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Social Information Processing, Security of Attachment, and Emotion Regulation in Children With Learning Disabilities

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This study examined the contribution of attachment security and emotion regulation (ER) to the explanation of social information processing (SIP) in middle childhood boys with learning disabilities (LD) and without LD matched on age and grade level. Children analyzed four social vignettes using Dodge's SIP model and completed the Kerns security scale and the children's self-control scale. Study results demonstrated major difficulties in SIP, lower attachment security, and less ER in children with LD compared to children without LD. Attachment as well as the interaction between attachment and ER emerged as important contributors to most SIP steps, suggesting that children with higher security who also have better ER skills will have better SIP capabilities along the different steps, beyond group inclusion. Results were discussed in terms of practical and clinical implications regarding the importance of mother-child attachment and ER skills for social cognitive capabilities in children with LD.

Keywords: *social-emotional; social information processing; learning disabilities*

The purpose of the current study was to examine the contribution of attachment security and emotion regulation (ER) to the explanation of social information processing (SIP) in middle childhood boys with and without learning disabilities (LD). SIP is a major component of children's social competence that enables them to make sense of their social world, specifically regarding their social interactions within this world (Dodge, 1986; Gifford-Smith & Rabiner, 2004; Lemerise & Arsenio, 2000). SIP offers a detailed model of how children process and interpret cues in social situations and arrive at a behavioral or emotional decision regarding these cues (Crick & Dodge, 1994; Dodge, 1986). As a social cognitive capability, SIP can be considered one of the most challenging domains for children with LD in that it draws together their cognitive difficulties (e.g., attention, memory, reasoning, focusing, processing information; American Psychiatric Association, 2000) and their social-emotional difficulties (e.g., limited emotion recognition skills, poor social and emotion understanding, peer rejection; Bauminger, Schorr-Edelsztein, & Morash, 2005; Frederickson & Furman, 2001; Nabuzoka & Smith, 1993; Tur-Kaspa, 2002). However, among children with LD, SIP processes have been more extensively examined than have the related emotional processes such as attachment or ER (Arthur, 2003; Bryan, Burstein, & Ergul, 2004).

The core unit of SIP models includes six on-line active steps: (1) encoding social cues (i.e., attending to appropriate cues, chunking and storing information), (2) mentally representing and interpreting the cues (i.e., integrating the cues with past experience and arriving at a meaningful understanding of them), (3) clarifying goals, (4) searching for possible social responses, (5) making a response decision after evaluating the consequences of the various responses and estimating the probability of favorable outcomes, and (6) acting out the selected response while monitoring its effects on the environment and regulating behavior accordingly (Crick & Dodge, 1994; Dodge, 1986, 1991; Gifford-Smith & Rabiner, 2004; Lemerise & Arsenio, 2000).

Latent mental and affective processes are considered to influence and interplay with SIP's six on-line active steps (Crick & Dodge, 1994; Dodge, 1986, 1991; Lemerise & Arsenio, 2000). Past research has emphasized the importance of mental processes for efficient active SIP, such as children's memory capabilities, selective attention skills,

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and processing speed (Crick & Dodge, 1994; Dodge, 1986). Newer studies of SIP have added the child's emotional processes to the equation, emphasizing the quality of the child's affective ties (i.e., attachment security) and children's ability to regulate emotion, which are both perceived as undifferentiated latent SIP processes (Dodge, 1991; Lemerise & Arsenio, 2000).

Attachment and SIP in Typical Development

Bowlby (1969) conceptualized attachment as the first affective bond that the child forms with the primary caregiver. Drawing from object relations theory, Bowlby suggested that in the first year of life, it is in the infant's interest to seek out proximity to the attachment figure when under stress (Bretherton, 1985). To foster proximity, the child is involved in many interactions with the main caregiver. According to Bowlby, the caregiver's responsiveness to the child's signals will determine the nature of their relationship, which the child will internalize via internal working models. These models comprise schemas representing the child's knowledge about the world and about significant persons in the world, including the self (Bowlby, 1969; Bretherton & Munholland, 1999). Such schemas/models may also govern what the child expects in relationships with others, such as teachers and friends (Berlin & Cassidy, 1999; Weinfield, Sroufe, Egeland, & Carlson, 1999). Positive experiences with a trustworthy and responsive caregiver will lead toward a secure type of attachment with others, which is linked with positive views of the self (e.g., self-confidence, flexibility) and positive expectations of others concerning relationships (e.g., "I am loved by my mother, so I deserve to be loved"). On the other hand, negative experiences with an unresponsive or inconsistent caregiver will lead to an insecure type of attachment with others, which is linked with negative views of the self and of others (Sroufe & Fleeson, 1986).

According to SIP theorists, attachment and SIP are conceptually linked (Gifford-Smith & Rabiner, 2004). Internal working models of attachment function as a latent SIP process that influences on-line processing of social cues. On-line SIP processing, then, impacts social behavior and adjustment (Crick & Dodge, 1994; Gifford-Smith & Rabiner, 2004; Price & Landsverk, 1998). For example, internal working models of insecure attachment that reflect negative views of self, others, and relationships will influence SIP in ways that may result in maladaptive behavioral responses or hostile attributions. Children who view others as hostile or rejecting are more likely to interpret ambiguous social information in an aggressive manner and to react accordingly (e.g., Cassidy, Kirsh, Scolton, & Parke, 1996; DeMulder, Denham, Schmidt, & Mitchell-Copeland, 2000; Halberstadt, Denham, & Dunsmore, 2001; Laible & Thompson, 1998; Price & Landsverk, 1998; Rabiner, Keane, & MacKinnon-Lewis, 1993). Conversely, internal working models of secure attachment that consist of positive representations of self, others, and relationships will facilitate the processing of social information in ways that are unbiased, accurate, and competent, which in turn will lead to the display of competent and adaptive behavior. Increasing evidence suggests that children with a more secure internal working model are more skilled at accurately receiving emotional communication, and they expect people to be trustworthy, which may enrich their social experiences (DeMulder et al., 2000; Laible & Thompson, 1998).

ER and SIP in Typical Development

Frijda (1986) claimed that "people not only have emotions, they also handle them" (p. 401). Most definitions of ER relate to children's self-control ability—their capacity to manage and modify their emotional reactivity and expressivity (Denham, 1998; Eisenberg & Fabes, 1992; Eisenberg & Spinard, 2004; Hubbard & Dearing, 2004; Saarni, 1999; Thompson, 1994). For example, Thompson (1994) defined ER as "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goal" (p. 27).

The child's capability for ER is considered a major contributor to efficient SIP (Dodge, 1991; Eisenberg et al., 1996, 1997; Hubbard & Dearing, 2004; Lemerise & Arsenio, 2000). Lemerise and Arsenio (2000) proposed that ER is relevant to each and every step of the on-line SIP steps. For example, poor regulatory skills may interfere with assessing a situation from different perspectives, prevent comprehensive interpretation of the situation, and impede a flexible approach to goal selection that takes into account contextual factors (Saarni, 1999). This may result in misinterpretation of the situation and in rigid goals due to "preemptive processing." In a like manner, children's process of searching for a response may be restricted by poor regulatory skills. Although conceptually ER seems highly relevant to SIP, empirical study of SIP and ER has been very limited. Studies have demonstrated the relevancy of ER to children's social competency in general or to peer relations (e.g., Eisenberg et al., 1997; Hay, Payne, & Chadwick, 2004) but have mostly focused on the links between ER, attachment, and children's social competency (e.g., Cole, Martin, & Dennis, 2004; Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000; Kobak, Cole, Ferenz-Gillies, Fleming, & Gamble, 1993; Kobak & Sceery, 1988; Zimmermann, Maier, Winter, & Grossmann, 2001).

Attachment, ER, and SIP in Typical Development

Developmentally, ER is thought to be organized first within the context of the interaction between the child and the main caregiver, namely, within attachment relations (Field, 1994). Theorists have suggested that during infancy and childhood, attachment figures may function as "external organizers" for their children by helping them regulate their emotions (Bowlby, 1973; Cassidy, 1994; Grossmann & Grossmann, 1993; Grossmann, Grossmann, & Zimmermann, 1999). As individuals grow, there is increasing autonomous adaptation and application of ER patterns learned during interaction with the attachment figure. Children who are flexible in their ability to integrate both positive and negative emotions are generally securely attached, whereas children who are characterized by limited or heightened negative affect are more likely to be insecurely attached (Bretherton & Munholland, 1999; Cassidy, 1994; Spangler & Grossmann, 1993; Spangler & Schieche, 1998). When compared to insecure adolescents, secure adolescents were found to be less hostile toward their peers, less anxious, and less helpless (Kobak & Sceery, 1988) and were also shown to be more socially competent and to use more active and less avoidant coping strategies (Zimmermann & Grossmann, 1997).

Altogether, conceptually both attachment and ER appear to be important contributors to SIP. However, due to the lack of solid empirical evidence to date, it is difficult to predict whether ER mediates between attachment and SIP, as it does for the link between attachment and social competence in general (e.g., Contreras et al., 2000), or whether the effect of the interrelations between attachment and ER add significantly to the understanding of SIP's on-line steps (via a moderator model; Baron & Kenny, 1986). The current study will examine the contribution of attachment security, emotion regulation, and their interaction as variables explaining SIP in children with and without LD.

SIP, Attachment, and ER in Children With LD

Socially competent children, compared with average or less competent children, have better SIP skills. Such children (a) are better encoders of social information (Dodge & Price, 1994), (b) reveal less hostile interpretations of children's intent (Nelson & Crick, 1999), (c) prefer relational over instrumental goals and are less likely to endorse revenge goals (Rose & Asher, 1998), and (d) generate problem-solving strategies that are more prosocial and less aggressive or hostile (e.g., Erdley & Asher, 1998; Nelson & Crick, 1999; Rose & Asher, 1998). Overall, the SIP patterns of socially competent children reflect a priority for maintaining harmonious relationships with peers (Gifford-Smith & Rabiner, 2004). SIP appears deficient in children with LD, possibly contributing to their more general social-emotional dysfunction (American Psychiatric Association, 2000; Bryan et al., 2004; Kavale & Forness, 1996; Tur-Kaspa, 2002).

Two studies examined SIP's six on-line steps in children with LD during middle childhood (Bauminger et al., 2005; Tur-Kaspa & Bryan, 1994). Children with LD presented similar SIP deficiencies along the two studies, including lower encoding capabilities, less information recall, and the tendency to add more irrelevant information while processing social situations, compared to children without LD. Indeed, the ability to identify a problem and to interpret a situation as positive or negative was similar in children with and without LD, but the former group evidenced better attributions to the situation's social context. In addition, children with LD suggested fewer social solutions to problems than did their counterparts without LD, and even though they resembled the control group in evaluating the competency of solutions presented to them, children with LD showed a less appropriate response decision. These studies are unique in their comprehensive evaluation of the whole SIP model with regard to children with LD.

Other researchers demonstrated these children's difficulties in performing some specific steps of Dodge's model. In encoding and mentally representing social cues, children with LD evidenced problems in focusing attention on significant cues, attending instead to extraneous irrelevant information (Parrill-Burnstein, 1981; Tur-Kaspa & Bryan, 1994). These children exhibited difficulty in appropriately interpreting social situations, problematic comprehension of verbal and nonverbal social cues, and weak social perception processes (Bruno, 1981; Bryan, 1977; Markoski, 1983; Minskoff, 1980), and they sometimes found social codes to be meaningless and confusing (Schumaker & Hazel, 1984). In addition, children with LD demonstrated lower competence levels than did average-achieving children in taking others' perspectives and in understanding others' intentions (Weiss, 1984; Wong & Wong, 1980). When dealing with problem-solving processes (response search → evaluation → decision → enactment), children with LD (a) lacked planning strategies and developed nonsophisticated social goals (Olivia & LaGreca, 1988; Parrill-Burnstein, 1981), (b) evidenced a lower number and quality of social alternatives compared with average-achieving children (Carlson, 1987; Toro, Weissberg, Guare, & Liebenstein, 1990), and (c) did not utilize feedback to correct their mistakes and were deficient in predicting the consequences of social situations

or of their own or others' actions (Bruno, 1981; Derr, 1986). Thus, children inevitably revealed difficulties in selecting responses (Bryan, Werner, & Pearl, 1982). Although some of the aforementioned findings should be taken with caution due to methodological shortcomings, such as weak design or underspecified sample, the findings as a whole portray a coherent picture of difficulties along the different SIP steps.

Altogether, studies have focused on identifying SIP difficulties in children with LD but not on the processes that may contribute to these difficulties. Notwithstanding their importance to the understanding of social-emotional functioning in children with LD and to their difficulties in SIP, both attachment and ER processes are overlooked areas of studies.

Indeed, very few studies have examined the possible role attachment may play in explaining LD individuals' social-emotional difficulties; however, these studies' findings were consistent (Al-Yagon, 2003; Al-Yagon & Mikulincer, 2004a, 2004b; Barzel, 2002; Smith & McCarthy, 1996). School-age children with LD (Al-Yagon & Mikulincer, 2004a, 2004b; Barzel, 2002), adults with LD (Smith & McCarthy, 1996), and children at risk for LD (Al-Yagon, 2003) consistently demonstrated less attachment security and more insecurity compared with children without. Furthermore, attachment was found to contribute to a sense of loneliness and self-perceived coherence among children with LD, where negative representations of significant others (insecure internal working models) contributed to a high sense of loneliness and low sense of coherence, and the opposite picture emerged for positive representations of others (secure internal working models; Al-Yagon, 2003; Al-Yagon & Mikulincer, 2004a, 2004b). These results underscore the role secure attachment plays in the social-emotional functioning of children with LD. The aforementioned higher risk for insecure attachment style may have implications for children's SIP performance.

Studies probing the negative feelings that increase the likelihood of ER problems such as depression, anxiety, and loneliness (Eisenberg et al., 1996, 1997) have demonstrated that children with LD are at risk for experiencing these emotions more often than children without LD (Bryan et al., 2004; Huntington & Bender, 1993; Margalit & Al-Yagon, 2002; Pavri & Monda-Amaya, 2000). However, studies have not yet investigated children's ER skills while coping with these negative emotions. Negative affect may also "color" children's perceptions and interpretations of others' behaviors toward them as well as others' responses to them, thus possibly influencing children's SIP processes (Bryan, Sullivan-Burstein, & Mathur, 1998).

In sum, children with LD demonstrate difficulties along the different on-line steps of SIP and are at higher risk for developing insecure internal working models and for experiencing ER difficulties. Insecure working models and ER difficulties may influence these children's SIP performance; however, these possible influences have not yet been explored. Thus, the current study had three aims: (a) to compare children with and without LD in their SIP, internal working models of attachment, and ER skills; (b) to examine the relations between attachment models, ER skills, and SIP within each study group; and (c) to investigate the possible contribution of internal working models and ER skills to the explanation of SIP in children with and without LD. We also examined if the interaction of internal working models and ER would add to the explained variance of SIP's different on-line steps to test a possible moderator model (Baron & Kenny, 1986). Based on the theory that ER is formed within the attachment context and only later in development appears to function more autonomously (Bowlby, 1973; Cassidy, 1994; Grossmann & Grossmann, 1993), internal working models were entered into the regression equation first, followed by ER and their interaction. The moderator model had three causal paths: Path A included the impact of internal working models as the predictor, Path B included the impact of ER as the moderator, and Path C included the interaction of the Predictor × Moderator. According to Baron and Kenny (1986), the moderator hypothesis is supported only if the interaction is significant, not if significant main effects emerge for the predictor and the moderator.

Method

Participants

The present study included 100 boys in the fourth through sixth grades (age range: 10 to 12.9 years; for LD: $M = 137.42$ months, $SD = 9.40$; for non–LD: $M = 137.74$ months, $SD = 9.69$) who attended four large public elementary schools in central Israel. All schools served students of middle socioeconomic status and of similar racial backgrounds (Caucasian Jews). The experimental group comprised 50 students with LD, and the control group comprised 50 average-achieving children who were matched to the former group on age, grade, and class distribution. Class distribution was even in both groups and included 14 fourth graders, 19 fifth graders, and 17 sixth graders. Children in each group were sampled from 23 classes. All male children with LD who met our full inclusion criteria (as specified in the following) were included in the study, except for 5 students whose parents

did not consent. The control group consisted of average-achieving students from the same classes of the children with LD who according to teacher report evidenced average grades and did not reveal any specific or consistent learning or behavioral problem. Out of the 230 boys without LD who met our selection criteria based on teacher report, we randomly selected 90 male students (30 for each class grade) and sent consent forms to their parents. In all, 71 parents consented; we then randomly selected 50 children to participate in the study who were matched to the children with LD based on age and class distribution.

LD sample. In line with the educational policy of the Israeli Ministry of Education, students with LD had been formally diagnosed by the school district psychological services agency. The diagnostic assessment included instruments such as the *Wechsler Intelligence Scale for Children–Third Edition* (Wechsler, 1974), *Bender-Gestalt Test* (Koppitz, 1975), figure drawings (Koppitz, 1968), *Kaufman Assessment Battery for Children* (Kaufman & Kaufman, 1983a, 1983b), and achievement tests in one or more learning processes (i.e., reading, writing, mathematical calculation, or mathematical reasoning) as well as additional tests where necessary. Students received an LD diagnosis based on the criteria in Israel for LD classification, which includes (a) achievement test scores at least 2 years below grade level and (b) average or above-average intelligence with a marked deficit in academic achievement. Exclusion criteria were (a) absence of extreme behavioral or attentional difficulties that would impede completion of the study measures, (b) absence of frank neurological problems, (c) absence of sensory impairments, and (d) absence of problems presumed to be due to environmental, economic, or cultural factors. In line with the Israeli Law of Special Education (Ministry of Education, Culture, and Sports, 1996), students with significant LD were assessed in their schools, diagnosed by the school district psychological services, and identified by an interdisciplinary placement committee as in need of remedial help or special education services. In line with this educational policy, in all schools, students with LD received an individual educational program that included between 2 to 5 weekly hours of tutoring from resource teachers specializing in LD, and they were entitled to testing accommodations (e.g., longer test duration, disregard of spelling mistakes, task reductions). Children with LD were given this tutoring assistance either individually or in small groups in a school-based learning center during school hours or within their regular classes. Children's IQ scores were not available to the research team owing to Israeli regulations for privacy protection. However, by definition for an LD diagnosis, these IQ scores were in the normal range (Ministry of Education, Culture, and Sports, 1996).

Reported academic grades. To validate the classification and matching process, we examined the two groups of students' academic grades based on school records from the previous academic year in three subjects: reading, mathematics, and English. A significant difference emerged between the children with and without LD on reading, LD: $M = 71.0$, $SD = 9.31$; non–LD: $M = 82.3$, $SD = 9.95$; $F(1, 94) = 10.20$, $p < .01$; math, LD: $M = 63.5$, $SD = 11.39$; non–LD: $M = 76.3$, $SD = 12.15$; $F(1, 94) = 29.45$, $p < .001$; and English, LD: $M = 63.3$, $SD = 16.05$; non–LD: $M = 73.2$, $SD = 16.24$; $F(1, 94) = 33.31$, $p < .001$. The Israeli school system considers grades between 70 and 85 as indicative of average performance.

Assessment Measures

In line with the study objectives, we examined three main domains in the present study: SIP, attachment, and ER.

Child's SIP Skills Measure

To tap children's SIP, we utilized the modification of Tur-Kaspa and Bryan's (1994) SIP measure that was reported in Bauminger et al. (2005) for use with LD children. This tool is based on Dodge's (1986) SIP model and on Crick and Dodge's (1994) revised SIP model. The modified instrument includes four short social vignettes with the following contents: peer entry, told from the point of view of the child attempting entry; intentional provocation; ambiguous provocation in which the child is the provoker; and ambiguous provocation in which the child is the victim. The examiner (the second author) read each of the four vignettes aloud to the child individually; for example, the peer entry vignette was: "One free period Dan has nothing to do. He walks outside and sees two of his classmates playing a game. Dan really wants to play with them. He walks up to them but they just keep on playing." After each vignette, the examiner asked the child a series of questions that aimed to examine the child's SIP steps as described in Crick and Dodge's model.

Step 1. Encoding social cues. To measure children's ability to attend to appropriate cues and to chunk and store information, we asked, "Tell me everything you remember about the story." We coded children's responses along two dimensions: core informational units and embellishments (items not included in the scenario). We summed all core informational units that each child

provided along all four of the stories together. Our four social vignettes included 17 information units. We also computed the number of embellishments, with a score of 1 point for each bit of extraneous information.

Step 2. Representing/interpreting social cues. This step included three variables and a combined score:

A. Problem identification: To measure mental representation of social cues, we asked: "What is the problem here?" We coded answers on a 3-point scale: 0 = *incorrect identification of the problem*, 1 = *identification of the problem with no attribution or inclusion of social aspects* (e.g., "Dan was bored" for the peer entry vignette; "The tower got knocked over" for the provocation vignette with child as a victim), and 2 = *a definition of the problem that related to its social aspects* (e.g., "The kids ignored him" for peer entry; "Guy destroyed Dan's tower and Dan was not happy" for provocation with child as victim).
B. Content interpretation: We asked children to interpret social cues, which would require integrating the cues with past experience and arriving at a meaningful understanding of them, for example: "Why do you think the two classmates keep on playing without inviting Dan to join them?" (peer entry). We scored responses as either a *negative, hostile interpretation* (0) (e.g., "because everybody hates him") or a *positive, nonhostile interpretation* (1) (e.g., "because they were busy with their game").
C. Context attribution: We also scored whether children's interpretation took into account the multiple contextual and situational aspects related to the scenario, with a score of either *referring to situational aspects* (1) or *lacking reference to situational aspects* (0).
D. Combined score: Due to moderate to high intercorrelations (r = .40–.69) between the problem identification, content interpretation, and context attribution variables within this step, we also created an overall interpretation score to be used in the regression analysis based on the combination of the three variables above.

Step 3. Clarifying goals. To measure children's ability to anticipate a desired outcome for the situation, we asked questions that tapped their social goal, for example: "If you were in the same situation as Dan, what would you like to have happen?" We coded responses on the content of the goals in terms of positive goals (e.g., that they include him in their game) versus negative goals (e.g., that they destroy his tower).

Step 4. Searching for possible social responses. To measure how the child evaluated the consequences of the various responses and estimated the probability of favorable outcomes, we asked a question like: "Tell me all the different ways you can think of that Dan could deal with this situation. . . . What else? . . . What else?" We scored the total number of solutions that the child generated (or 0 for none). In addition, we executed content analysis of children's solutions and calculated the frequency of children's responses along each of the following five categories: competent solutions (e.g., politely asking the kids if he could join them), aggressive solutions (e.g., grabbing the ball from the kids), passive-avoidant solutions (e.g., sitting and watching the kids playing), solutions involving a third person (e.g., asking the teacher to tell the kids to play with him), or any other ineffective solution.

Step 5. Making a response decision and evaluating given alternatives. This step included two parts:

A. Response decision: "You've suggested several solutions to this problem. Let's pretend that you're in the same situation as Dan. Which of these solutions would you choose?" We coded children's choice as either a *competent solution* (1) or an *incompetent solution* (0).
B. Solution evaluation: After the child made a decision, we also examined how the child evaluated the following given types of solutions: competent solutions, aggressive solutions, passive solutions, third-party intervention solutions, and incompetent solutions. We said to the child: "Now, here is a list of other possible solutions to this problem. Listen carefully to each one of them, and tell me if you think it is a bad, fair, or good solution." We scored children's response evaluations on a scale of 0 to 2, with 2 as the highest endorsement.

Step 6. Enactment process. To measure how the child would act out the selected response while monitoring its effects on the environment and regulating behavior accordingly, we asked a question like: "One of the things you could do is to ask your classmates nicely to join their game. Let's pretend again that you're in the same situation as Dan. Could you show me how you would go about saying this to your classmates?" We excluded the enactment step from the analysis because all children in both groups provided an effective, although artificial, response.

To calculate interrater agreement for the coding of the social information steps, two raters who were blind to the participants' diagnostic status independently coded the same randomly selected 40% of children's responses. Interrater agreement was 85% for encoding, 91% for representation/interpretation, 98% for clarification of goals, 87% for response search, and 86% for response decision and response evaluation. All disagreements were discussed until the raters reached agreement. In line with the procedure in former SIP studies (e.g., Bauminger et al., 2005; Bryan et al., 2004; Tur-Kaspa, 2004; Tur-Kaspa & Bryan, 1994), we composed a sum score for each of the different on-line SIP steps based on the four social vignettes together.

Child's Attachment Measure

To tap children's attachment quality, we utilized the *Kerns Security Scale* (KSS; Kerns Aspelmeier, Gentzler, & Grabill, 2001; Kerns, Klepac, & Cole, 1996), the most widely used self-report for children in middle childhood that provides a continuum of security scores among individuals. The frequency and intensity of attachment behaviors decline across childhood, and the child's perception of parents' availability becomes a more salient characteristic of attachment in middle childhood; thus, self-reports seem more apt to tap attachment quality in this age group. KSS items are intended to reflect those aspects of attachment (e.g., availability, reliance) that are thought to reflect security of attachment in the middle childhood years.

The KSS is a 15-item, forced-choice, self-report measure that was designed to evaluate children's perceptions of security in mother-child and father-child relationships in middle childhood. Items on the security scale tap the following: (a) the degree to which children believe a particular attachment figure is responsive and available (e.g., whether a child worries that a parent will not be there when needed), (b) the children's tendency to rely on the attachment figure in times of stress (e.g., whether a child goes to the parent when upset), and (c) children's reported ease and interest in communicating with the attachment figure (e.g., whether a child likes to tell a parent what she or he is thinking and feeling). Items are rated on a 4-point scale using Harter's (1982) "Some kids . . . Other kids" format. For example: "Some kids find it easy to trust their mom BUT other kids are not sure if they can trust their mom;" "Some kids feel like their mom really understands them BUT other kids feel like their mom does not really understand them." Children are asked to indicate which statement is more characteristic of them and then indicate whether this statement is really true for them or somewhat true. Scores across items are summed so that children receive a score on a continuous dimension of security, with higher scores indicating more secure attachment. Also, Kerns et al. (1996) suggested a cutoff score of 45 for the differentiation of secure and insecure attachment style. A score of 45 and below reflects an insecure attachment style, whereas a score above 45 reflects a secure attachment style.

The KSS has good internal consistency for mother-child and father-child security perceptions (Cronbach's alphas of .79 and .87, respectively) and a high test-retest correlation over a short time interval, $r(30) = .75$, indicating stability in children's perceptions of security over a short period of time (Kerns et al., 1996, 2001). Efforts to validate the instrument have examined how children's security scores are related to concurrently administered projective measures of attachment. Child security scores have been significantly correlated with ratings derived from the *Separation Anxiety Test* (SAT; Resnick, 1993), a projective interview that taps children's state of mind with respect to attachment. Security scores were related to both the ratings and classifications from the SAT; for example, children who reported greater security to mother were less dismissing and had more coherent discourse during the SAT interview (Contreras et al., 2000; Kerns, Tomich, Aspelmeier, & Contreras, 2000). In a different study, children's security scores were significantly related to secure classifications and ratings obtained from an attachment-doll interview measure (Granot & Mayseless, 2001). In the current study, we used the Hebrew version of the KSS (Granot & Mayseless, 2001) for mother-child relationships, and we obtained a high internal consistency, Cronbach's alpha of .90.

Child's ER Skills Measure

To tap children's ER, we utilized the *Children's Self-Control Scale* (CSC; Rosenbaum & Ronen, 1991), a self-report developed to assess the extent to which an individual regulates everyday stressful situations by applying ER self-control methods. Its 16 items reflect different skill areas: delaying immediate gratification, coping with physical discomfort, dealing with disturbing emotions or distress, and giving self-instruction such as use of self-talk when planning. The scale includes individuals' cognitive, emotional, and behavioral ER skills. For example, cognitive skills include usage of self-statements to control emotional responses and planning skills. The emotion component includes strategies to cope with regulation of negative emotions, and the behavior component includes the child's understanding that a favorable action can modify negative emotions that are related to a stressful situation. Examples of items were: "When I lose something

I really want, I tell myself it does not matter—I will have it again someday"; "After I see scary things on TV, it's hard for me to shake them off and forget the fear"; "When I am very thirsty and there is nothing to drink, I try not to think about drinking." Each item is rated on a 6-point scale ranging from *does not characterize me at all* (1) to *is very characteristic of me* (6), where higher scores indicate a higher level of ER skills. Originally developed by Rosenbaum (1980a, 1980b) for young adults, the CSC was adapted for children by Rosenbaum and Ronen (1991). The children's version demonstrates good internal consistency (Cronbach's alphas of .78–.81) and a high test-retest correlation over a short-term interval, $r(47) = .89$, indicating stability in children's perceptions of their self-control skills over a short period of time (3 months). Evidence for scale validity was also presented, for example, in Hamama, Ronen, and Feigin (2000), where a link emerged between feelings of anxiety and loneliness in the healthy sibling of a child with cancer and that sibling's ability for self-control as a skill in coping with emotional distress. Findings demonstrated a link between higher ability for self-control and less anxious and lonely feelings. In our study, the CSC yielded high internal reliability, Cronbach's alpha = .90.

Procedure

Based on the procedure in Bauminger et al. (2005), the examiner administered the three study measures (KSS, CSC, and SIP) in a quiet room in children's schools during one individual interview with each child, lasting about 45 minutes. Despite the deficient cognitive processes previously documented among children with LD, the participants were able to complete all assessment measures in a single meeting without apparent fatigue. The SIP scales' four different vignettes, the KSS attachment scale, and the CSC measure of ER were all counterbalanced between the children to prevent order effects. Children's academic grades were obtained from their teachers, based on school records. Middle childhood period was chosen for this study (Grades 4–6) due to the fact that children in this period are considered to have complex social-emotional understanding (e.g., understanding of complex emotions, mixed emotions, and rules for display of emotions; Denham, 1998), which will enable more reliable self-reflection on the attachment and the ER scales. Also, children's age and grade level were chosen based on Bauminger et al., who successfully implemented the SIP assessment with children with LD at middle childhood. Lastly, grade level differences were not significant for any of study variables (SIP steps, KSS attachment scale, or the CSC of ER).

Results

Between-Group Comparisons for SIP, Attachment Security, and ER

The SIP Measure

To examine differences between the children with and without LD on the SIP steps, we performed multivariate analysis of variance (MANOVA) according to Wilks criterion, followed by univariate analysis of variance (ANOVA) for each of the SIP components.

Step 1. Encoding. A MANOVA for encoding social cues yielded a significant effect of disability status, $F(2, 97) = 30.05$, $p < .001$, $\eta^2 = .38$. As can be seen in Table 1, univariate ANOVAs were significant for both recall of core information units and for embellishments, indicating that children with LD were likely to recall significantly fewer core information units from the social vignettes and to provide significantly more extraneous irrelevant information units that had not been included in the stimuli, compared to children without LD.

Step 2. Representation/interpretation. The MANOVA for disability status effect was significant with regard to the interpretation of social cues, $F(3, 96) = 8.44$, $p > .001$, $\eta^2 = .21$. A series of univariate ANOVAs for problem identification, content interpretation, and context attribution revealed a significant difference only with regard to the latter. Children without LD considered the multiple contextual and situational aspects related to the vignette's social context to a significantly greater degree in their interpretations than did their counterparts with LD (see Table 1).

Step 3. Clarification of goals. Children's responses on the clarifications of goals were coded according to the goals' quality (positive or negative). We conducted a MANOVA on the positive or negative content of children's goals suggested for solving the vignettes' social problems. The MANOVA revealed a significant disability status effect, $F(2, 97) = 19.06$, $p < .001$, $\eta^2 = .28$. Univariate ANOVAs were significant for both positive and negative goals (see Table 1). Children with LD provided significantly fewer positive and significantly more negative goals to solve the problem compared with children without LD (see Table 1). The gap between children with and without LD was higher for the positive goals than for the negative goals.

Step 4. Response search. The ANOVA examining the total number of solutions that the children generated

Table 1
Means, Standard Deviations, and *F* Values for the Group Differences Between Children With and Without Learning Disabilities (LD) Regarding Social Information Processing Components

	Children With LD		Children Without LD		Group Differences	
Components	*M*	*SD*	*M*	*SD*	*F*(1, 98)	Eta^2
1. Encoding						
Information units	10.38	2.87	13.44	2.25	35.07***	.26
Embellishment	3.46	1.37	1.72	1.16	46.80***	.32
2. Interpretation						
Problem identification	5.90	1.38	6.26	1.31	1.78	.01
Content interpretation	2.28	0.83	2.42	0.97	0.59	.00
Context attribution	1.18	1.30	2.34	1.09	23.12***	.19
3. Goal clarification						
Positive goals	2.74	1.53	4.80	1.89	35.65***	.27
Negative goals	2.14	0.85	1.74	0.80	5.79*	.06
4. Response search						
Number of solutions	9.56	1.76	11.90	1.65	46.77***	.32
Contents generated						
Competent	5.76	2.29	7.74	2.48	17.13***	.15
Aggressive	0.40	0.60	0.30	0.54	0.75	.00
Passive avoidant	1.18	0.91	0.92	0.83	2.21	.02
Third-person	0.72	0.53	1.08	0.63	9.45**	.08
Other ineffective	1.50	0.88	1.86	1.04	3.43*	.03
5a. Response decision						
Competency of solutions	2.64	1.22	3.04	1.14	2.85	.02
5b. Response evaluation						
Competent	7.20	0.95	7.44	0.84	1.80	.01
Aggressive	0.78	0.84	0.32	0.82	7.68**	.07
Passive	2.76	1.36	1.98	1.22	9.08**	.08
Third-person	5.66	1.02	5.30	1.03	3.06	.03
Incompetent	4.46	1.12	3.88	1.13	6.55**	.06

Note: Several *SD*s were higher than their *M*s; therefore, we performed an additional Mann-Whitney nonparametric test for independent samples for these cases, and the same significant differences emerged.
*$p < .05$. **$p < .01$. ***$p < .001$.

revealed a significant disability status effect. Children with LD suggested significantly fewer solutions compared to children without LD (see Table 1). Next, we conducted a MANOVA on the five different contents of solutions (competent, aggressive, passive-avoidant, those involving a third person, or other ineffective solutions). Disability status effect was significant, $F(5, 94) = 10.74$, $p < .001$, $\eta^2 = .36$. ANOVAs showed significant differences for competent solutions, solutions involving a third person, and other ineffective solutions (see Table 1); in all cases, children with LD suggested significantly fewer solutions compared to children without LD.

Step 5a. Response decision. To examine the competency level of children's chosen solutions, we computed an ANOVA, but no significant disability status difference emerged (see Table 1). Selection of competent solutions among children with LD resembled that of their peers without LD.

Step 5b. Response evaluation. To examine children's ability to evaluate given solutions (competent, aggressive, passive, third-person, and other incompetent solutions), we computed a MANOVA that yielded a significant disability status effect, $F(5, 94) = 3.89$, $p < .01$, $\eta^2 = .17$. ANOVAs showed a significant difference with regard to children's evaluation of aggressive solutions, passive solutions, and incompetent solutions. Children with LD endorsed those nonadaptive types of solutions significantly more than did the children without LD.

Summary of SIP skills. As a whole, children with LD revealed lower social informational capabilities compared to children without LD, specifically, poorer encoding skills, less inclusion of the social context within their representation of social cues, a lower quality of social goals, and a lower quantity of solutions generated during their response search. Interestingly, response decision

and the evaluation of competent solutions did not differ between the groups.

Attachment Security Measure

To examine disability status differences on the continuous security of attachment score, we performed an ANOVA on the child's KSS attachment scale score. Children without LD revealed significantly higher security scores compared to children with LD, $F(1, 98) = 9.33$, $p < .01$, $\eta^2 = .09$ ($M = 49.50$, $SD = 7.16$ and $M = 44.54$, $SD = 8.97$, respectively). Next, based on Kerns et al. (1996), we assigned the children in each disability status group to either a secure or insecure classification, using the cutoff score of 45. Of the children with LD, 64% were assigned a secure classification, versus 84% in the control group. Chi-square analysis was significant, $\chi^2(1, 100) = 5.19$, $p < .05$.

Both evaluations of attachment security showed that children with LD were less likely to evaluate their relationships with their mothers as secure compared to their matched peers without LD.

ER Measure

To examine disability status differences on ER, we performed an ANOVA on the child's CSC score, yielding a significant difference. Children with LD revealed significantly lower ER capabilities compared to children without LD, $F(1, 98) = 6.65$, $p < .01$, $\eta^2 = .07$ ($M = 3.65$, $SD = 1.18$ and $M = 4.24$, $SD = 1.09$, respectively).

Within-Group Associations Between SIP, Attachment Security, and ER

As can be seen in Table 2, in children with and without LD, attachment security and ER were found to be significantly correlated with most of the SIP steps, indicating that children who were more secure and had better ER skills were also better in their SIP capabilities. More specifically, whether with or without LD, children having higher security scores also recalled more information units in the encoding phase, offered more positive attributions regarding children's intentions, included the context more often in their social interpretations, suggested more positive goals and offered more competent solutions, and chose a more competent solution to the problem. Likewise, children in both disability status groups who had higher ER capabilities demonstrated better SIP capabilities.

On the other hand, children with lower security scores in both disability status groups proposed more negative goals, suggested more aggressive solutions, and only in the group without LD also suggested more passive and incompetent solutions. Likewise, children with lower ER capabilities in both disability status groups proposed more negative goals. In addition, children with lower ER capabilities offered more aggressive solutions in the LD group and offered more incompetent solutions to the social problem in the non–LD group.

Table 2
Within-Group Correlations Between Social Information Processing, Attachment Security, and Emotion Regulation

	With Learning Disabilities		Without Learning Disabilities	
Components	*Kerns Security Scale*	Emotion Regulation	*Kerns Security Scale*	Emotion Regulation
1. Encoding				
Information units	.50***	.45***	.58***	.45***
Embellishment	–.17	–.08	–.07	–.09
2. Interpretation				
Problem identification	.14	.39**	.46***	.30**
Content interpretation	.32**	.37**	.47***	.54***
Context attribution	.33**	.38**	.50***	.48***
3. Goal clarification				
Positive goals	.47***	.47***	.56***	.46***
Negative goals	–.32**	–.27*	–.54***	–.33**
4. Response search				
Competent	.46***	.54***	.63***	.35**
Aggressive	–.27*	–.28*	–.26*	–.07
Passive avoidant	–.03	–.08	–.25*	.03
Third-person	–.16	–.04	–.09	–.12
Other ineffective	.05	–.20	–.32**	–.27*
5. Response decision				
Competency of solutions	.39**	.44***	.58***	.36**

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

The Z Fisher test to examine disability status differences in correlations was significant only for two correlations: first, between security of attachment and problem identification (in the interpretation step), $r = .14$, $p > .05$ for LD; $r = .46$, $p < .001$ for non–LD; Z Fisher = 1.75, $p < .05$; and, second, for the correlation between security of attachment and the "other" category of ineffective responses (in the response search step), $r = .05$, $p > .05$ for LD; $r = -.32$, $p < .01$ for non–LD; Z Fisher = 1.84, $p < .05$.

Hierarchical Regressions

Inasmuch as we were primarily interested in predicting the child's competent SIP capabilities, we focused on the following competency aspects of the SIP steps in our regression analyses: encoding of information units (Step 1), general interpretation category (Step 2), positive goals (Step 3), competent solutions (Step 4b), and response

Table 3
Hierarchical Regression Analysis of Social Information Processing by Disability Status (With/Without Learning Disabilities), Attachment Security, Emotion Regulation (ER), and Their Interactions

	Social Information Processing Step									
	Encoding		Interpretation		Positive Goals		Competent Solutions		Response Decisions	
Predictors	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Regression Step 1		.26***		.10***		.26***		.15***		.03
Disability status	.51***		.32***		.52***		.38***		.17	
Regression Step 2		.21***		.19***		.19***		.24***		.22***
Disability status	.37***		.18*		.38***		.23**		.02	
Security	.48***		.46***		.45***		.52***		.49***	
Regression Step 3		.03**		.10***		.04**		.04*		.03*
Disability status	.35***		.15		.36***		.21**		.00	
Security	.37***		.26**		.33***		.40***		.37***	
ER	.21**		.39***		.24**		.22**		.22*	
Regression Step 4				.02*		.05**		.12***		.06**
Disability Status			.12		.33***		.16**		−.03	
Security			.38***		.49***		.69***		.56***	
ER			.36***		.21*		.14		.19[a]	
Security × ER			.18*		.17**		.36***		.29**	
Disability Status × ER						−.24**				
Disability Status × Security						.19*				
R^2		.50***		.42*		.54**		.55*		.34**

a. $p = .06$.
*$p < .05$. **$p < .01$. ***$p < .001$.

decision (Step 5a). We computed a series of regression analyses to predict the different SIP steps, as follows: The first step of the analysis introduced children's LD status (with/without LD) to control for its influence on the predictors. Based on the conceptual perception of the influence of attachment figures' support and emotional availability on children's development of adaptive emotion regulation (Bowlby, 1973; Cassidy, 1994; Grossmann & Grossmann, 1993), security of attachment was introduced as the second step of the regression equation, and ER was entered into the regression equation as its third step. The last step consisted of the interactions between the predictors (Security × ER, Disability Status × ER, and Disability Status × Security). The addition of the interaction step enabled the examination of the possible differential contributions of the predictors between the LD/non–LD study groups as well as indicating if the combination of internal working models and ER added to the explained variance in SIP, thus testing a moderator model. In all regression analyses, variables' entrance was forced in the first three steps, but in the interactions step, variables entered according to the significance of their contribution to the explained variance of SIP (stepwise approach, $p < .05$).

Overall, as seen in Table 3, the explained variance by the predictors for all SIP steps was high (R^2 ranges from .34 to .55). The dependent variables and their interactions best predicted the suggestion of a competent solution ($R^2 = .55$), followed by the establishment of positive goals ($R^2 = .54$), the encoding of information units ($R^2 = .50$), and the interpretation step ($R^2 = .42$). The independent variables and their interactions contributed the least (but still significantly) to the explained variance in response decision ($R^2 = .34$).

As can be seen in Table 3, the LD status (entered as the first step in the regression analyses) significantly contributed to the explanation of all the SIP steps except response decision, ranging from an explained variance of 26% for encoding information and for creating positive goals, to 15% for a competent solution, and to 10% for interpretation. Higher SIP skills emerged among children without LD versus children with LD along these SIP steps, indicating that learning disorders place children at risk for reduced SIP capabilities. Security of attachment (introduced in the second step of the regression equation) added significantly to the explained variance of all SIP steps: 24% for competent solutions, 22% for response decision, 21% for encoding information, and 19% for interpretation and for positive goals, demonstrating that attachment security predicts better SIP skills in children, beyond disability status. Likewise, the addition of ER in the third step contributed significantly to the explained

variance for all SIP steps, although to a lower extent than attachment, ranging from 3% in encoding and response decision steps up to 10% in the interpretation step. These findings revealed that higher ER skills contributed to better SIP skills, beyond disability status.

The contribution of the internal working models by ER interaction was statistically significant for all SIP steps except encoding, adding low to moderate percentages of explanation (2%–6%) to the variance for interpretation, positive goals, and response decisions and high percentages of explanation (12%) to the variance for competent solutions, supporting a moderator model. In addition, only for competent solutions, the interactions of LD status (with/without LD) by secure attachment and of LD status by ER were also both significant.

To clarify the interaction between secure attachment and ER, we divided the participants into two attachment status classifications, secure and insecure children, based on Kerns et al.'s (1996) suggested cutoff score of 45 on the KSS questionnaire. Then we calculated the correlation between ER and the different SIP steps for each attachment status (secure/insecure). Higher correlations emerged between ER and SIP steps in the secure status group than in the insecure status group for four out of the five competent SIP capabilities that were tested, with significant *Z* Fisher tests examining differences in correlations between the attachment status groups. The differences in the correlations for secure versus insecure status were significant for the interpretation step, $r = .53$, $p < .001$ versus $r = .05$, $p > .05$, respectively, *Z* Fisher = 2.25, $p < .05$; for positive goals, $r = .46$, $p < .001$ versus $r = -.24$, $p > .05$, respectively, *Z* Fisher = 3.08, $p < .001$; for competent solutions, $r = .48$, $p < .001$ versus $r = -.31$, $p > .05$, respectively, *Z* Fisher = 3.50, $p < .001$; and for competent response decisions, $r = .42$, $p < .001$ versus $r = -.27$, $p > .05$, respectively, *Z* Fisher = 3.04, $p < .001$. To verify these findings, we repeated the correlation analyses dividing the two attachment status groups according to a median score of 49.5, and the correlation results were similar. This finding suggests that the contribution of ER to the performance of SIP is more relevant and significant for children who are securely attached to their mothers, indicating that attachment security and higher ER contribute to better SIP skills. ER was found to contribute less to SIP performance among insecurely attached children. Only for the competent solution step was the picture more complex.

As noted before, for the competent solution step only, all possible interactions between the predictors contributed significantly to the explained variance. To clarify the source of the interaction between attachment security and ER, we calculated correlations separately within the LD and non–LD groups. Findings demonstrate a higher correlation between ER and competent solutions ($r = .54$, $p < .001$) than between attachment security and competent solutions ($r = .46$, $p < .001$) among the children with LD (*Z* Fisher, *ns*), whereas for children without LD the opposite pattern emerged: Competent solutions correlated more strongly with attachment security than with ER ($r = .63$, $p < .001$ and $r = .35$, $p < .001$, respectively, *Z* Fisher = 1.79, $p < .05$). For children without LD, security of attachment is more important for a competent solution, whereas for children with LD, higher ER skills seem to play a more important role.

In sum, learning disorders in children did lower their SIP skills, but the security of attachment and ER skills and their interactions emerged as important predictors of children's different SIP capabilities, beyond LD status. Thus overall, more securely attached children with better ER skills showed better SIP performance regardless of disability status.

Discussion

Social cognition is considered a major difficulty in children with LD and as a significant contributor to their social maladjustment (e.g., Tur-Kaspa, 2002). SIP is a core aspect of children's social cognitive capabilities, influencing how they perceive and interpret the social world and how they decide to act in its social interactions (Cowan, 1982; Gifford-Smith & Rabiner, 2004). Former studies have already demonstrated significant difficulties in SIP among children with LD (Bauminger et al., 2005; Tur-Kaspa, 2004; Tur-Kaspa & Bryan, 1994), corroborated by the current study. However, the components that may contribute to dysfunctional SIP processes are less understood. The unique contribution of the current study, in line with most recent SIP models (e.g., Lemerise & Arsenio, 2000), lies in its examination of the role played by two major social-affective processes, namely, internal working models of attachment and ER in the SIP of children with LD. We will first discuss the differences in SIP, attachment security, and ER between children with and without LD, followed by a discussion of the unique influences of attachment security, ER, and the interaction between them on children's performance in the on-line SIP steps.

Between-Group Differences on SIP, Attachment Security, and ER

On the whole, children with LD showed lower functioning compared to children without LD on most of the SIP steps. Current findings are consistent with two previous studies examining Dodge's SIP model in middle

childhood for children with LD (Bauminger et al., 2005; Tur-Kaspa & Bryan, 1994). Can we portray a SIP profile for children with LD based on difficulties that appeared along the three studies? Deficient encoding skills were consistent across studies, where children with LD recalled fewer information units and added more extraneous information that was not originally presented in the social vignettes. When interpreting social cues, children with LD exhibited difficulties in relating to important situational clues within the social context. All three studies showed that children with LD were less likely than their nondisabled counterparts to generate multiple contextual interpretations of the scenarios. The higher ability of children without LD to take contextual components into account enabled them to imagine a broader spectrum of possible peer intentions and situational outcomes, whereas lower sensitivity to contextual cues among children with LD seemed to lead them to interpret peers' social intentions and the situation's outcome as either "black or white," that is, as either hostile or amicable. Another common finding across the three studies was that the LD group produced a smaller repertoire of possible solutions when searching for responses to the social problems presented, compared to their nondisabled peers. One related finding, which was only supported by two of the studies, should be mentioned: In Bauminger et al. (2005) and in the current study, children with LD revealed an impairment in their ability to generate a feasible competent solution on their own. Also, in the current study, when children with LD were asked to evaluate a given solution, they misjudged the solution's social usefulness, giving higher scores to aggressive, passive, and other ineffectual solutions than did the group without LD. This may imply social understanding difficulties related to restricted social knowledge in these children, compared to their nondisabled peers.

Nevertheless, it should be noted that despite overall lower functioning along the different SIP steps in children with LD, some processes were found to be intact for these children, across studies. For example, children's identification of the problem in the interpretation step did not differ between the groups. Also, when given alternative solutions to evaluate, they resembled their peers without LD in assessing competent responses. More striking and hard to construe was the lack of group differences in response decisions, found only in the current study. This finding indicates that even if children with LD generated a less competent solution in the response search step and endorsed more nonadaptive types of solutions compared to their peers without LD, their ability to select the most competent solution in their repertoire was as accurate as their counterparts without LD. Indeed, speculations based on only one study are difficult. However, based on this current finding and other processes that were found intact in these children, we may perhaps assume a continuum of difficulties in social knowledge rather than an "all or nothing" dichotomy paradigm. This issue should be further explored.

In an attempt to explain SIP deficits in children with LD, McNamara (1999) focused on deficient cognitive processes that characterize the performance of children with LD (American Psychiatric Association, 2000; Swanson, 1998; Swanson, Ashbaker, & Lee, 1996). For example, ineffective short-term memory processing may affect the step of encoding, which requires selective attention to multiple social cues presented in the social scenario, which must be processed quickly. These children's difficulties in generating multiple interpretations may relate to problems in executive functions, with an emphasis on the working memory necessary to enable children to integrate between prior relevant knowledge from long-term memory and recent information. The developmental lag in utilizing organizational strategies, needed for recalling information when searching in long-term memory, may explain their difficulties in response generation.

It may indeed be the case that deficient cognitive processes, specifically those related to storage and retrieval of information, influence SIP capabilities in children with LD. Due to the current study's lack of formal cognitive assessment, we cannot support or rule out the cognitive source hypothesis for the SIP deficit in children with LD. Our focus here was to explore the feasibility of possible social-affective resources to the SIP deficit in children with LD, namely, internal working models of attachment and emotion regulation. These two variables may conjoin with the cognitive explanation to demonstrate logico-affective deficits in children with LD. Dodge (1991) discussed the role of emotions in SIP and claimed that drawing a clear line between emotion and cognition as a dichotomy is problematic. Cowan (1982) suggested that the constructs of emotion and cognition are entangled, with both cognitive structures and emotional energy composing the basic "building blocks" of the symbol system. According to this view, emotion and cognition are part of a single symbolic scheme. Emotion is the scheme's energy, indicating the arousal level and the strength of movement toward or away from a stimulus, whereas cognitions are the scheme's content and rule structure. Inasmuch as every action needs energy and rule-structured content, every action may be both emotional and cognitive. Theory also suggests that a significant portion of this cognitive-affective scheme is governed by the child's internal working models with significant others (Bretherton

& Munholland, 1999). Our study coincided with other recent research demonstrating a higher level of insecurity among children with LD compared to children without LD (Al-Yagon, 2003; Al-Yagon & Mikulincer, 2004a, 2004b; Barzel, 2002). Indeed, it is important to note that even if group differences in attachment security were significant but not large, a significant portion of the LD group (36%) obtained a score that reflected insecurity, compared to 16% among the children without LD. Lower emotion regulation capabilities were also noted in the group means for children with LD versus the control group, despite the fact that again this size effect was significant but not large. Lower functioning in children with LD, both on security of attachment and on ER, may possibly prevent efficient SIP functioning.

The Contribution of Internal Working Models of Attachment and ER to SIP Performance: A Moderator Model

Our hierarchical regressions presented consistent effects of attachment and ER on all SIP steps beyond the effects of disability status, highlighting the important contributions of both these factors to children's SIP performance. The fact that disability status (with/without LD) when entered as a first step to the regression equation was not meaningful in its contribution to response decision is not surprising because children with LD resembled their nondisabled counterparts regarding the competency level of their chosen solution. However, in all other SIP steps, the significant contribution of disability status emphasized that LD placed children at risk for SIP difficulties. Yet, securely attached children with LD showed better SIP capabilities. Secure attachment when entered in the second step to our regression equation reduced disability status βs and added significant percentages to the explained variance in all SIP steps, with R^2 change ranging from 19% to 29%. The highest βs were obtained for children's ability to generate a competent solution ($\beta = .52$). Attachment theory assumes that children with a more positive view of themselves and others will reveal less hostile perceptions of others and more competent social behaviors (Bretherton & Munholland, 1999). Indeed, studies so far have examined the link between attachment and different aspects of social adjustment, such as children's perceptions (Cassidy et al., 1996), children's social status (Allen, Moore, Kuperminc, & Bell, 1998; Rabiner et al., 1993), and children's emotional communication (DeMulder et al., 2000; Laible & Thompson, 1998). However, to date, none have presented the contribution of attachment to a complete SIP model, including all on-line processing steps. Uniquely, in this study we demonstrated the importance of parent-child interaction for social-cognitive skills as reflected during the process of SIP. Children in our study who were securely attached to their mothers could make more competent social decisions, had better encoding skills, produced more positive social goals, and exhibited fewer "black and white" interpretations of social cues.

Adding ER to the third step of our regression equation also significantly contributed to children's SIP functioning, contributing most to the interpretation SIP step ($R^2 = .10$; $\beta = .39$). Children's better ER skills over negative emotions contributed the most to their ability to competently interpret social scenarios. Indeed, research has shown that heightened arousal may impair children's intention-cue interpretation accuracy, with increased tendencies toward overattribution of hostile intentions to peer (Dodge, 1991; Frijda, 1986). Importantly, children's interpretation of a scenario may significantly influence the ensuing SIP steps such as response solution; the solution must address the problem identified in the earlier interpretation step. Indeed, ER emerged as most relevant for interpretation; yet, its contribution to the explained variance in SIP was found important for all other steps as well. Children who possessed better ER skills demonstrated better SIP skills. In fact, the significant interaction between ER and attachment security for all SIP steps but encoding indicates that the contribution of ER to SIP is even higher.

The interaction between attachment and ER in the fourth step added between 2% and 6% to the explained variance in the various SIP steps, supporting a moderator model. More specifically, children who were more secure and showed better ER skills derived less hostile interpretations of social information, generated more positive goals, and also reached more competent response decisions. Yet, children who are insecure have a more limited capability to compensate for their insecurity by applying high-level ER skills when processing social information. This finding holds significant implications specifically for the children with LD, who, considering their lower functioning in both internal working models and ER skills, appear to face heightened risk for maladaptive SIP skills, compared to their nondisabled counterparts.

For children's generation of a competent solution, we found a significant interaction between attachment and ER but also a significant interaction between disability status and attachment and between disability status and ER. Based on our analysis of the source of the interaction, we may suggest that security of attachment leads to better generation of a competent solution in children without LD, whereas ER seems more crucial for a competent solution in children with LD. This finding is difficult to explain and requires further examination in future studies,

but it highlights the seemingly critical skill of ER for LD children to produce competent social solutions. Thus, even if they are securely attached to the caregiver, children with LD may exhibit ER difficulties that can impede their ability to generate competent solutions to social situations.

Conclusions and Implications

On the whole, the current study contributed to the understanding of SIP processes in both children with typical development and with learning disorders. Even if attachment theory assumes that security of attachment will influence children's overall social-cognitive functioning (with positive perceptions of the world and of people leading to less biased and more accurate perceptions of social situations; Bowlby, 1973), only limited studies have investigated the link between attachment and social-cognition processes, especially information processing in the social domain. Also, studies have assumed the relations between attachment, ER, and social functioning but have focused less on SIP. Data are accumulating to support the critical role that SIP plays in children's social adjustment (Gifford-Smith & Rabiner, 2004). Overall, we have shown that attachment and ER each significantly contributed to the understanding of children's performance along the different on-line SIP steps. However, the best prediction of SIP's on-line steps (excluding encoding) was obtained when we considered the interrelations between attachment and ER as supporting a moderator model, both in typical development and in LD.

Two other studies have examined the role that emotion plays in SIP for children with LD (Bauminger et al., 2005; Bryan et al., 1998). Bryan et al. (1998) demonstrated that various affect states differently influence children's SIP; for example, positive self-induced mood correlates with the generation of a higher number of responses. Although this refers to quantity rather than quality of responses, failure to compose competent solutions may stem in part from depressed or negative affect triggered by former negative social experiences. In Bauminger et al. (2005), children with LD showed consistent difficulties in understanding or recognizing complex social emotions such as embarrassment, pride, guilt, or loneliness—which rely heavily on the consideration of social context and of the perspectives held by the individuals involved in the situation (Kasari, Chamberlain, & Bauminger, 2001) in addition to their SIP difficulties. A logico-affective theoretical model to explain these children's social cognition difficulties may be examined in future studies to encompass the possible dynamic interaction between social-emotional and cognitive processes during coping with the social world. It may be interesting to include in future studies a combination of cognitive variables such as memory, speed of processing, and executive functions together with social-emotional processes such as attachment, emotion regulation, emotionality, and emotion understanding to test for their prediction of SIP capabilities in children with LD.

Our study also suffers from several limitations that should be noted. First, to control for sample heterogeneity, we only included boys, thus restricting generalization for girls, although no evidence is available to suggest that attachment and ER contribute differently to SIP functioning for boys and girls. In line with the same aim for sample homogeneity, we excluded children with LD who have comorbid attention-deficit/hyperactivity disorder (representing approximately 30% of the LD population), thus restricting generalization to such children. Also, we did not divide the LD group into subgroups such as verbal versus nonverbal learning disabilities, better readers versus better calculators, and so on. Thus, we do not know if these specific characteristics influence children's SIP capabilities and if attachment or ER may differ between these subgroups. Second, we lacked formal cognitive or language assessment, thus we are unable to evaluate their specific contribution to the deficient SIP functioning that appeared within the LD group. Third, future studies would do well to examine a broader battery of ER skills, such as observations of children's concrete behaviors while coping with negative emotions or with stressful situations. Finally, more comprehensive information on children's family and environmental characteristics could add to the understanding of the specific influences of family, neighborhood, and school experiences on children's social cognitive functioning in SIP.

However, despite the study's shortcomings, the present findings regarding the role that attachment and ER play in SIP capabilities for children with LD suggest possible significant clinical and practical implications. Clinically, the current outcomes emphasize that children with LD are at risk for social maladjustment based on their insecure internal working models as well as their ER difficulties. Also, this study underscores the importance of early intervention for children with LD, considering that both security of attachment and ER skills are formed very early in life and have a long-term impact on child development. Early screenings for these children would enable intervention as early as possible, before ER skills are already formed. Practically, the present results should lead interventionists to focus on the quality of the child's interaction with the mother (or other significant caregiver) as well as on strategies to develop more skillful emotion regulation capabilities. Also, we

would like to call attention to the role that emotion and social processes play in the social-cognitive functioning of children with LD, possibly in addition to their well-documented cognitive deficits.

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