Published in final edited form as:

J Exp Child Psychol. 2013 February ; 114(2): 306–320. doi:10.1016/j.jecp.2012.08.009.

Social Information Processing Patterns, Social Skills, and School Readiness in Preschool Children

Yair Ziv

Department of Counseling and Human Development, University of Haifa.

Abstract

The links between social information processing, social competence, and school readiness were examined in this short-term longitudinal study with a sample of 198 preschool children. Data on social information processing were obtained via child interview, data on child social competence were obtained via teacher report, and data on school readiness were obtained via child assessment (early literacy skills) and teacher report (approaches to learning). Findings provided support for our hypothesis that both social information processing and social competence are related to school readiness. Social competence also partially mediated the link between social information processing and school readiness thus supporting our hypothesis about an indirect path in which mental processes are translated into social skills and then translated into school readiness.

Social Information Processing Patterns, Social Skills, and School Readiness in Preschool Children

The link between children's social information processing (SIP) patterns and their social skills has been well established in many studies, especially in school (e.g., Crick & Dodge, 1994; Dodge, 1986; Dodge, Bates, & Pettit, 1990; Dodge, Laird, Lochman, & Zelli, 2002; Dodge & Price, 1994; Garner & Lemerise, 2007; Lansford et al., 2006; Schultz, Izard, & Bear, 2004; Zelli & Dodge, 1999) but also in the preschool years (e.g., Hart, DeWolf, & Burts, 1992; Katsurada & Sguwara, 1998; Runions & Keating, 2007; Ziv & Sorongon, 2011). Most of these studies have linked distorted SIP patterns with less competent social skills, but some (e.g., Mayeux & Cillessen, 2003; Nelson & Crick, 1999), have also reported strong links between more competent social information processing patterns and prosocial behavior. A different set of studies have found that children's social skills are related to their readiness for school, and later, to their actual academic achievement in school (e.g., Bulotsky-Shearer, Fernandez, Dominguez, & Rouse, 2011; NICHD Early Child Care Network, 2004; Pianta & McCoy, 1997; Zill & West, 2001), with children exhibiting more socially competent behaviors generally being in a better position to succeed academically in school than children exhibiting less competent social behaviors.

Nevertheless, no studies to date have examined if and how social information processing patterns are related to school readiness and academic adjustment in preschool. Thus, given (a) the direct links between social information processing and social skills and between

© 2012 Elsevier Inc. All rights reserved.

Correspondence should be addressed to: Yair Ziv, Department of Counseling and Human Development, University of Haifa, Israel
yziv@edu.haifa.ac.il.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

social skills and school readiness; and, (b) the apparent paucity in empirical examinations of the links between social information processing and school readiness, it seems that the purpose of the present study - to examine relations between SIP, social skills, and aspects of school readiness in preschool – is timely and needed.

This research is guided, both theoretically and methodologically, by the social information processing approach of Dodge and his colleagues (Crick & Dodge, 1994; Dodge, 1986; Dodge, 2006). According to this approach, at the root of every social encounter is a series of stepwise mental mechanisms responsible for the processing of new social information. These mechanisms are activated in response to external social cues and deactivated upon the individual's enactment of a behavioral response and include: (1) encoding of social cues; (2) interpretation of the cue; (3) clarification of goals; (4) response construction; and (5) response decision (Crick & Dodge, 1994). This is a circular process in which each mental step affects, and is affected by, a database for behavior in social encounters. In the early stages of this process, the individual selectively focuses on particular social cues and, based on these cues, interprets the context of the situation. In later stages, the individual accesses possible responses enacted in previous encounters and then stored in long-term memory. S/he then evaluates these responses, and based on this evaluation process selects a response to enact (Crick & Dodge, 1994). The database which guides this process includes also acquired social rules and schemes that are highly influenced by past experiences. In every social situation, this database is presumed to guide one's perception of appropriate and inappropriate social behaviors. If one's database is distorted, it likely means that the knowledge of what is right or wrong, what is acceptable or unacceptable, and what is the correct response to a certain social situation, is inaccurate (Dodge, 2006). This in turn, may result in a faulty social decision making mechanism which could inhibit social behaviors that contribute to positive developmental outcomes in favor of social behaviors that delay optimal developmental outcomes.

As mentioned, previous social information processing research had almost exclusively focused on socioemotional developmental outcomes whereas this study aims to examine whether these outcomes also include aspects of school readiness. Theory suggests, however, that if indeed social information processing is related to school readiness, this link is mediated via social behavior. First, this cognitive process fosters competent social skills and inhibits problem behavior (or, in the case of distorted processes, the other way around). Then, when children's social skills are solidified, the path for competent and more efficient learning is paved (or, in the case of less competent social skills – inhibited or blocked). To the best of our knowledge, this complete mediation path (social information processing via social skills to school readiness) has yet to be empirically examined. As mentioned above, however, the two separate paths that are included within this mediated model (social information processing to social skills and social skills to school readiness) were examined extensively in previous research. Findings from these two lines of research suggest that the assertion of a mediated path between social information processing and school readiness through social skills is plausible. In the next few pages, literature on these two separate paths is reviewed.

Social Information Processing and Social Skills

The social information processing approach presented above was proven to be quite effective in identifying unique patterns of social perceptions in school-aged children as a function of their social behaviors, particularly in relation to three of the five mental stages presented above: interpretation of cues, response construction, and response decision. Children with aggressive tendencies were found to have distorted social information processing patterns in each of these steps. They have been found to be less accurate in their interpretation of peers' social intentions (Dodge & Price, 1994; Dodge, Murphy, &

Buchsbaum, 1984; Hart et al., 1992; Katsurada & Sguwara, 1998; Lansford et al., 2006; Orobio de Castro, Merk, Koops, Veerman, & Bosch, 2005; Runions & Keating, 2007; Slaby & Guerra, 1988), more likely to construct aggressive or inept responses (Orobio de Castro et al., 2005; Schultz, & Shaw, 2003; Webster-Stratton & Lindsay, 1999), and more likely to expect positive instrumental and interpersonal outcomes for an aggressive response (Crick & Ladd, 1990; Orobio de Castro et al., 2005).

Similar findings were also found in preschool children, although the number of studies conducted with this age group is much smaller. Katsurada and Sguwara (1998) have shown that hostile/aggressive preschoolers were more likely than their less aggressive peers to attribute a hostile intent to another person's actions. Hart and his colleagues (Hart et al., 1992) have shown that preschoolers who engaged in more antisocial/disruptive behavior expected more positive instrumental outcomes for hostile methods of resolving conflict than their less disruptive peers. In more recent studies, Runions and Keating (2007) have shown that hostile attribution measured during the preschool years is a better predictor of problem behavior in first grade than hostile attribution measured concurrently in first grade, and Ziv and Sorongon (2011) have shown that preschoolers with aggressive tendencies evaluate better outcomes for aggressive responses.

Unique social information processing patterns were found not only for aggressive children. For example, Burgess and colleagues have found that as opposed to aggressive children, shy/withdrawn children were more likely to attribute hostile intentions to unfamiliar than to familiar peers (Burgess, Wojslawowicz, Rubin, Rose-Krasnor, & Booth-LaForce, 2006). These and similar findings (e.g., Hanish & Guerra, 2004; Rubin, Chen, & Hymel, 1993) have led Burgess et al. to suggest that withdrawn children have distinctive ways of thinking about interpersonal interaction in light of their own experiences of rejection and victimization (Burgess et al., 2006).

Finally, social information processing patterns have been found to also predict desirable, socially competent behavior (as opposed to the mere absence of maladaptive behavior). For example, Nelson and Crick (1999) found that children who were identified as prosocial by their teachers and peers showed significantly less hostile attribution bias than other children. Mayeux and Cillessen (2003), found that boys who were more socially popular generated more positive responses to ambiguous social situation compared to their less popular peers. Positive social interactions were also found to predict more competent social information processing patterns. For example, Ziv, Oppenheim, and Sagi (2004) have shown that by age seven, children who were classified as securely attached to their mothers at infancy exhibit more competent response evaluation patterns compared to children who had been classified as insecurely attached to their mothers.

Social Skills and School Readiness

Researchers have devoted much attention to the social skills of preschoolers and their possible contribution to school readiness and children's adaptability to the formal school setting (Coolahan, Fantuzzo, Mendez, & McDermott, 2000; Ladd, Price, & Hart, 1990; NICHD Early Child Care Network, 2004; Pianta & McCoy, 1997; Zill & West, 2001). Findings from this research have contributed to the notion that the emergence of the ability to establish effective and positive peer relationships in preschool is an important indicator of school readiness. For example, preschoolers' ability to establish and maintain positive peer relationships has been found to be associated with a more positive transition to formal school settings as well as continued school achievement throughout the school years (Fantuzzo & McWayne, 2002; Hampton & Fantuzzo, 2003; Ladd, Kochenderfer & Coleman, 1996; Ladd & Price, 1987). It has also been found that children who are rejected or not liked by others, and children who have negative peer interactions in the early years

are more likely to have negative outcomes during the school years and beyond, including poor academic performance and grade retention, high absenteeism, and negative emotional sequelae (Denham & Holt, 1993; DeRosier, Kupersmidt & Patterson, 1994; Hartup & Moore, 1990; Kupersmidt, Coie, & Dodge, 1990; Ladd & Coleman, 1997; Parker & Asher, 1987; Vitaro, Tremblay & Gagnon, 1992; Wasik, Wasik & Frank, 1993). In contrast, findings from six large-scale longitudinal studies, including the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K) suggests that whereas academic skills such as early reading and math skills at kindergarten entrance were strongly predictive of higher grade academic skills, social competence and positive social behavior were not as predictive (Duncan et al., 2007).

Blair (2002), in an integrative review of the neurodevelopmental, socio-emotional and school readiness literatures, has proposed a model of school readiness that emphasizes the importance of social and emotional capacities in the development of school readiness. This model posits that children's emotionality and emotion-related functioning (implicitly including social functioning) influence neurophysiological maturation and the interconnections among the neuronal structures that underlie higher order cognition. Blair's theoretical approach is complemented by the work of Eisenberg and her colleagues (e.g., Eisenberg et al., 1997; Eisenberg et al., 2000; Eisenberg et al., 2004) who have examined concurrent and longitudinal associations between maternal characteristics (such as emotional expressiveness) and aspects of children's emotionality, and social functioning throughout the school years. The findings of these studies suggest that children's early socioemotional environment is associated with children's emerging capacities to engage in effortful control and emotion-regulated behavior, which, in turn, are associated with social competence and then with positive adjustment to and achievement in school.

In conclusion, existing findings are inconclusive about the existence of a link between social competence and academic competence and also about the direction of effects between these two competencies (Kupersmidt & Coie, 1990; Ladd, 1990; O'Neil, Welsh, Parke, Wang, & Strand, 1997; Wasik, Wasik, & Frank, 1993; Welsh, Parke, Widaman, & O'Neil, 2001). However, the examination of the existing research along with the consideration of models such as Blair's suggest that this path is plausible but may be more complex than originally envisioned. At least part of this complexity may be attributed to the role social cognitive processes play in the interplay between behavior and cognition.

Social Information Processing to Social Skills to School Readiness

The social information processing approach guiding this study suggests that the interplay between the child and her environments, whether interpersonal or academic, are encoded, interpreted, organized, and stored in memory, to be translated into mental models or schemas that inform subsequent exchanges (Burks, Laird, Dodge, Pettit, & Bates, 1999). In this way, early social information processing patterns may persist in their contribution to children's social behavior in school, thus impacting later school readiness and academic success. As long as these processes are not biased, they do not interfere with the learning process and children may be able to devote adequate mental resources to academic tasks. However, social information processing distortions may put the child in a considerable disadvantage in the classroom because she may misinterpret others' intents, devote considerable resources to negative emotional processes, and translate these emotions into less competent social behaviors. These distortions could then serve as self fulfilling prophecies with others starting to hold negative attitudes and intents towards the maladjusted child, making her task to maintain academic readiness harder because of the negative social environment that is building around her.

While this explanation is theoretically plausible, there are many other factors that may be more clearly related to academic achievement. For example, there is abundant literature supporting the role of children's cognitive abilities in school readiness (Bickham et al., 2001; Duncan et al., 2007), in particular executive functions (e.g., Riggs, Blair, & Greenberg, 2003; Zelazo, Carter, Reznick, & Frye, 1997), preliteracy (e.g., Hart & Risley, 1999; Jordan, Snow & Porche, 2000; Whitehurst & Lonigan, 1998,) and prenumeracy skills (e.g., Sophian & Vong, 1995). Thus, when examining links between social cognitions and aspects of school readiness, one must carefully consider the types of school readiness factors that are most likely to be influenced by these social cognitive processes. From this perspective, an aspect of school readiness that seem to be especially vulnerable to social information processing disruptions is children approaches towards learning.

Approaches towards learning are defined as the individual characteristics and observable behaviors that children show while taking part in learning activities (McWayne, Fantuzzo, & McDermott, 2004) and include behaviors such as persistence, motivation, attentiveness, flexibility, and organization (Fantuzzo, et al., 2007; McWayne et al., 2004). The successful acquisition of these behaviors during the preschool years is considered to be a vital first step towards a smooth transition into the more formal and strict school environment (Li-Grining, Votruba-Drzal, Maldonado-Carreño, & Haas, 2010). Many recent studies have shown that approaches to learning are negatively related to children's problem behavior and positively related to their positive social skills (Bulotsky-Shearer et al., 2011; Dominguez & Greenfield, 2009; Fantuzzo, Bulotsky-Shearer, Fusco, & McWayne, 2005). Since approaches to learning represent basic perceptions about school, these may be more vulnerable to other types of social perceptions of peers that are a major part of the school experience. Therefore, in the present study, a measure of approaches to learning as an indicator of school readiness is also included.

However, measuring school readiness only through children's approaches to learning does not take into account cognitive abilities such as early literacy that are still considered the core of academic competence. In the only examination of links between social information processing and such skills, Runions and Keating (2007), using the NICHD study of early child care and youth development, reported that kindergarten children with higher literacy skills were more likely to attribute benign intents to peers in ambiguous social situations and were less likely to attribute hostile intents to peers demonstrating aggressive responses. In the present study, the same early literacy measure (the *Picture Vocabulary subtest of the Woodcock-Johnson (WJ) Psycho-Educational Battery –Third edition*; McGrew and Woodcock, 2001) used in the Runions and Keating report is also utilized.

Based on the above review, the first hypothesis of this study is that social information processing patterns will be significantly and positively related to children's social competence and that social information processing and social competence will be positively related to school readiness. The study's second hypothesis is that social competence will mediate the link between social information processing and school readiness such that the indirect path between SIP and school readiness via social competence will be significant. The complete hypothesized structural model guiding this study is presented in Figure 1.

Method

Sample and Procedure

The sample was drawn from a large metropolitan area and included 198 children (99 girls; 50%) ages 48 to 61 months at the beginning of the study ($M = 55$ months, $SD = 6.1$ months). Eligible families (families with 4- or 5-year old English speaking children) were recruited through their preschool centers using fliers distributed in their mailboxes. Some of the

recruitment efforts took place in local Head Start programs to get a sufficient number of children from low socioeconomic status (SES) backgrounds. This effort resulted in 47 children (23 boys) that were recruited from four local Head Start programs. Information on household income (parent report) was available for 167 recruited families; 38 (23%) of whom reported household annual income lower than \$50,000 per year, 15 (9%) reported an annual income of \$50,000 to \$75,000, and 114 (68%) reported a household annual income higher than \$75,000. Information on race (parent report) was available for 175 children; 83 (47%) were White, 44 (25%) were Black, 34 (19%) were Asian, and 14 (8%) were Latino.

The data used in this study were collected at the beginning (Time 1) and end (Time 2) of the preschool year (2006–2007). Here, social information processing data (direct assessment) and social behavior data (teacher report) are reported from Time 1, and early literacy data and approaches to learning data from Time 2. All parents signed their consent for their children's participation in the study prior to the beginning of the study, and all children gave their verbal assent. Families and teachers received monetary compensation for their participation in the study.

Measures

Social information processing—The Social Information Processing Interview – Preschool Version (SIPI-P; Ziv & Sorongon, 2011) was used to collect data regarding children's social information processing patterns. This structured interview is based on a storybook easel depicting a series of vignettes in which a protagonist is either rejected by two other peers (in the “*peer-rejection*” vignette) or provoked by another peer (in the “*peer-provocation*” vignette). The peers’ intent is portrayed as either ambiguous or nonhostile/. Each type of vignette is combined with each type of peer intent to generate four stories: (1) a nonhostile rejection story (the protagonist asks other children to join their game with blocks but they say the teacher does not allow it because only two can play in the block area), (2) an ambiguous rejection story (the protagonist asks the other children to join their game but they do not answer), (3) an accidental provocation story (another child accidentally spills the protagonist’s milk cup), and (4) an ambiguous provocation story (the protagonist watches TV, another child comes over and changes the channel). The stories are told by a trained interviewer using a storybook easel with illustrations of bears. There are parallel picture books for boys and girls. As the child hears the story, the interviewer stops at scripted points and poses questions addressing the hypothesized information processing steps.

In the present study, three main scores were derived from the SIPI-P. These three scores correspond to the three social information processing steps that were found to be most useful in predicting children social behaviors: interpretation of cues, response construction, and response decision. All three scores are termed positively. Interpretation of cues yielded one score: Benign intent. Response construction yielded one score: Positive response construction. Finally, response decision yielded one score: Positive response decision. Table 1 presents the SIPI-P questions as they apply to the social information processing steps.

The *benign intent score* is a frequency count of the number of times the child describes the other child/children as not being mean across the four stories. Thus, the range for this score is 0 to 4 with higher scores representing the absence of a hostile attribution bias. Internal consistency reliability, as measured by Cronbach’s Alpha was .76.

The *Positive Response construction* score is derived from the child’s responses to the open-ended item “What would you say or do if this happened to you?” The answers are used to create three, mutually-exclusive flag variables (coded 0, 1) for each story: competent flag, aggressive flag, and inept flag. For example, if the child’s response is coded as “competent,” then she is given a “1” for the competent flag, a “0” for the aggressive flag, and a “0” for the

inept flag. The values for the three respective flags are combined across the four stories to create three scales: competence scale, aggressiveness scale, and inept scale. The final positive response construction score is then calculated by subtracting the aggressive and inept scores from the competent score. The original range of this score is minus four (only inept or aggressive responses) to four (only competent responses). However, to avoid negative scale scores, the scale is modified such that the presented possible range for this score is zero (only inept or aggressive responses) to eight (only competent responses). Interrater reliability for the decision about the quality of the response (i.e., competent, aggressive, or inept) was 100 percent (on 20 percent of the cases). Internal consistency for the positive response construction score was .78.

The *Positive Response Decision* score is constructed from a combination of the 36 response decision questions (4 stories $\times$ 3 competent /aggressive/ inept presented responses $\times$ 3 questions per presented response). The total number of non-competent responses (i.e., aggressive and inept responses) are summed across stories and subtracted from the total number of competent responses to create this score. After adjusting for negative scores, the possible range for this scale is 0–36 with higher scores representing higher positive response evaluation. Internal consistency reliability for that score was .87.

Social competence—Children social skills were measured through two separate teacher's ratings: one that tapped positive social behaviors and the other the tapped problem behaviors.

The measure that tapped positive behaviors was the teacher's ratings of *competent social behavior*. The competent social behavior scale items are drawn from the Personal Maturity Scale (Alexander & Entwisle, 1988) and the Social Skills Rating System (Elliott, Gresham, Freeman, & McCloskey, 1988). The scale is composed of items dealing with helpful and compliant behaviors like "Follows the teacher's directions." Other items deal with the child's maturity and skill in interacting with other children, such as "Invites others to join in activities." This scale was used extensively in previous studies including three different cohorts of the Family and Child Experiences Survey (FACES; ACYF, 2006). All items are scored on a 3-point frequency scale ranging from "never" to "very often." There are 12 rating items in all, and the scale score could range from zero (all items marked "never") to 24 (all items marked "very often"). Internal consistency score for this measure was .90.

The second measure was a *teacher rating of problem behavior*. Teachers were asked to rate how often children exhibited various externalizing and internalizing behaviors: "never" (0), "sometimes" (1), or "very often" (2). This widely used problem behavior scale (ACYF, 2005, 2006) is derived from the Personal Maturity Scale (Alexander & Entwisle, 1988), the Child Behavior Checklist for Preschool-Age Children, Teacher Report (Achenbach, Edelbrock, & Howell, 1987), and the Behavior Problem Index (Zill, 1990). Example of an externalizing item is "Hits or fights with others." Example of an internalizing item is "Keeps to himself or herself; tends to withdraw." All items are scored on a 3-point frequency scale ranging from "never" to "very often." There are 20 rating items in all, and the scale score could range from zero (all items marked "never") to 40 (all items marked "very often"). Internal consistency score for this measure was .87. For the current study, scores on this scale were reversed such that higher scores on that scale represented lack of problem behavior.

School readiness measures—Readiness to school was measured with two separate measures. The first was the *Picture Vocabulary subtest of the Woodcock-Johnson (WJ) Psycho-Educational Battery –Third edition* (McGrew and Woodcock, 2001). This test was included to test for children's growth in expressive language skills during the course of the

preschool year. It is part of a widely used WJ psycho-educational battery and the specific subtest chosen is a measure of oral language development and word knowledge. The task requires the child to identify pictured objects. Although a few receptive items are offered at the beginning of the test, this is primarily an expressive language task. The items become increasingly difficult as children are asked to give the name of more obscure objects (e.g., monocle). The published internal consistency reliability was reported as .77 (McGrew & Woodcock, 2001). Internal consistency reliability in this study was .81 in Time 1 and .82 in Time 2. The test contains a total of 44 items. However, it also includes a stopping rule when three consecutive items are answered wrong. As a result, preschool children are unlikely to receive all items. Indeed, children in our sample received on average 15 items in Time 1 and 17 items in Time 2. In the present study, Time 2 scores were used as indicators of school readiness and Time 1 scores were also entered in our structural model to partial out the effect of general cognitive skills.

The second measure of school readiness was a teacher report of the child's *Approaches toward learning*. The Preschool Learning Behavior Scale (PLBS; McDermott, Leigh, & Perry, 2002) was used to measure children's approaches to learning at the end of the preschool year. The PLBS is a 29-item nationally standardized teacher-rating scale of learning behaviors within the classroom. Three dimensions that were found to represent coherent factors in previous research (e.g., Bulotsky-Shearer et al., 2011) are derived from the PLBS: Competence Motivation, Attention/Persistence, and Attitude Toward Learning. Internal consistency scores for the three constructs in the present study were high (Cronbach Alphas higher than .80 for all constructs in both data collection times) and consistent with previous research. Each item is rated on a 3-point scale (most often applies, sometimes applies, or doesn't apply). The Competence motivations scale assesses children's willingness to take on tasks and their determination to complete activities successfully (e.g., "reluctant to tackle a new activity"). The attention/Persistence dimension measures the degree to which children pay attention and are able to persist with difficult tasks (e.g., "tries hard, but concentration soon fades and performance deteriorates"). The Attitude Toward Learning dimension focuses on such concepts as children's willingness to be helped, desire to please the teacher, and ability to cope when frustrated (e.g., "doesn't achieve anything constructive when in a sulky mood"). Internal consistency scores for the three scales in this study were .90, .89, and .87, respectively.

Results

Preliminary Analyses

Descriptive statistics of the study's main outcome variables are reported in Table 2. Next, links between various child and family characteristics and the study's outcome variables were examined. Four significant correlations were found: age was negatively related to two PLBS scores: Attention/Persistence, and Attitude toward Learning, $r(197) = -.16, p < .05$; $r(197) = -.19, p < .01$, respectively; family income was positively related to the child's competent behavior score, $r(170) = .17, p < .05$; and gender was positively related to Attitude Toward Learning $r(196) = .15, p < .05$, which meant that girls (dummy coded 1) were reported to have slightly better attitudes toward learning. Thus, age, gender, and family income were entered into the main model as control variables.

Finally, because multiple teachers (26 teachers in 26 different classrooms) reported on children's social behavior and academic readiness, the intra-class correlations (ICC) coefficients describing how similar or different were teacher's ratings within each classroom and between classrooms were also examined. Coefficients were small ranging from 0.03 (social skills scale) to 0.09 (Attention/Persistence scale)), which essentially means that the assumption regarding independence of ratings was not violated in the present study.

Main Analyses

Table 3 present the zero order correlations among all of the study main variables. As can be seen, of the three social information processing variables, benign intent was not related to any outcome but the other two SIP constructs: positive response construction and positive response decision were related to all outcomes. The two social competence indicators were related to all school readiness constructs.

Next, to examine whether social competence mediated the effects of social information processing on school readiness, the procedures outlined by Mackinnon (2008) and Shrout and Bolger (2002) were followed. According to Mackinnon (2008), mediation is best examined when structural equation modeling is used. A case in which a previously significant link between an independent variable (in the present study: SIP) and a dependent variable (in the present study: school readiness) is reduced to zero when a proposed mediator (in the present study: social competence) is introduced into the equation represents full mediation. When the same link is reduced in magnitude but remains significant, it is a case of partial mediation. The Shrout and Bolger (2002) bootstrapping approach allows for the estimation of a confidence level for the significance of the indirect path (i.e., the path from SIP to school readiness via social competence). Bootstrapping is considered to be a more powerful and less conservative test of mediation compared to the more conventional Sobel test (MacKinnon, 2008). The hypothesized SEM presented in Figure 1 was estimated via AMOS version 18 (Arbuckle, 2009). One variable -- benign intent -- that was part of the hypothesized model was excluded from the measurement model because its loading on the latent construct SIP was small ($\lambda = .14$). Note that the inclusion or exclusion of this variable had almost no effect on the robustness of the model but because this variable did not appear to represent any meaningful information about children's SIP it was removed from the final model. To control for possible confounds, the measurement model also included age, gender, family income, and WJ scores from time 1. The hypothesized model appeared to be a good fit to the data based on conventional fit indexes: CFI = .96; TLI = .95; and RMSEA = .048; chi-square = 13.63; degrees of freedom = 12. The results of this analysis are presented in Figure 2.

As can be seen, this analysis provided support for the hypothesis of the mediating role of social competence on the link between social information processing and school readiness: social competence reduced almost 40 percent of the zero-order link between social information processing and school readiness (the standardized beta coefficient was reduced from .61 to .41 when social competence was introduced to the model). Calculated by the bootstrap method, this reduction in the magnitude of the direct path of .20 after the introduction of social competence (SC) into the model was significant at $p < .001$. Because the direct link between social information processing and school readiness remained statistically significant (see Figure 2), these results represent a partial mediating effect of social competence on that link.

Discussion

Children who start school with more positive approaches to learning and better academic skills have a better chance than children who do not possess the same readiness qualities to succeed in school (Li-Grining et al., 2010). Thus, knowing as much as we can about the antecedents of such aspects of school readiness is vital for successful preparation of preschool children to school and is considered a national priority in the US (US Department of Education, 2000). In that respect, links found in that study between (a) social cognition, (b) social behavior, and (c) learning behaviors and academic skills, put us in a better position to understand some of the origins of school readiness. Our findings clearly show that children who view social encounters in more competent ways, are also reported to possess

more competent and less abrasive behaviors in preschool, and, seem to be better ready to perform in school, both academically (as demonstrated by their better expressive language abilities) and in relation to their motivation, persistence, and attitudes towards learning (as demonstrated in their reported approaches to learning).

The direct links found between social information processing and approaches to learning are intriguing. Children who constructed positive responses in uncertain social situations and correctly evaluated competent and non-competent responses scored are also more likely to score high on all three approaches to learning dimensions: competence/motivation, attention/persistence and attitude toward learning. These findings indicate that children's motivation and ability to focus and sustain attention in the preschool setting is associated with them having socially competent mental representation of social encounters. One interpretation of these findings could be that children who correctly identify social situations spend less mental energy on processing and thus find it easier to remain focused and engaged in learning tasks. Another interpretation could be that the same mental capabilities that affect children's readiness to school also play a role in children's understanding of social encounters. More longitudinal and perhaps experimental research is needed to more fully understand the nature of these relationships.

The direct links found between social information processing and expressive language are even more striking: whereas social information processing patterns measured at the beginning of the school year were related to expressive language abilities both at the beginning and at the end of the school year, the longitudinal links between SIP and expressive language were notably stronger than the concurrent links between these constructs. In other words, children with more competent SIP patterns were more likely to make higher gains in their expressive language skills during the preschool year than children with less competent SIP patterns. These striking findings provide strong empirical support for our hypothesis that social cognitive processes are likely to contribute not only to social aspects of school readiness but also to the academic aspects of this construct. When viewing these links in conjunction with the similar pattern of associations found between social competence (as reported by the teacher) and expressive language (i.e., stronger longitudinal than concurrent correlations), one can speculate that it is easier to develop emerging language capacities when your behavior towards others are more positive and less abrasive, or, that it is easier to develop these capacities when you are viewed by your teacher as more socially competent.

The mediated path: social information processing to school readiness via social competence was also significant, supporting our hypothesis about an indirect path in which mental processes are translated into social skills and then translated into school readiness. Although the design of this study does not support causal interpretation, the significance of the mediated path suggest that social information processing patterns persist in their contribution to children's social behavior in school, thus impacting later school readiness and academic success. That the mediating effect was partial and not full suggests that a significant part of the link between social information processing and school readiness cannot be attributed to children's social competence as measured here.

The results of this study have implications for social information processing theory and research. First, these results extend the emphasis of social information processing theory on behavior problems to include unique influences on more socially competent behaviors. That preschool children with more competent processing patterns were also reported to be more socially competent by their teachers add to the isolated findings from SIP research with older children on the link between social information processing and prosocial behavior (Mayeux & Cillessen, 2003; Nelson & Crick, 1999). This is important because questions

had been raised about the utility of the social information processing approach in identifying unique processing trends in relation to positive social skills and in non-clinical samples (Lemerise & Aresnio, 2000; Runions & Keating, 2007; Schultz & Shaw, 2003). Second, the positive links between positive SIP patterns and higher levels of school readiness further extends the theory to include links to behaviors that are considered crucial for school success and even further, to more "pure" academic skills such as preliteracy that are the core of academic adjustment in school. Of course, design limitations do not allow us to draw definite conclusions about the nature and direction of these links but the positive links reported here are still encouraging in their ability to open new avenues for research about the intriguing links between social cognition and more general cognition.

This investigation also makes contributions to school readiness research. That social competencies (both perceptual and behavioral) were related to both academic (expressive language) and social (approaches to learning) readiness skills add to the still inconclusive evidence about the existence of a link between social competence and academic competence. Moreover, that social competencies and each of the learning behavior dimensions were positively correlated with emergent language skills suggest the concurrent emergence of social competency, learning behaviors, *and* cognitive skills in preschool. This has significant implications to the construction of preschool readiness programs in the sense that programs focusing their efforts only on the enhancement of cognitive/academic skills may not be as efficient as more holistic programs who include in their definition of school readiness both academic and social aspects of development.

Limitations and Future Directions

The intriguing results presented here should be viewed with caution because of a number of limitations. First, our design includes only two time points in measurement whereas our theory about a mediated path would have been better examined using a three time point design (time 1 is social information processing, time 2 is social competence, and time 3 is the school readiness outcomes). Thus, because the reported data is part cross-sectional, causal links between the three main constructs examined here cannot be assumed. This could be addressed in future studies by incorporating a design that will include at least three measurement points. Second, both social competence and approaches to learning were measured via report from the same teacher (albeit in different time points). A better design would have used different method/reporter to measure these two constructs. Third, school readiness was examined at the end of the preschool year and not in school thus only indirect inferences to children adjustment to school could be made. Future studies examining the links between SIP and school readiness should employ a longer-term longitudinal design which will include a measurement point in school so that adjustment to school could be directly measured.

Conclusion

This study extends existing knowledge on the links between social cognition, social competence, and readiness to school in the preschool years. Both main and mediated effects of social information processing on school readiness were found in a relatively large and representative community sample. These findings have both theoretical and practical implications. Theoretically, findings such as these support models of school readiness that emphasize the importance of social capacities in the development of school readiness (such as Blair's, 2002). Practically, findings of studies like this one could and should inform preschool policies about the types of programs that best prepare children to school.

Acknowledgments

This study was supported by grant RO3HD051599 from the National Institute of Child Health and Development (NICHD). The author thank the children and families for their participation, to the preschool teachers for their cooperation, and to all staff who took part in this study.

References

- Achenbach TM, Edelbrock C, Howell CT. Empirically based assessment of the behavioral/emotional problems of 2- to 3-year-old children. *Journal of Abnormal Child Psychology*. 1987; 15:629–650. [PubMed: 3437096]
- Administration on Children, Youth, and Families (ACYF). Head Start impact study: First year findings. Washington, DC: Administration for Children, Youth, and Families, U.S. Department of Health and Human Services; 2005.
- Administration on Children, Youth, and Families (ACYF). Head Start Performance Measures Center Family and Child Experiences Survey (FACES 2000). Washington, DC: Administration for Children, Youth, and Families, U.S. Department of Health and Human Services; 2006.
- Alexander KL, Entwisle DR. Achievement in the first two years of school: Patterns and processes. *Monographs of the Society for Research in Child Development*. 1988; 53(2) Serial No. 218.
- Arbuckle, JL. AMOS 18 [software]. Chicago, IL: SPSS; 2009.
- Bickham, DS.; Wright, JC.; Huston, AC.; Valkenburg, PM.; Naigles, LR.; Mayeux, L.; Miron, D.; Bryant, J.; Zillmann, D.; Mares, M.; Woodard, EH. Cognitive functions and school-readiness skills. In: Singer, DG.; Singer, JL., editors. *Handbook of children and the media*. Thousand Oaks, CA, US: Sage Publications, Inc.; 2001. p. 101-205.
- Blair C. School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist*. 2002; 57:111–127. [PubMed: 11899554]
- Bulotsky-Shearer, Fernandez V, Dominguez X, Rouse LS. Behavior problems in learning activities and social interactions in Head Start classrooms and early reading, mathematics, and approaches to learning. *School Psychology Review*. 2011; 40:39–56.
- Burgess KB, Wojslawowicz JC, Rubin KH, Rose-Krasnor L, Booth-LaForce C. Social Information Processing and Coping Strategies of Shy/Withdrawn and Aggressive Children: Does Friendship Matter? *Child Development*. 2006; 77:371–383. [PubMed: 16611178]
- Burks VS, Laird RD, Dodge KA, Pettit GS, Bates JE. Knowledge structures, social information processing, and children's aggressive behavior. *Social Development*. 1999; 8:220–236. [PubMed: 20011226]
- Coolahan K, Fantuzzo J, Mendez J, McDermott P. Preschool peer interactions and readiness to learn: Relationships between classroom peer play and learning behaviors and conduct. *Journal of Educational Psychology*. 2000; 93:458–465.
- Crick NR, Dodge KA. A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*. 1994; 115:74–101.
- Crick NR, Ladd GW. Children's perceptions of the outcomes of aggressive strategies: Do the ends justify being mean? *Developmental Psychology*. 1990; 26:612–620.
- Denham SA, Holt RW. Preschoolers' likability as cause or consequence of their social behavior. *Developmental Psychology*. 1993; 29:271–275.
- DeRosier M, Kupersmidt JB, Patterson CJ. Children's academic and behavioral adjustment as a function of the chronicity and proximity of peer rejection. *Child Development*. 1994; 65:1799–1813. [PubMed: 7859556]
- Dodge, KA. A social information processing model of social competence in children. In: Perlmutter, M., editor. *Minnesota symposium of child psychology*. Hillsdale, NJ: Erlbaum; 1986. p. 77-125.
- Dodge KA. Transitional science in action: Hostile attributional style and the development of aggressive behavior problems. *Development and Psychopathology*. 2006; 18:791–814. [PubMed: 17152401]

- Dodge KA, Bates JE, Pettit GS. Mechanisms in the cycle of violence. *Science*. 1990; 250:1678–1683. [PubMed: 2270481]
- Dodge KA, Murphy RM, Buchsbaum K. The assessment of intention-cue detection skills in children: Implications for developmental psychopathology. *Child Development*. 1984; 55:163–173. [PubMed: 6705618]
- Dodge KA, Price JM. On the relation between social information processing and socially competent behavior in early school-aged children. *Child Development*. 1994; 65:1385–1397. [PubMed: 7982356]
- Dodge KA, Laird R, Lochman JE, Zelli A. Multidimensional latent-construct analysis of children's social information processing patterns: Correlations with aggressive behavior problems. *Psychological assessment*. 2002; 14:60–73. [PubMed: 11911050]
- Domínguez Escalón X, Greenfield DB. Learning behaviors mediating the relationship between behavior problems and academic outcomes. *NHSA Dialog*. 2009; 12:1–17.
- Duncan GJ, Claessens A, Huston AC, Pagani LS, Engel M, Sexton H, et al. School readiness and later achievement. *Developmental Psychology*. 2007; 43:1428–1446. [PubMed: 18020822]
- Eisenberg N, Guthrie JK, Fabes RA, Reiser M, Murphy BC, Holmgren R, et al. The relations of regulation and emotionality to resiliency and competent social functioning in elementary school children. *Child Development*. 1997; 68:295–311. [PubMed: 9180003]
- Eisenberg N, Guthrie JK, Fabes RA, Shepard SA, Losoya S, Murphy BC, et al. Prediction of elementary school children's externalizing problem behaviors from attentional and behavioral regulation and negative emotionality. *Child Development*. 2000; 71:1367–1382. [PubMed: 11108101]
- Eisenberg N, Spinrad TL, Fabes RA, Reiser M, Cumberland A, Shepard SA, et al. The Relations of Effortful Control and Impulsivity to Children's Resiliency and Adjustment. *Child Development*. 2004; 75:25–46. [PubMed: 15015673]
- Elliott SN, Gresham FM, Freeman R, McCloskey G. Teacher and observer ratings of children's social skills: Validation of the social skills rating scales. *Journal of Psychoeducational assessment*. 1988; 6:152–161.
- Fantuzzo JW, Bulotsky-Shearer R, Frye D, McDermott PA, McWayne C, Perlman S. Investigation of social, emotional, and behavioral dimensions of school readiness for low-income, urban preschool children. *School Psychology Review*. 2007; 36:44–62.
- Fantuzzo JW, Bulotsky-Shearer R, Fusco RA, McWayne C. An investigation of preschool emotional and behavioral adjustment problems and social-emotional school readiness competencies. *Early Childhood Research Quarterly*. 2005; 20:259–275.
- Fantuzzo J, McWayne C. The relationship between peer play interactions in the family context and dimensions of school readiness for low-income preschool children. *Journal of Educational Psychology*. 2002; 94:79–87.
- Garner PW, Lemerise EA. The role of behavioral adjustment and conceptions of peers and emotions in preschool children's peer victimization. *Development and Psychopathology*. 2007; 19:57–71. [PubMed: 17241484]
- Guerra NG, Huesmann LR, Spindler A. Community Violence Exposure, Social Cognition, and Aggression Among Urban Elementary School Children. *Child Development*. 2003; 74:1561–1576. [PubMed: 14552414]
- Hampton VR, Fantuzzo JW. The Validity of the Penn Interactive Peer Play Scale with urban low-income kindergarten children. *School Psychology Review*. 2003; 32:77–91.
- Hanish LD, Guerra NG. Aggressive Victims, Passive Victims, and Bullies: Developmental Continuity or Developmental Change? *Merrill-Palmer Quarterly*. 2004; 50:17–38.
- Hart, B.; Risley, TR. *The social world of children: Learning to talk*. Baltimore, MD: Paul H. Brookes; 1999.
- Hart CH, DeWolf DM, Burts DC. Linkages among preschoolers' playground behavior, outcome expectations, and parental disciplinary strategies. *Early Education and Development*. 1992; 3:265–283.
- Hartup WW, Moore SG. Early peer relations: Developmental significance and prognostic implications. *Early Childhood Research Quarterly*. 1990; 5:1–17.

- Jordan GE, Snow CE, Porche MV. Project EASE: The effect of a family literacy project on kindergarten students' early literacy skills. *Reading Research Quarterly*. 2000; 35:524–546.
- Katsurada E, Sugawara AI. The relationship between hostile attributional bias and aggressive behavior in preschoolers. *Early Childhood Research Quarterly*. 1998; 13:623–636.
- Kupersmidt JB, Coie JD. Preadolescent peer status, aggression, and school adjustment as predictors of externalizing problems in adolescence. *Child Development*. 1990; 61:1350–1362. [PubMed: 2245729]
- Kupersmidt, JB.; Coie, JD.; Dodge, KA. The role of poor peer relationships in the development of disorder. In: Asher, Steven R.; Coie, John D., editors. *Peer rejection in childhood*. New York, NY, US: Cambridge University Press; 1990. p. 274-305.
- Ladd GW, Coleman CC. Children's classroom peer relationships and early school attitudes: Concurrent and longitudinal associations. *Early Education & Development*. 1997; 8:51–66.
- Ladd GW, Kochenderfer BJ, Coleman CC. Friendship quality as a predictor of young children's early school adjustment. *Child Development*. 1996; 67:1103–1118. [PubMed: 8706512]
- Ladd GW, Price JM. Predicting children's social and school adjustment following the transition from preschool to kindergarten. *Child Development*. 1987; 58:1168–1189.
- Ladd, GW.; Price, JM.; Hart, CH. Preschoolers' behavioral orientations and patterns of peer contact: Predictive of peer status?. In: Asher, SR.; Coie, JD., editors. *Peer rejection in childhood*. New York: Cambridge University Press; 1990. p. 90-115.
- Lansford JE, Malone PS, Dodge KA, Crozier JC, Pettit GS, Bates JE. A 12-Year Prospective Study of Patterns of Social Information Processing Problems and Externalizing Behaviors. *Journal of Abnormal Child Psychology*. 2006; 34:715–724. [PubMed: 17053997]
- Lemerise EL, Arsenio WF. An integrated model of emotion processes and cognition in social information processing. *Child Development*. 2000; 71:107–118. [PubMed: 10836564]
- Li-Grining CP, Votruba-Drzal E, Maldonado-Carreño C, Haas K. Children's early approaches to learning and academic trajectories through fifth grade. *Developmental Psychology*. 2010; 46(5): 1062–1077. [PubMed: 20822223]
- MacKinnon, DP. *Introduction to Statistical mediation analysis*. Mahwah, NJ: Erlbaum; 2008.
- Mayeux L, Cillessen AHN. Development of social problem solving in early childhood: Stability, change, and associations with social competence. *The Journal of Genetic Psychology: Research and Theory on Human Development*. 2003; 164(2):153–173.
- McDermott PA, Leigh NM, Perry MA. Development and validation of the Preschool Learning Behaviors Scale. *Psychology in the Schools*. 2002; 39:353–365.
- McGrew, KS.; Woodcock, RW. *Woodcock-Johnson III*. Itasca, IL: Riverside Publishing; 2001. Technical manual.
- McWayne CM, Fantuzzo JW, McDermott PA. Preschool Competency in Context: An Investigation of the Unique Contribution of Child Competencies to Early Academic Success. *Developmental Psychology*. 2004; 40:633–645. [PubMed: 15238049]
- NICHD Early Child Care Network. Trajectories of physical aggression from toddlerhood to middle childhood. *Monographs of the Society for Research in Child Development*. 2004; 69:1–129. (4, Serial No.278). [PubMed: 15566544]
- Nelson DA, Crick NR. Rose-colored glasses: Examining the social information-processing of prosocial young adolescents. *Journal of Early Adolescence*. 1999; 19:17–38.
- O'Neil R, Welsh M, Parke RD, Wang S, Strand C. A longitudinal assessment of the academic correlates of early peer acceptance and rejection. *Journal of Clinical Child Psychology*. 1997; 26:290–303. [PubMed: 9292387]
- Orobio de Castro, Merk WB, Koops W, Veerman JW, Bosch JD. Emotions in social information processing and their relations with reactive and proactive aggression in referred aggressive boys. *Journal of Clinical Child and Adolescent Psychology*. 2005; 34:105–116. [PubMed: 15677285]
- Parker JG, Asher SR. Peer relations and later personal adjustment: Are low-accepted children at risk? *Psychological Bulletin*. 1987; 102:357–389. [PubMed: 3317467]
- Pianta RC, McCoy SJ. The first day of school: The predictive validity of early school screening. *Journal of Applied Developmental Psychology*. 1997; 18:1–22.

- Riggs NR, Blair C, Greenberg MT. Concurrent and 2-year longitudinal relations between executive function and the behavior of 1st and 2nd grade children. *Child Neuropsychology*. 2003; 9:267–277. [PubMed: 14972705]
- Rubin, KH.; Burgess, KB.; Kennedy, AE.; Stewart, SL. Social withdrawal in childhood. In: Mash, EJ.; Barkley, RA., editors. *Child psychopathology*. 2nd ed.. New York, NY, US: Guilford Press; 2003. p. 372–406.
- Rubin KH, Chen X, Hymel S. Socioemotional characteristics of withdrawn and aggressive children. *Merrill-Palmer Quarterly*. 1993; 39:518–534.
- Runions KC, Keating DP. Young children's social information processing: Family antecedents and behavioral correlates. *Developmental Psychology*. 2007; 43:838–849. [PubMed: 17605518]
- Schultz D, Shaw DS. Boys' maladaptive social information processing, family emotional climate, and pathways to early conduct problems. *Social Development*. 2003; 12:440–460.
- Schultz D, Izard CE, Bear G. Children's Emotion Processing: Relations to Emotionality and Aggression. *Development and Psychopathology*. 2004; 16:371–387. [PubMed: 15487601]
- Shrout PE, Bolger N. Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*. 2002; 7(4):422–445. [PubMed: 12530702]
- Sophian C, Vong KI. The parts and wholes of arithmetic story problems; Developing knowledge in preschool years. *Cognition and Instructions*. 1995; 13:469–477.
- U.S. Department of Education. Strategic plan, 2001–2005. Washington DC: Department of Education; 2000.
- Vitaro, Tremblay, Gagnon. Social competence and conduct problems in young children: Issues in assessment. *Journal of Clinical Child Psychology*. 1992; 28:25–43. Webster, S. C. & Lindsay, D. W. (1999).
- Wasik BH, Wasik JL, Frank R. Sociometric characteristics of kindergarten children at risk for retention. *Journal of School Psychology*. 1993; 31:241–257.
- Webster-Stratton SC, Lindsay DW. Social competence and conduct problems in young children: Issues in assessment. *Journal of Clinical Child Psychology*. 1999; 28:25–43. [PubMed: 10070605]
- Welsh M, Parke RD, Widaman K, O'Neil R. Linkages between children's social and academic competence: A longitudinal analysis. *Journal of School Psychology*. 2001; 39:463–481.
- Whitehurst GJ, Lonigan CJ. Child development and emergent literacy. *Child Development*. 1998; 69:848–872. [PubMed: 9680688]
- Zelazo PD, Carter A, Reznick JS, Frye D. Early development of executive function: A problem solving framework. *Review of General Psychology*. 1997; 1:198–226.
- Zelli, A.; Dodge, KA. Personality development from the bottom up. In: Cervone, D.; Shoda, Y., editors. *The coherence of personality: Social-cognitive bases of consistency, variability, and organization*. New York: Guilford Press; 1999. p. 94–126.
- Zill, N. Behavior problems index based on parent report [memorandum]. Washington, DC: Child Trends; 1990.
- Zill, N.; West, J. Entering kindergarten: A portrait of American children when they begin school. Washington, DC: National Center for Education Statistics, U.S. Department of Education; 2001.
- Ziv Y, Oppenheim D, Sagi A. Social information processing in middle childhood: Relations to infant-mother attachment. *Attachment and Human Development*. 2004; 6:327–348. [PubMed: 15513272]
- Ziv Y, Sorongon A. Social information processing in preschool children: Relations to sociodemographic risk and problem behavior. *Journal of Experimental Child Psychology*. 2011; 109(4):412–429. [PubMed: 21420102]

Research Highlight

A first-time examination of the mediating effect of social competence on the link between social information processing and school readiness in preschool children

Multi method/reporter examination of that link (data on social information processing and early literacy skills via child interview; children's social competence and approaches to learning via teachers reports)

Large and diverse sample (198 children)

Short-term longitudinal design

Main effects for social information processing on social competence and on school readiness indices

Mediation effect of social competence on the link between social information processing and school readiness

Figure 1.

Hypothesized structural equation model connecting social information processing to school readiness via social competence. Latent Variables: SIP = Social Information Processing; SC = Social Competence; SR = School Readiness. Observed variables: BI = Benign Intent; PRC = positive response construction; PRD = positive response decision; (Lo)PB = (Lack of) Problem Behavior; CSB = Competent Social Behavior; EL = expressive language; CM = Competence/Motivation; AP = Attention/Persistence; ATL = Attitude Toward Learning.

Figure 2.

Empirical structural equation model connecting social information processing to school readiness via social competence. Latent Variables: SIP = Social Information Processing; SC = Social Competence; SR = School Readiness. Observed variables: PRC = positive response construction; PRD = positive response decision; (Lo)PB = (Lack of)Problem Behavior; CSB = Competent Social Behavior; EL = expressive language; CM = Competence/Motivation; AP = Attention/Persistence; ATL = Attitude Toward Learning. * $p < .05$; ** $p < .01$; *** $p < .001$. Numbers in italics represent the loadings of observed on latent variables; path coefficients for the final model are shown in bold; the direct path coefficient prior to mediation is shown in parentheses.

Table 1

The SIPI-P questions and composite scores as a function of the social information processing steps

Composite score	Question	Social information processing step
Benign Attribution	"Were the other kids mean or not mean?"	Interpretation
Positive response construction	"What would you say or do if this happened to you?"	Response construction
Positive response decision	1. "Was it a good thing or a bad thing to say (do)?" 2. "If you did that, do you think the other children would like you?" 3. "Do you think the other children would let you play if you did that?"	Response Decision (based on set responses provided by the interviewer)

Note. Question presented in general form (language was adapted based on the content of each story). The three response decision questions are asked separately for each type of response

Table 2

Descriptive statistics of the study main outcome variables

Possible Range	Observed Range	SD	M	Score
Social information processing:				
0–4	0–4	1.49	1.50	Benign intent
0–8	0–8	2.42	5.14	Positive response construction
0–36	14.36	6.48	27.84	Positive response decision
Social skills:				
0–40	4–25	4.78	18.60	Lack of problem behavior
0–24	4–24	5.85	16.88	Competent social behavior
School Readiness:				
0–44	7–27	3.15	15.97	Expressive language Time 1
0–44	8–29	3.70	17.52	Expressive language Time 2
0–27	11–27	4.34	18.00	Competence/Motivation
0–24	11–24	4.36	16.85	Attention/Persistence
0–21	8–21	2.19	13.80	Attitude Toward Learning

Table 3

Zero-order correlations among social information processing, social skills, and school readiness

10	9	8	7	6	5	4	3	2	1
-.05	-.08	-.02	.08	.06	.10	-.09	-.16*	.00	1
.21**	.25***	.24***	.39***	.29***	.30***	.34***	.35***	1	2. PRC
.21**	.25***	.27***	.41***	.32***	.29***	.43***	1	1	3. PRD
.33***	.30***	.35***	.35***	.13	.56***	1	1	1	4. CSB
.32***	.30***	.24***	.40***	.23**	1	1	1	1	5. (Lo)PB
.30***	.27***	.27***	.74***	1	1	1	1	1	6. EL1
.49***	.52***	.47***	1	1	1	1	1	1	7 EL2
.55***	.71***	.1	1	1	1	1	1	1	8. CM
.52***	1	1	1	1	1	1	1	1	9. AP
1	1	1	1	1	1	1	1	1	10. ATL

Note. BI = Benign Intent; PRC = Positive Response Construction; PRD = Positive Response Decision; (Lo)PB = (Lack of) Problem Behavior; CSB = Competent Social Behavior; EL = Expressive Language; CM = Competence/Motivation; AP = Attention/Persistence; ATL = Attitude Toward Learning

* $p < .05$;

** $p < .01$;

*** $p < .001$