheson, 1992;

Howes, Phillipsen & Hamilton, 1993). Further research might use both sociometric measures filled out by children's peers (e.g., popularity ratings), in addition to social competency ratings from observers, teachers, and parents, to further detail the social benefits of mentalistic Emotion Understanding from various viewpoints.

Another difference between parent and teacher raters was the role of vocabulary in the correlation between the internalizing SSIS subscale and mentalistic EU. Importantly, teachers only showed a statistically significant correlation when vocabulary *was not* controlled for, while parents only showed a correlation when vocabulary *was* controlled. The internalization subscale (e.g., “acts lonely”, “is anxious with others,” “acts sad or depressed”) measures the nuanced construct of behaviors associated with prominent negative feelings and perceptions about the self and social environments, and also gauges negative mood. These characteristics and their severity may be less noticeable to teachers in a large classroom. Furthermore a student who is more verbal and shows internalizing behavior (e.g., communicates and shares with the teacher that they are lonely or anxious) will be more noticeable in a large classroom than a child who is quiet but also feels the same emotions. This may explain why after vocabulary was controlled, teacher ratings of their students' internalizing behaviors were no longer connected to the student's mentalistic EU, while parent ratings became significant after vocabulary was controlled. The home context may be well-suited to parents' noticing internalizing behaviors, as when the children display cues of internalization, these may be more easily noticed in a smaller setting: even when they do not verbalize an issue, a shift in mood at home is more noticeable. In either case, the negative relationship between children's ability to

understand others' desires, beliefs, and emotions in social contexts and internalizing behavior showcases a connection between mind understanding and socio-emotional health.

Mentalistic EU's relationship to the responsibility SSIS subscale (e.g., "is well behaved when unsupervised") and negative relationship to the externalization SSIS subscale ("has difficulty waiting their turn"), as rated by parents and teacher and when vocabulary was controlled for, show that mentalistic EU has connections to demonstrating appropriate behavior—especially during unstructured or unsupervised moments where the correct behavior and rules are not necessarily made explicit. This mirrors the unstructured nature of the storytelling task, which in part required the participant to organize, structure, and monitor their "behavior" (i.e., the story) with little structure or guidance on what was appropriate or not appropriate for the story. Therefore, mentalistic EU's relationship to responsibility and externalization behaviors may be an artifact of the TAT task demands, which, arguably, required forms of self-control and executive functioning. However, one may argue that real-world emotion understanding consists of similar behaviors inherent in interpreting a social scene—the need to organize and structure internal processes and form an interpretation of the social scene requires attention to detail, self-control, and executive functioning, to determine what details are most important/relevant (e.g., not being distracted by everyone laughing at a joke in the room, noticing a friend isn't laughing, and then inferring the friend's feelings are hurt).

Mentalistic EU also related to the SSIS cooperation scale, as rated by both teachers and parents, even when vocabulary was controlled for. This scale focuses on

knowledge and adherence to explicit rules and expectations (e.g., “follows your directions”). Additionally, while the ECT Emotion Situations subtest did relate to the cooperation subscale as rated by teachers, this relationship became non-significant, once vocabulary was controlled.

Unexpectedly, situationistic EU (as measured by the ECT-combined test) did not relate to any social skill subscales across raters, with some correlations, while non-significant, even showing a negative direction. Notably, for the ECT Emotion Situations subtest, without vocabulary controlled for, there was a significant, but negative, correlation with cooperation for teacher raters and a negative correlation approaching significance, with the communication subscale, for parent raters. These results must be interpreted with caution, given the low internal consistency of the Emotion Situations subtest when the outlier case was removed. However, taken at face value, these results imply that high situationistic EU, or knowledge of common emotions and their connection to prototypical social situations, relates to a disregard of directions or classroom rules. Similarly, situationistic EU is also indicative of not saying “please and thank you,” taking turns in conversations, etc. Given the breadth of literature on situationistic EU’s connections (positive correlations) to these social skills, these results are most likely an artifact of the measure used (the ECT) and not indicative of the construct itself.

Therefore, these results suggest that the ECT measure and its corresponding subtests may not have been appropriate to use with this age group. Specifically, the ECT was originally adapted from the ACES, to work with the preschool age group. This was the first time the ECT was tested on a kindergarten population and while no

severe ceiling effects were indicated, the measure showed a negative skew, indicating that most participants displayed relatively high situationistic EU skills. While the population of 5 to 6 year olds was chosen in order to tap into their mentalistic EU capabilities, further research should either include a wider age range (e.g., 4 to 6 year olds) where situationistic EU skills are also still developing, or consider a cross-sectional approach that investigates 3-, 4-, 5- and 6-year-olds' emotion understanding capabilities.

Overall, these findings provide some support for the hypothesis that mentalistic EU and situationistic EU are different constructs, however ToM (Non-False Belief tasks) seems to be involved in both Emotion Understanding skills. Results should be interpreted with caution given the unexpected direction of the correlations between situationistic EU and many of the social skill subscales. Future work should consider using a different situationistic Emotion Understanding task developed specifically for older populations (which will include a wider variation of scores) when comparing and contrasting with Emotion Understanding to ToM and other external correlates.

**Vocabulary and social skills.** Results indicated that the relationship between vocabulary and social skills varied by the rater, with teacher raters perceiving social skills as more language-mediated than parents. Once vocabulary was controlled, teacher correlations of emotion understanding and ToM to specific social skills disappeared. Specifically, for teachers, there were no longer correlations between empathy or communication and mentalistic EU (TAT score), between responsibility and ToM FB and ToM Non-FB, or between cooperation and situationistic EU. In

contrast, most of the parents' ratings stayed statistically significant or gained statistical significance (e.g., internalizing behavior) after vocabulary was controlled—possibly due to parent perceptions of social skills being less language-mediated. These results provided preliminary support to suggest teachers may view social skills as partially interwoven with “language,” whereas parents may view social skills through a different lens. Future studies should consider the importance of “blended” constructs (e.g., parent raters may be picking up on the social skills of children with high mentalistic EU *and vocabulary*) as a result of rater perceptions rather than merely the nature of the task demands. Importantly, further refining of how a construct measured via a performance task translates to real world behavior that a teacher might observe and perceive in the classroom is also important. For example, vocabulary subtests (such as the WPSI-III subtest which measured verbal fluency, concept formation, word knowledge, and word usage) are considered a subcomponent of crystallized intelligence and correlates well with Verbal and Full Scale IQ (Sattler, 2008). Teachers may therefore, notice intelligent children as more likely to be social competent while the child's intelligence is less salient to parent perceptions of a child's social competence.

### **Predicting Social Competence**

Research question 2 investigated whether, when taken together, situationistic and mentalistic EU and ToM predicted a significant amount of variation in social competence as rated by teachers, even when controlling for vocabulary. Results supported the hypothesis that these three variables predict a significant amount of variance in social competence. Specifically the full model predicted 31.2% of the

variance, and situationistic EU, mentalistic EU, and ToM accounted for 12.1% of the variance above and beyond vocabulary.

While this piece alone supports the literature in its claim that these aspects of social cognition are precursors to social competence, investigating research question 3 revealed that only vocabulary and mentalistic EU were significant predictors in the full model. These results support the importance of mentalistic EU as unique and integral predictor for kindergarteners' social competence, as rated by teachers.

Incorporating mentalistic EU skills into social competence interventions may improve children's social-emotional development. A recent study by Ornaghi et al. (2014) trained school-age children in Emotion Understanding over the course of a 2-month intervention program. After reading illustrated scenarios based on emotional scripts, the training group engaged in conversations on Emotion Understanding (whereas the control group was simply asked to produce a drawing about the story). Importantly, the training sessions focused on guided discussion of both the external and internal causes that elicited the target emotion, the possibility that individuals may experience mixed emotions, and reflection on their own and their peers' likely emotions in that situation. Results showed that the training group outperformed the control group on emotion comprehension, theory of mind, and empathy.

Notably, despite using a diverse set of ToM tasks, ToM Verbal failed to make a contribution to teacher-rated social competence beyond the contribution of mentalistic EU and vocabulary. While some studies have found that ToM did not relate to global social skills, as rated by teachers and observers (Cassidy et al., 2003), other studies have found a connection between ToM and general social skills (Watson

et al., 1999). A major difference between these studies is the type of social skill measure employed. With measures that ask teachers to compare the student's social skills to other children their age, there are more positive results and significant correlations to general social skills, but less so with measures that ask the teacher to rate the frequency of a certain behavior. This may be because the former measurement type is similar to peer-likeability ratings, which the literature has also shown to have a positive relation to ToM (Cassidy et al., 2003). The current study utilized a measure that only asked for frequency of the social behavior, which does not allow the rater to report the level of quality of the behavior or to compare the child to their peers. It is possible that a different social skills measure may have elicited a correlation with ToM.

### **Conclusions**

Review of the literature shows that links between EU and ToM and between EU and social competence vary depending on child age, type of measure used, and matched task demands between measures. This study brings some clarity to these relationships by deliberately contrasting situationistic and mentalistic EU measures and relating them to ToM (measured by both False Belief and advanced components of ToM) and to parent-and-teacher-rated social competence.

Overall results of the study indicate that teachers and parents do perceive children with more “mind” understanding (i.e., mentalistic EU and ToM) to be more socially competent. These findings add to the Emotion Understanding literature's discussion of how mentalistic EU relates to children's social competence. Further research into mentalistic EU should continue to use novel measures of Emotion

Understanding that match the task demands of expansive ToM tasks, and not only involve navigating and representing different perspectives, thoughts, desires, and beliefs, but also requires other kinds of mental understanding (e.g., being able to interpret a social scene, moving from a literal understanding to a conceptual understanding of someone's actions or meaning). The similarities and differences between mentalistic EU and ToM should also be further investigated, to ascertain how one may feed into the other. Finally, mentalistic EU should be further related to various social skills, as rated by parents, teachers, and the children themselves, as well as by observers of the classroom.

### **Limitations**

There were several limitations of the study due to the archival nature of the data. A major limitation is the ECT measure, whose ECT Emotion Situations subtest did not show adequate internal consistency once the outlier was removed. The ACES measure on which the ECT was based is commonly used; however, there are variations in the literature on how it is scored. A three-point scoring system was used in this study. A more strict, binary scoring system, however, may have been more appropriate to use with the older age group. Another limitation is that, while the study sought to differentiate between aspects of Emotion Understanding and its relationship to higher-order mind understanding, these constructs are likely intertwined with each other. For example, it is difficult to only measure situationistic EU, even if the task is largely structured to elicit situational knowledge, as a child with advanced mentalistic EU may still bring in those skills to provide a nuanced interpretation of the provided vignette (e.g., the correct answer may be “mad” or “scared” for a vignette where a

character is pushed in the hallway, but the child may create a context to the story where, say, the character should actually feel more “sad” than “mad,” because this is a small, tight-knit, school, where everyone is close, so being picked on becomes a surprising act rather than a threatening one). In the same way, the TAT most likely measures more than just one aspect of mentalistic EU. As discussed above, it most likely entails aspects of self-control and self-monitoring to complete the task. This may be a necessary trade-off in order to provide a task that fits closely to ToM. Both tasks might involve open-ended questions, prompts to contrast others’ thoughts and desires, detail different perspectives, and require reasoning beyond the literal interpretation. Finally, the low number of participants in the parent sample precluded a multiple regression analysis, which would have strengthened the final conclusions of the study and further delineated the observed patterns of ToM, mentalistic EU, and situationistic EU’s relationship to social competence.

## Appendix A: Review of Emotion Understanding Measures in the Literature

| Selected Components of Emotion Understanding |   |  |   |  |  |   |
|--|---|--|---|--|--|---|
|  | Emotion Recognition   | External Cause   | Desire  | Belief   | Reminder   | Regulation  |
| <b>Studied in literature</b>                 | Emotion Knowledge<br><br>Emotion ID   | Emotion Situation Knowledge<br><br>Affective Perspective Taking  | Desire  | Belief   | Reminder<br><br>Memory   | Regulation  |
| <b>Task</b>                                  | Label facial expressions of emotions  | Match emotion labels to environmental events.  | Differentiate feelings of two characters that have different desires and presented with one outcome.  | Must make an emotional attribution to a protagonist that holds a false belief  | Understand that a reminder of an event of the past can elicit a present emotional state  | Child is asked to consider how the protagonist may prevent himself or herself from feeling a negative emotion from an undesired event.      |
| <b>Demands</b>                               | Presented with pictures of different facial expressions . Child chooses if expression is “happy, sad, mad or neutral” | 2-3 sentence vignette read aloud. Child is asked if subject feels “happy, sad, mad, or neutral”<br><br>Picture of scenario | Vignette of two characters, each identified with a different/ opposing desire is given.<br><br>Child chooses from a list (or chooses from several | Vignette (usually accompanied by picture) is presented. Child is given the opportunity to identify the false belief in the character. If they get the answer | Vignette of the past event is given and the character is portrayed as remembering that event. Child must answer how character feels in the present as they | Vignette is provided about character remembering undesired event. Child is asked what character can do to prevent them from being sad. Four |

|                           |  |   |   |   |  |  |
|---------------------------|--|---|---|---|--|--|
|                           |  | shown. Out of several options of facial expressions (ex. Happy, sad, mad, neutral) and the child points to the facial expression appropriate for the scenario depicted. | pictures of expressions) to indicate how each character would feel based on the outcome of the situation. | wrong, child is told the correct belief and then asked how the character is feeling. Child should keep in mind the false belief while answering the question. | remember the past event.                                       | depictions of possible regulation strategies (denial, distraction, thoughts, and no coping) are presented and the child picks between them |
| <b>Onset of component</b> | 3-4 years old  | 3-4 years old   | 3-5 years old   | 4-6 years old   | 3-6 years old  | 6-7 years old  |
| <b>Selected Sources</b>   | (Cutting & Dunn, 1999; Denham 1986; Izard, Schultz, & Fine, 2000). | (Cutting & Dunn, 1999; Denham, 1986; Hughes & Dunn, 1998)   | (Harris, Johnson, Hutton, Andrews, & Cooke, 1989; Yuill, 1984)  | Harris et al., 1989; Pons, Lawson, Harris, & Rosnay, 2003   | Harris, 1983; Laguttuta & Wellman, 2001; Taylor & Harris, 1983 | Meerum, Terwogt & Stegge, 1995   |

## Appendix B: Constructs and Corresponding Measures

| Construct         | Measure   | Description   | Sample Reliability   | Example   | Scoring   |
|-------------------|---|---|--|---|---|
| Social Competence | Social Skills Improvement System (SSIS; Gresham et al., 2011)<br><br>SSIS-T<br><br>SSIS-P | 76-79 items; Widely used, normed measure appropriate for children aged 3–18<br><br><b>Social skills</b> (made up of assertion, responsibility, self-control, communication, cooperation, empathy, and engagement subscales)<br><b>Problem behaviors</b> (made up of externalizing, internalizing, bullying, hyperactivity, and autism spectrum subscales) | SSIS-T (46 items; $\alpha = .95$ )<br><br>SSIS-P (46 items; $\alpha = .91$ )<br><br>Coefficient alphas for both the teacher- and parent-rated social skills and problem behavior scales are within range of .67 to .90 | Frequency is rated on a 4-pt scale (Never, Sometimes, Often, Always)<br><br>“Tries to understand how you feel.”<br>“Follows your directions.”<br>“Makes friends easily.”<br>“Interacts well with other children.”<br>“Invites others to join in on activities.” | Standard Scores for SSIS total scores<br><br>Raw scores for subscales of interest |
| Situationistic EU | Emotion Comprehension Test (ECT; Gustafson, 2009)   | 15-item test, non-normed adaptation of the widely used Assessment of Children’s Emotion Skills  | <b>With outlier:</b><br><br>Emotion Identification (21 items; $\alpha = .71$ )   | “Green was riding a tricycle down a big hill and it started going   | 3 point scoring system that differentiates between correct, incorrect but         |

|                |  |  |  |   |   |
|----------------|--|--|--|---|---|
|                | EID<br>ECT-Situations<br>ECT-combined  | (ACES; Schultz et al., 2004).<br><br>Involves vignettes, acted out by puppets that provide situational cues to what the character is feeling.  | Emotion Situations subtest (15 items; $\alpha = .67$ )<br><br>ECT-combined subtest (36 items; $\alpha = .80$ )<br><br><b>Without outlier:</b><br><br>Emotion Identification subtest (21 items; $\alpha = .67$ )<br><br>Emotion Situations subtest alone (15 items; $\alpha = .42$ )<br><br>ECT-combined (36 items; $\alpha = .71$ ). | faster than Green wanted. How do you think Green feels: happy, sad, mad, scared, or no feeling?"  | with correct valence, and incorrect.                                |
| Mentalistic EU | Thematic Apperceptions Test (TAT)<br><br>Abstraction<br>Perceptual Integration<br>TAT mean score | The TAT is a non-standardized, non-normed performance measure that gives insight into social scripts, schemas and perceptions utilized by the participant.<br><br>Only abstraction and | TAT Abstraction (6 items; $\alpha = .90$ )<br><br>TAT Perceptual Integration (6 items; $\alpha = .83$ ).   | There were seven cards, each with a different scene. Children were asked to "tell a story about what is happening in the picture. Tell me what happened | Mean score (mean of abstraction + mean of perceptual integration/2) |

|     |  |  |   |  |            |
|-----|--|--|---|--|------------|
|     |  | perceptual integration are used.   |   | before, what the characters are thinking and feeling and how it all turns out in the end.”   |            |
| ToM | NEPSY-II ToM subtest (Korkman, Kirk, & Kemp, 2007)<br><br>ToM Verbal<br><br>ToM False Belief<br><br>ToM Non-False Belief | Standardized and normed, widely used test to assess participants’ ability to understand that others have thoughts, ideas, and feelings that may be different from one’s own.<br><br>Task involves several false belief tasks: (i.e., unexpected contents tasks, unexpected locations task, and a second order false belief task).<br><br>Task also involves appearance-reality, mental-physical distinction, concept of the brain, and abstraction items | ToM Verbal subpart (15 items; $\alpha = .73$ )<br><br>“ToM False Belief” (4 items; $\alpha = .45$ ). Spearman brown prophecy statistic for 8 items ( $\alpha^{new} = .66$ )<br><br>ToM Non-False Belief (11 items; $\alpha = .66$ ) | “Mom and Maya are looking into the store window. Mom is interested in the sofa. What does Mom think Maya is interested in?”<br><br>“Jack did not do well on his spelling test. Mom says to visit Ben’s house because that will make him feel better. When Jack gets there Ben wants to play “Word Spell.” Jack leaves Ben’s house. | Raw scores |

|            |  |  |                              |  |              |
|------------|--|--|------------------------------|--|--------------|
|            |  |  |                              | Why did Jack leave Ben's house?                                    |              |
| Vocabulary | WPSSI-III Vocabulary subtest (Kaufman & Lichtenberger, 2000) | Standardized and normed proxy for a language measure | (25 items; $\alpha = .81$ ). | Children were asked what several words mean (ex. "What is a dog?") | Scaled score |

## Appendix C: Description of Measures

### Parent questionnaires:

*Social Skills Improvement System (SSIS)*—The SSIS assesses social skills and behavioral problems. The questions refer to such behaviors as “following rules” or “taking turns” (about 15 minutes).

### Teacher questionnaires:

*Social Skills Improvement System (SSIS)*—Same as above, but some items may be changed to reflect the classroom context.

### Activities administered to the child one-on-one:

These are given in two 30-minute sessions with a doctoral student in school psychology.

1. Vocabulary portion of the *Wechsler Preschool and Primary Scale of Intelligence-Third Edition, (WPPSI-III)*. Child points to pictures of named items and defines words.
2. *Emotion Comprehension Test*. Child identifies emotions from pictures and indicates how a child would feel about certain situations—such as when another child cuts in line.
3. Thematic Apperception Test (TAT). A storytelling task where the child views a stimulus card with a picture of characters and identifies the problem, the causal sequences, the inner thoughts, feelings, and intentions of the characters, and means-end connections.
4. *Neuropsychological Evaluation (NEPSY-II)* Theory of Mind subtest involves several false belief tasks and ToM tasks.

## Appendix D: Emotion Understanding Measures

### Puppet Adaptation of Assessment of Children’s Emotion Skills: ECT Emotion Situations

Participant \_\_\_\_\_

*I’m going to tell you about some kids your age. I want you to tell me how they feel. Tell me if you think they would feel happy, sad, mad, or scared. Sometimes you might think they feel two feelings, like both mad and sad. If you think there is more than one feeling, tell me both (If they say two, circle both. Then follow up by asking which they think the child feels more strongly and put an asterisk by that feeling). Sometimes the child may not have any feeling, and you can tell me that by saying, "no feeling." Don't say "no feeling" just because you're not sure how they would feel, though. If you think they would have any feeling, I want you to take a guess at what it is, okay? We will use puppets and call the children by the color of their shirt.( Make an R next to the item if they ask for a repeat. Follow up with the highlighted items after you have completed all of the questions).*

For all prompts, demonstrate with Green puppet, and Red puppet if applicable

|                   |       |      |      |        |    |   |
|-------------------|-------|------|------|--------|----|---|
| 1.                | Happy | Sad  | Mad  | Scared | NF | Green’s parents said that they would take the family to the fair. But when it is time to go they say that they cannot go. How do you think Green feels: happy, sad, mad scared, or no feeling?<br><b>Follow up: (Re-read the prompt.)</b> You said that Green felt _____. Tell me more about Green feeling _____. <b>(After response)</b> Is there anything more you would like to say about Green feeling _____? |
| 1pt.              | 3pt.  | 3pt. | 2pt. | 1pt.   |    |   |
| # of Participants | 2     | 61   | 2    | 1      | 2  |   |
| 2.                | Happy | Sad  | Mad  | Scared | NF | Green just finished coloring a picture. <b>Narrator</b>   |

|                   |               |             |             |                |                       |  |
|-------------------|---------------|-------------|-------------|----------------|-----------------------|--|
|                   | 3pt           | 1pt         | 1pt         | 1pt            | 1pt                   | <b>demonstrates with Red puppet: “It looks really nice.”</b> How do you think Green feels: happy, sad, mad scared, or no feeling?  |
| # of participants | 63            | 2           |             |                | 3                     |  |
| 3.                | Happy<br>1pt. | Sad<br>3pt. | Mad<br>2pt. | Scared<br>2pt. | NF<br>1pt.            | Green always took care of the family’s kitten. Green really loves this kitten. But the kitten is gone and won’t come back. How do you think Green feels: happy, sad, mad scared, or no feeling?                  |
| # of participants | 1             | 56          | 3           | 4              | 4                     |  |
| 4.                | Happy<br>1pt  | Sad<br>2pt  | Mad<br>2pt  | Scared<br>3pt  | No<br>Feeling<br>1pt  | Green is walking down the hall and sees a big kid walking toward him.<br><b>Narrator demonstrates with Red puppet: “Get out of my way!”</b> How do you think Green feels: happy, sad, mad scared, or no feeling? |
| # of participants | 0             | 44          | 10          | 13             | 1                     |  |
| 5.                | Happy<br>1pt. | Sad<br>2pt. | Mad<br>3pt. | Scared<br>2pt. | No<br>Feeling<br>1pt. | Green built a big tower of blocks. Red came over and knocked them down and then laughed. How do you think Green feels: happy, sad, mad scared, or no feeling?  |
| # of participants | 0             | 56          | 9           | 1              | 2                     |  |
| 6.                | Happy<br>1pt. | Sad<br>3pt. | Mad<br>3pt. | Scared<br>2pt. | No<br>Feeling<br>1pt. | Green let Red play with Green’s favorite toy. Red plays with the toy and then it breaks. How do you think Green feels: happy, sad, mad scared, or no feeling?  |

|                   |               |             |             |                |                       |  |
|-------------------|---------------|-------------|-------------|----------------|-----------------------|--|
|                   |               |             |             |                |                       | <p><b>Follow up: (Re-read the prompt.)</b> You said that Green felt _____. Tell me more about Green feeling _____. <b>(After response)</b> Is there anything more you would like to say about Green feeling _____?</p> |
| # of participants | 0             | 55          | 10          | 2              | 1                     |  |
| 7.                | Happy<br>1pt. | Sad<br>2pt. | Mad<br>3pt. | Scared<br>2pt. | No<br>Feeling<br>1pt. | Green is in line at the water fountain and Red gets in front of Green without asking. How do you think Green feels: happy, sad, mad scared, or no feeling?   |
| # of participants | 1             | 39          | 19          | 4              | 5                     |  |
| 8.                | Happy<br>1pt. | Sad<br>2pt. | Mad<br>2pt. | Scared<br>3pt. | No<br>Feeling<br>1pt. | Green was riding a tricycle down a big hill and it started going faster than Green wanted. How do you think Green feels: happy, sad, mad scared, or no feeling?  |
| # of participants | 22            | 9           | 4           | 30             | 3                     |  |
| 9.                | Happy<br>3pt. | Sad<br>1pt. | Mad<br>1pt. | Scared<br>1pt. | No<br>Feeling<br>1pt. | Red made a nice card for a friend, Green. Green likes the card a lot. How do you think Green feels: happy, sad, mad scared, or no feeling?   |
| # of participants | 67            |             |             |                | 1                     |  |
| 10.               | Happy         | Sad         | Mad         | Scared         | No<br>Feeling         | Green's grandfather died. How do you think Green feels: happy, sad, mad  |

|                   |               |             |             |                |                       |   |
|-------------------|---------------|-------------|-------------|----------------|-----------------------|---|
|                   | 1pt.          | 3pt.        | 2pt.        | 2pt.           | 1pt.                  | scared, or no feeling?  |
| # of participants |               | 64          |             | 2              | 1                     |   |
| 11.               | Happy<br>1pt. | Sad<br>3pt. | Mad<br>2pt. | Scared<br>3pt. | No<br>Feeling<br>1pt. | Green's parents are yelling at each other in the other room. Green can hear them and thinks they are fighting. How do you think Green feels: happy, sad, mad scared, or no feeling?   |
| # of participants | 1             | 21          | 7           | 19             | 17                    |   |
| 12.               | Happy<br>1pt. | Sad<br>3pt. | Mad<br>2pt. | Scared<br>3pt. | No<br>Feeling<br>1pt. | At the park, Green's mother bought an ice cream. Green took one lick and accidentally dropped the ice cream cone. How do you think Green feels: happy, sad, mad scared, or no feeling?<br><b>Follow up: (Re-read the prompt.)</b> You said that Green felt _____. Tell me more about Green feeling _____. <b>(After response)</b> Is there anything more you would like to say about Green feeling _____? |
| # of participants | 4             | 58          | 2           | 3              | 1                     |   |
| 13.               | Happy<br>1    | Sad<br>2    | Mad<br>3    | Scared<br>2    | No<br>Feeling<br>1    | Green brings a favorite candy bar to school and it is in the book bag. Another child sees the candy bar, takes it and eats it. How do you think Green feels: happy, sad, mad scared, or no feeling?   |

|                   |               |             |             |                |                       |  |
|-------------------|---------------|-------------|-------------|----------------|-----------------------|--|
| # of participants | 1             | 52          | 13          |                | 1                     |  |
| 14.               | Happy<br>1pt. | Sad<br>2pt. | Mad<br>2pt. | Scared<br>3pt. | No<br>Feeling<br>1pt. | Green is playing in the woods with Red. Red runs away and leaves Green alone in the woods. It is getting dark. How do you think Green feels: happy, sad, mad scared, or no feeling?<br><b>Follow up: (Re-read the prompt.)</b> You said that Green felt _____. Tell me more about Green feeling _____. <b>(After response)</b> Is there anything more you would like to say about Green feeling _____? |
| # of participants |               | 28          |             | 39             | 1                     |  |
| 15.               | Happy<br>3pt. | Sad<br>1pt. | Mad<br>1pt. | Scared<br>1pt. | No<br>Feeling<br>1pt. | It is the first day of school. Red and Green are friends and have not seen each other all summer. Now Green sees Red in class. How do you think Green feels: happy, sad, mad scared, or no feeling?  |
| # of participants | 65            | 3           |             |                |                       |  |

**Please go to the highlighted items and say:** “That was good. Now I would like to go back to a few of these. I will read them to you again, and tell you the feeling that you said. I would like you to tell me more about the feeling to help me understand what you are thinking. Shall we try?”

Write down verbatim what the child says in the space below. Just in case, please tape the child’s responses. Only tape the open ended responses, not the entire administration

**Emotion Identification (EID)**  
**Participant Number \_\_\_\_\_**

*I'm going to show you some pictures of children and I want you to tell me how they feel. Tell me if you think they look happy, sad, mad, or scared. Sometimes you might think they look like they have two feelings, like both mad and sad. If you think they have two feelings, tell me both (If they say two, circle both. Then follow up by asking "which feeling is stronger" and mark the selected one with an asterisk). Sometimes the child in the picture may not look like any feeling, and you can tell me that by saying, "no feeling." Don't say "no feeling" just because you're not sure how they look, though. If you think they look like any feeling, I want you to take a guess at what it is, okay?(When you show each picture, prompt: Do you think he/she is happy, sad, mad, scared or no feeling?)*

|                   | Happy | Sad  | Mad  | Scared | NF    |
|-------------------|-------|------|------|--------|-------|
| Item 1            | 3 pt. | 1pt. | 1pt. | 1pt.   | 1pt.  |
| # of Participants | 67    |      |      |        | 1     |
| Item 2            | 1pt.  | 3pt. | 2pt. | 2 pt.  | 1 pt. |
| # of Participants |       | 63   |      | 2      | 3     |
| Item 3            | 1pt.  | 1pt. | 1pt. | 1pt.   | 3pt.  |
| # of Participants |       | 3    | 7    | 8      | 49    |
| Item 4            | 1pt.  | 2pt. | 3pt. | 2pt.   | 1pt.  |
| # of Participants |       | 3    | 60   | 3      | 1     |
| Item 5            | 1pt.  | 2pt. | 2pt. | 3pt.   | 1pt.  |
| # of              | 4     | 1    |      | 51     | 12    |

|                   |       |       |       |       |       |
|-------------------|-------|-------|-------|-------|-------|
| Participants      |       |       |       |       |       |
| Item 6            | 1pt.  | 3pt.  | 2pt.  | 2pt.  | 1pt.  |
| # of Participants |       | 50    | 3     | 4     | 11    |
| Item 7            | 1pt.  | 2pt.  | 3pt   | 2pt.  | 1pt.  |
| # of Participants |       |       | 61    | 2     | 4     |
| Item 8            | 3pt.  | 1pt.  | 1 pt. | 1 pt. | 1 pt. |
| # of Participants | 61    |       |       | 2     | 4     |
| Item 9            | 1 pt. | 2 pt. | 2 pt. | 3 pt. | 1 pt. |
| # of Participants |       | 1     |       | 44    | 22    |
| Item 10           | 3 pt. | 1 pt. | 1 pt. | 1 pt. | 1 pt. |
| # of Participants | 65    |       |       |       | 3     |
| Item 11           | 1 pt. | 1 pt. | 1 pt. | 1 pt. | 3 pt. |
| # of participants | 14    |       | 11    | 1     | 42    |
| Item 12           | 1 pt. | 2 pt. | 2 pt. | 3 pt. | 1 pt. |
| # of Participants | 2     | 1     |       | 52    | 11    |
| Item 13           | 1 pt. | 2 pt. | 3 pt. | 2 pt. | 1 pt. |
| # of              |       | 1     | 64    | 2     | 1     |

|                   |       |       |       |       |       |
|-------------------|-------|-------|-------|-------|-------|
| Participants      |       |       |       |       |       |
| Item 14           | 1 pt. | 3 pt. | 2 pt. | 2 pt. | 1 pt. |
| # of Participants |       | 59    |       | 5     | 4     |
| Item 15           | 3 pt. | 1 pt. | 1 pt. | 1 pt. | 1 pt. |
| # of Participants | 66    |       |       |       | 2     |
| Item 16           | 1 pt. | 2 pt. | 3 pt. | 2 pt. | 1 pt. |
| # of Participants |       |       | 57    | 8     | 3     |
| Item 17           | 1 pt. | 2 pt. | 2 pt. | 3 pt. | 1 pt. |
| # of Participants | 2     | 1     |       | 46    | 15    |
| Item 18           | 1 pt. | 2 pt. | 1 pt. | 1 pt. | 3 pt. |
| # of Participants | 2     | 13    | 4     | 5     | 43    |
| Item 19           | 1 pt. | 2 pt. | 3 pt. | 2 pt. | 1 pt. |
| # of Participants |       | 2     | 60    | 4     | 2     |
| Item 20           | 1 pt. | 3 pt. | 2 pt. | 2 pt. | 1 pt. |
| # of Participants | 3     | 39    |       | 17    | 8     |
| Item 21           | 3 pt. | 1 pt. | 1 pt. | 1 pt. | 1 pt. |
| # of Participants | 66    |       | 1     |       | 1     |

## Appendix E: Variables in Analysis and Research Questions

### *Variables used in Analyses*

| Variable                    | Descriptive Statistics | Exploratory Analyses | Q1 | Q2 | Q3 |
|-----------------------------|------------------------|----------------------|----|----|----|
| Age in months               | ✓                      | ✓                    |    |    |    |
| School Teacher              | ✓                      | ✓                    |    |    |    |
| Gender                      | ✓                      | ✓                    |    |    |    |
| ECT Emotion                 |                        |                      |    |    |    |
| Situations subtest          | ✓                      | ✓                    | ✓  | ✓  | ✓  |
| NEPSY-II TOM subtest        | ✓                      | ✓                    | ✓  | ✓  | ✓  |
| TAT                         | ✓                      | ✓                    | ✓  | ✓  | ✓  |
| WPSI-III Vocabulary subtest | ✓                      | ✓                    | ✓  | ✓  | ✓  |
| SSIS-Parent                 | ✓                      | ✓                    | ✓  | ✓  | ✓  |
| SSIS-Teacher                | ✓                      | ✓                    | ✓  | ✓  | ✓  |

### *Research Questions and Related Analyses*

| Purpose  | Analyses   |
|--|--|
| PQ1. What are the properties of the variables of interest?   |  |
| Descriptive statistics.  | Mean, Standard deviations, Frequency and Ranges on key independent and dependent variables . |
| PQ2. What variables should be controlled for in the MR analyses?<br>Are nested levels in the data influencing the outcome variable (SSIS)? |  |

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Exploratory analysis to identify variables that should be controlled for. Identify possible nested levels using ICC. Screen for impact of gender, age in months, and vocabulary on variables of interest using zero-order correlations and spearman correlations.

An ICC between School and SSIS teacher was calculated to determine the need for a multi-level model. ICC's between School and SSIS teacher subtests were also be run for exploratory purposes.

Correlations between: a) Vocabulary and TAT, b) Vocabulary and ToM, c) School and Teacher, d) Age in months and ECT subtests and combined, e) Gender and SSIS-T and f) Gender and SSIS-P

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RQ1. Are situationistic EU and mentalistic EU distinct constructs? How do they relate to each other and to external correlates?

H1a) There is a low or non-significant correlation between situationistic and mentalistic EU.

Pearson correlation of ECT and ToM. Partial correlation controlling for vocabulary.

H1b) Situationistic and mentalistic EU has distinct relations to external correlates when controlling for vocabulary— mentalistic EU relates to ToM but situationistic emotion understanding does not.

Partial correlation of ECT and ToM and TAT and ToM, controlling for vocabulary

H1c) Mentalistic EU and situationistic EU relate differently to various subcategories of social competence within the SSIS. Mentalistic EU relates to Engagement, Empathy, Responsibility, and Externalizing subscales on the SSIS, whereas situationistic EU relates to the Communication, Cooperation and Internalizing subscales.

Pearson correlation of ECT-combined test and SSIS subscales

Pearson correlation of TAT and SSIS subscales

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RQ2. When taken together, do ECT, TAT, and ToM, predict a significant amount of variation teacher rated social competence even when controlling for vocabulary?

H2) Mentalistic EU, situationistic EU and ToM account for a significant amount of variance in teacher-rated social competence when controlling for vocabulary.

MR Step 1:  
Vocabulary

MR Step 2:  
ECT-combined, TAT, NEPSY-II ToM subtest

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RQ3. Will mentalistic EU be a significant predictor of teacher rated social competence?

H3) Mentalistic EU will be a significant predictor in the model of teacher rated social competence.

MR analysis (see above) with predictor statistics.

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