# The impact of developing social perspective-taking skills on emotionality in middle and late childhood

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| Journal: | *Social Development* |
| Manuscript ID: | SODE-09-0151.R1 |
| Manuscript Type: | Original Manuscript |
| Keywords: | Perspective-taking, Emotion regulation, Middle childhood, Emotion |
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Abstract

A sample of 209 children was followed longitudinally to examine the impact of growing perspective-taking skills on positive and negative emotionality in middle and late childhood. Perspective-taking skills were assessed through interviews. Teachers rated children's emotional reactivity and capacity to regain a neutral state following emotional arousal. Analyses of contemporaneous data revealed that more developed perspective-taking skills were associated with moderate levels of emotional reactivity. In addition, in children with high emotional reactivity, good perspective-taking skills were associated with good capacity to regain a neutral affective state following emotional arousal. Longitudinal analyses revealed that children who made gains in perspective-taking skills over a two-year-period became more moderate in negative emotional reactivity and improved their ability to down-regulate strong positive emotions. The overall findings support the notion that children use perspective-taking skills as a tool for optimal regulation of emotional responses.

Key words: Perspective taking, Emotion, Emotion regulation, Middle childhood, Late childhood.

# The Impact of Developing Social Perspective-taking Skills on Emotionality in Middle and Late Childhood

Being able to manage one's emotional experience and expression in a flexible and adaptive manner is an essential aspect of social competence. Emotion regulation encompasses internal and external processes involved in initiating, maintaining, and modulating the occurrence, intensity and expression of emotion (Gross & Thompson, 2007; Thompson, 1994). An important part of this regulation is accomplished through deployment of attention or the inhibition or activation of behavior. Accordingly, several studies have found links between skillful regulation of attention and behavior and various indices of social competence and adjustment in children (see Eisenberg, Hofer, & Vaughan, 2007; Eisenberg, Smith, Sadovsky, & Spinrad, 2004; Rothbart & Bates, 2006, for reviews). However, cognitive processes other than attention play a role in the regulation of emotional experiences as well. Such processes influence the interpretation of situations and feelings aroused in these situations and help in guiding decisions, such as deliberately using behavioral or mental efforts to modulate an emotional response (Lemerise & Arsenio, 2000; Ochsner & Gross, 2005). Although it is likely that children's emotional responses are affected by developmental changes in the cognitive competency with which they process social cues and understand emotions, few longitudinal studies have investigated developmental links between socio-cognitive skills and regulatory aspects of children's emotional response (Eisenberg, Champion, & Ma, 2004). The purpose of the present study was to address this gap in the literature by examining how social perspective-taking skills affect emotionality in middle and late childhood. Possible cross-sectional as well as longitudinal associations were investigated.

## *Emotionality, Emotion Regulation, and Social Adjustment*

Emotionality is difficult to distinguish from its regulation (Cole, Martin, & Dennis, 2004; Gross & Thompson, 2007). According to temperament theorists, individuals who are high in

emotionality frequently experience and/or express positive and negative emotions; these emotions are often of high intensity and slowly return to baseline (Rothbart & Bates, 1998). Although definitions of emotionality generally refer in this way to individual differences in thresholds of reaction, latency, intensity and recovery time, some researchers have conceptualized falling reactivity (rate of recovery from emotional arousal) as an aspect of emotion regulation rather than emotionality (e.g., Rydell, Berlin, & Bohlin, 2003). However, treating falling reactivity as an aspect of emotionality is in agreement with findings in factor analyses showing that reactivity and falling reactivity tend to load on one factor, while measures of attentional and behavioral regulation load on a second factor (Eisenberg et al., 1995; Murphy, Shephard, Eisenberg, & Fabes, 2004). In the current study, we conceptualize emotional reactivity and falling reactivity as two aspects of emotionality and we investigate whether either of these aspects is influenced by social perspective-taking skills. This conceptualization is consistent with the view that emotion generation involves a sequence of processes, each of which can be modified as part of emotion regulation (Eisenberg, Fabes, Guthrie, & Reisner, 2000; Gross & Thompson, 2007; Thompson, 1994).

Positive and negative emotionality are included in models of temperament (Evans & Rothbart, 2009; Rothbart & Bates, 2006) and display moderate stability across time as the child develops (Sallquist et al., 2009; Wachs, 2006). Both characteristics have been studied extensively in relation to social adjustment. Negative emotionality tends to be negatively related to indices of social competence (Eisenberg et al., 1993; Eisenberg, Fabes, Karbon et al., 1996; Eisenberg et al., 1995) and positively related to internalizing symptoms and externalizing symptoms (Eisenberg, Fabes, Guthrie et al., 1996; Eisenberg et al., 2001; Lengua, 2003; Muris & Ollendick, 2005). The implications of children's emotionality for social functioning, however, depend on their regulatory skills. Social adjustment benefits from good regulation of attention and behavior, particularly in children who are very high in

negative emotional reactivity and intensity (Belsky, Friedman, & Hsieh, 2001; Diener & Kim, 2004; Eisenberg, Fabes, Guthrie et al., 1996; Eisenberg, Fabes et al., 2000; Eisenberg, Guthrie et al., 1997; Eisenberg, Guthrie et al., 2000; Eisenberg et al., 2003; Stifter, Spinrad, & Braungart-Ricker, 1999). In fact, when effectively regulated, negative emotions may positively contribute to social competence by facilitating empathy and the development of conscience (Eisenberg et al., 1998; Kochanska, 1997; Rothbart, Ahadi, & Hershey, 1994). Very low intensity of affective response predicts poor social adjustment, particularly in combination with low efforful control of attention and behavior (Frick & White, 2008; Kochanska, Barry, Jimenez; Hollatz, & Woodard, 2009).

Moderate levels of positive emotionality and a happy mood have also been associated with positive outcomes, including prosocial behavior (Eisenberg, Fabes, Murphy et al., 1996), social adjustment (Lengua, West & Sandler, 1998) and peer popularity (Denham, McKinley, Cochoud, & Holt, 1990). However, intense positive affect and exuberance, and problems with down-regulation of positive affect, tend to be associated with disruptive behaviors (Eisenberg, Fabes, Guthrie et al., 1996; Rothbart, Ahadi, & Hershey, 1994; Rydell et al., 2003). Thus, skillful regulation of both positive and negative affect contributes to social adjustment in children.

*Cognitive Regulation of Emotion in Middle and Late Childhood*

Six-year-olds are aware of the fact that emotions are internal states that can be intentionally modified with regard to subjective experience and outward expression (Saarni, 1999). However, during the elementary school years, there is a marked increase in children's understanding and use of cognitive strategies for emotion regulation (Altshuler & Ruble, 1989; Band & Weisz, 1988; Losoya, Eisenberg, & Fabes, 1998; Rice, Levine, & Pizarro, 2007). Prior studies have investigated children's use of cognitive strategies to regulate ongoing emotion during this age period, primarily in relation to coping with problems and

stress. Findings from this research indicate that social competence and psychological adjustment in middle and late childhood are associated with the use of more constructive cognitive types of coping such as problem solving, cognitive restructuring, and positive reappraisal of the stressor (Compas, Connor, Saltzman, Thomsen, & Wadsworth, 2001; Reijntjes, Stegge, Meerum Terwogt, & Hurkens, 2007). These findings are consistent with the adult literature, where several studies have indicated that using cognitive reappraisal is an effective means of moderating emotional responses (John & Gross, 2007). They are also in line with findings from research on children's use of cognitive emotion regulation strategies in empathy, which indicate that children with a high capacity for empathic concern and considerate behavior tend to use cognitive reappraisal to moderate the intensity of their empathic response (Bengtsson, 2003).

### *The Present Study*

From a developmental and clinical perspective, it is essential to identify the developmental changes in cognitive processes that make children better equipped to manage their feelings. Cognitive regulation can be expected to follow a developmental course, such that growing skills and capacities open up new ways to control emotional experience and expression by changing a situation's meaning in ways that alter its emotional impact (Denham, 1998; Kopp, 1989; Saarni, 1999). In the present study, we investigated the potential effects of perspective-taking skills, and growth in perspective-taking skills, on emotionality in middle and late childhood. Often, the term perspective taking refers to cognitive processes which result in knowledge about others' internal states (Eisenberg, Fabes, & Spinrad, 2006). For the purposes of the present study, however, we adopted Selman's (1980) paradigm of perspective-taking skills, defining perspective taking as the developing capacity to differentiate and integrate social perspectives. Thus, we focus on cognitive skills, which not only contribute to an

understanding of other people's experiences, but also to an understanding of how different points of view are related and coordinated with one another.

Selman and Demorest (1989) provided a detailed account of the ways in which these skills comprise an important set of resources on which children can draw in attempting to manage emotions in a flexible and adaptive manner. According to their account, perspective taking operates at each cognitive step in the processing of social information. Thus, as operationalized in their interpersonal negotiation strategies (INS) model, perspective taking affects the way the social situation is defined and interpreted, the way alternative responses are generated, the selection and implementation of a specific response, and the evaluation of outcomes. The perception and control of emotion is conceptualized as an integral part of this processing, resting on the four developmental levels of perspective coordination that are distinguished in the model.

At the lowest level of perspective taking (Level 0), emotional states are experienced as diffuse. There is no reflection on feelings as distinct entities and therefore no sense of deliberate control over feelings. Feelings control the self rather than the reverse, and emotional states are directly expressed in impulsive action. At Level 1, emotional states are recognized as distinct entities of a time-limited and transitory nature. Feeling is perceived as an objective necessity, but there is a rudimentary understanding that feelings can be controlled and changed deliberately by acting on external events or persons perceived to be the causes. However, there is still no understanding that feelings can be regulated mentally. At Level 2 in the INS model, children recognize conflicting concerns within the self or between two individuals in a given context. This allows feelings to be moderated by putting things in a relativistic perspective. For example, the child may use mental effort to deal with a perceived conflict between subjective perspectives by prioritizing one perspective over the other. Or the child may deliberately modulate feelings through the use of mentalistic strategies, for example

using role-taking to increase empathic feelings. At Level 3, finally, a given situation may be construed by differentiating and relating multiple aspects, allowing the emotional response to be understood and modulated by ordering and prioritizing feelings, within the self or between self and other, or by putting these various feelings into the perspective of a relationship or a larger social context. The preferred mode of control at this level is proposed to be working through one's feelings using active reflection. Within this framework, perspective-taking ability develops throughout childhood and into adolescence, with the highest levels of perspective taking sometimes never being reached by the individual (Selman et al., 1986). In reflective interviews, Level 1 emerges in the preschool years, Level 2 at about the age of 7 or 8, and Level 3 at about the age of 10 or 11 (Selman, 1980).

We assessed social perspective-taking skills through individual interviews with the children, which took place in three occasions during a two-year period (henceforth labelled T1 for Time 1, T2 for Time 2 and T3 for Time 3). The interviews were examined, concurrently as well as longitudinally, in relation to teacher ratings of children's dispositional emotionality. In these analyses, emotionality was divided conceptually into two distinct but related aspects: *Emotional reactivity*, which refers to the frequency and intensity of emotional reactions, and *Falling reactivity*, which refers to how easily a normal affective state is regained following a temporary state of emotional arousal. This conceptual distinction is important to make because emotional arousal may be subjected to regulation during both of these phases in ways that are varyingly optimal in relation to separate, socially defined standards.

### *Hypotheses*

Children's emotionality is likely to be determined by several underlying factors, such as their constitutionally based reactive tendency, social experiences, and tendency to engage in automatic, or deliberately executed effortful control of emotion (Rothbart & Bates, 2006). Our

general working assumption was that children may use perspective-taking skills to modulate their emotional responses in a way that is consistent with effective and adaptive outcomes. By using these skills, children may figure out when emotional expression is appropriate and how to express emotion in a manner that fits with the social context. Moreover, they may use their perspective-taking skills to deliberately "up"- or "down"-regulate their emotions depending on their goals.

Low to moderate emotional reactivity seems to be more optimal for social functioning than are very low or high levels of reactivity (Baumeister, Zell, & Tice, 2007; Cole, Michel,& Teti, 1994; Eisenberg & Fabes, 1992; Eisenberg, Fabes et al., 2000; Pessoa, 2009). Therefore, based on our supposition that high perspective-taking skills would contribute to adaptive levels of reactivity, we hypothesized that high perspective-taking skills would be associated with relatively moderate levels of emotional reactivity, whereas both very high and very low levels of emotional reactivity would be associated with low levels of perspective-taking skills. This means that children with frequent and strong emotional responses will lack perspective-taking skills that would allow them to moderate their emotional reactivity and that children with very low emotional reactivity will lack sufficient perspective-taking skills to stimulate emotional responses.

Our longitudinal design allowed us to test not only concurrent associations between perspective taking and emotionality, but also whether growth in perspective-taking capacity is associated with changes in emotional reactivity over time. We tested two primary longitudinal hypotheses. Firstly, we examined whether high initial perspective-taking skills at T1 would predict change in the direction of more moderate emotional reactivity over time (T1 – T3). Thus, we examined whether perspective-taking skills at T1 were related to emotional reactivity at T3 when controlling for emotional reactivity at T1. Secondly, we examined how change in perspective taking over time (T1 – T3) was related to change in emotional reactivity

over time (T1 – T3). We anticipated that an age-related increase in the capacity to differentiate and coordinate social perspectives would be associated with a move away from more extreme levels of emotional reactivity toward more moderate levels.

Although our working assumption was that perspective taking would influence emotional reactivity rather than the reverse, we recognized that bidirectional influences may also exist between the two variables. Emotional reactivity may be too high, or too low, to stimulate the use or growth of perspective-taking skills (Lemerise & Arsenio, 2000). Therefore, for control purposes, we also examined statistically the influence of emotional reactivity at T1 on developmental gains in perspective-taking capacity from T1 to T3.

With respect to falling reactivity, we proposed that optimal cognitive control would allow children to down-regulate their feelings easily when needed, either on their own or with the assistance of others. Most likely, ease of emotional down-regulation is affected primarily by initial reactivity, i.e. it is more difficult to return to a normal state from higher levels of emotional arousal than from lower levels. However, beyond this, we expected good cognitive control to contribute to quick recovery. Thus, we expected to find a positive relationship between social perspective-taking skills and falling reactivity. In addition, we predicted that good cognitive skills would be most important for the ability to regain a neutral state in children with high emotional reactivity. As already mentioned, several studies have indicated that emotional intensity interacts with skillful regulation of attention and behavior (effortful control) in predicting positive social functioning, good regulation being most important for optimal functioning in children with strong negative emotional intensity (e.g., Eisenberg, Fabes et al., 2000). Finally, we hypothesized that improvement over time in the ability to regain a neutral state following emotional arousal (T1 – T3) would be predicted by good perspective taking skills at T1 as well as by improvement in perspective taking capacity between T1 and T3.

## Method

### *Participants*

The sample in the present longitudinal study originally consisted of 90 second graders (48 boys and 42 girls, mean age = 8.85 years, *SD* = 0.33) and 119 fourth graders (63 boys and 56 girls, mean age = 10.81, *SD* = 0.30). The children came from three socioeconomically mixed schools in southern Sweden, one situated in the country's third largest city and the other two in small communities in the province surrounding the city. All second and fourth graders at the three schools were invited to participate. To recruit the participants, permission from school principals and teachers was first obtained. Consent forms were then sent home to the parents, with only children who received parental permission and themselves agreed to participate being included in the sample (participation rate 83%).

Data were collected on three occasions (T1, T2, T3), each new data wave being separated by approximately one year. Attrition due to families moving reduced the total sample to *N* = 200 at T2 and to *N* = 187 at T3. Attrition analyses revealed that the mean levels of the study variables did not differ significantly when comparing participants who did not remain in the study to those who did.

### *Measures*

The Interpersonal Negotiating Strategies Interview (Schultz et al., 1989) was used to measure children's capacity to differentiate and coordinate social perspectives. The interview manual contains 12 short child vignettes or dilemmas that portray situations of interpersonal conflict with varying relationship status and familiarity of the story protagonists. Two dilemmas were selected for the present study. One of them involves a child protagonist's interaction with an unfamiliar peer:

"One day a new kid in class named Eric (Ann) says he's (she's) cold and asks Peter (Sara) to lend him (her) a sweater that Peter (Sara) has but isn't wearing. The next day when Eric (Ann) returns the sweater there is a hole in it that Peter (Sara) is sure wasn't there the day before."

The other dilemma describes a child protagonist's interaction with a familiar peer: "Anders (Lisa) and Lars (Maria) are friends. One day at school, they are trying to decide what to do on the weekend. Anders (Lisa) wants to invite the new kid in their class to see a movie with them, but Lars (Maria) says he (she) doesn't feel like having the new kid along."

The same two dilemmas were administered at all three assessments. The dilemmas were read individually to the participants and were followed by standard questions and follow-up probes to assess level of perspective taking in four information-processing steps: defining the problem, generating alternative strategies, selecting and implementing a specific strategy, and evaluating outcomes. Children were interviewed in a quiet room at their school. Interviewers were familiar with the INS model and trained by the first author in reading each dilemma, administrating standard questions and using good probing techniques in line with the recommendations delineated in the INS interview manual. Interviews lasted about 15 minutes and were audiotaped and later transcribed verbatim. The interview was part of a larger battery of tests and interviews that altogether took about an hour for the child to complete.

For each information-processing step, responses were scored according to four levels of perspective-taking coordination. Briefly, at Level 0, subjective perspectives are undifferentiated and there is confusion between action and feeling (e.g., "The sweater is the problem; they made a hole in the sweater."). At Level 1, subjective perspectives are clearly differentiated but they are related only in a one-way, unilateral fashion, for example by considering the impact of one actor on the other (e.g., "He has made the other child sad by making a hole in his sweater."). At Level 2, perspective taking is self-reflective, allowing perspectives to be considered simultaneously, for example by stepping outside oneself

mentally and taking a second-person perspective on one's thoughts and actions (e.g., "The problem is that they have different opinions, they don't agree with each other."). Level 3, finally, reflects the ability to take a third-person perspective, allowing persons and interpersonal relations to be considered as systems where the perspective on relationships simultaneously includes and coordinates the perspectives of self and other(s) (e.g., "None of them wants to spoil the chance of getting to know each other better and build a long, lasting relationship.").

Prior research has established the internal and external validity of the interview, including structural coherence between the information-processing steps and a link between interview responses and INS manifested in social action (Selman, Schorin, Stone, & Phelps, 1983; Yeates, Schultz, & Selman, 1991). INS scores have been found to be lower in maltreated children and adolescents than in their nonmaltreated peers (Burack et al., 2006), lower in children with ADHD than in children without ADHD (Marton, Wiener, Rogers, Moore, & Tannock, 2009), and negatively related to duration of parental affective illness (Beardslee, Schultz, & Selman, 1987). IQ is positively related to INS scores, but INS accounts for unique variance in social adjustment when the effect of IQ is controlled for (Beardslee, Schultz, & Selman, 1987; Selman, Beardslee, Schultz, Krupa, & Podorefsky, 1986).

In the present study, the first author scored all the interviews blind to each participant's previous scores. To assess interrater reliability, 30 randomly selected protocols (10 from each data collection wave) were scored independently by both authors. They achieved 78% exact agreement when scoring the developmental level of responses to each question (kappa = .65). As a further test of reliability, we examined participants' consistency in reasoning. Scores for each information-processing step were (a) averaged for each dilemma and compared across dilemmas (alpha = .83) and (b) averaged for each step across dilemmas and compared across steps (alpha = .92). Because the consistency in reasoning was high, we used the average score

of the four steps across the two dilemmas in the subsequent analyses. Interrater reliability for these scores was .89.

Emotional reactivity and the ability to return to a neutral state following emotional arousal were assessed using the Emotion Questionnaire (Rydell et al., 2003), which was slightly adapted so that it could be filled in by the participants' teachers instead of their parents. The test consists of three subscales for negative emotions (anger, fear, sadness) and one for positive emotions and exuberance, each subscale containing four emotional reactivity items and six items assessing falling reactivity. Emotional reactivity is rated in terms of both the frequency and the intensity of emotional reactions (e.g., The pupil often gets angry and ends up in a bad mood; When angry or in a bad mood, the pupil reacts strongly and intensely) and falling reactivity is measured with questions reflecting both the capacity to regain a neutral affective state on one's own (e.g., He/She has difficulties calming down on his/her own. *[reverse item]*) and the capacity to regain a neutral affective state with the help of others (e.g., It's easy for others, for instance a parent to calm him/her down). Ratings are made on Likert-scales ranging from 1 (Does not fit at all) to 5 (Fits very well). Across the three data collection waves, the alpha values (based on the total sample) were for negative emotionality: reactivity (.92, .92,.93), falling reactivity (.96, .96, .96), and for positive emotionality: reactivity (.86, .75, .82), and falling reactivity (.93, .93, .93). Previous research (Rydell et al., 2003) has documented adequate test-retest reliability in parental ratings (.62 - .79 over a 5-week period), construct validity for similar scales on the CBQ (Rothbart et al., 2001), and significant correspondence between teacher ratings on an adapted version of the Emotion Questionnaire and children's self-reports of emotion regulation.

At T1 and T2, the same teachers filled in the Emotion Questionnaire; at T3, 30.5% of the children had a new teacher who filled in the form. Data collection was always carried out in spring, toward the end of the school year.

## Results

### *Descriptive Analyses*

Means and standard deviations for measures of perspective taking and emotionality are presented in Table 1 separately for the younger and the older cohort. Sex and age differences in perspective talking ability were explored in a mixed between-within repeated measures ANOVA with age cohort (younger, older) and sex (boys, girls) as between-subject variables and perspective taking as within-subject factor (at T1, T2, T3). There was an improvement in INS scores with time, $F(2, 180) = 16.24$, $p < .000$, which was moderated by age cohort, $F(2, 180) = 3.63$, $p < .05$. The scores increased significantly between each assessment only in the younger cohort (Grade 2 vs 3, $p < .000$, Grade 3 vs 4, $p < .05$). In the older cohort, INS scores improved more slowly and differed significantly only between 4$^{th}$ and 6$^{th}$ grade ($p < .05$). As expected, children in the older cohort performed better than children in the younger cohort ($M = 1.52$, $SE = 0.03$ vs $M = 1.28$ $SE = 0.04$, $F(1, 181) = 23.27$, $p < .000$) and girls performed better than boys, ($M = 1.48$, $SE = 0.04$ vs $M = 1.33$ $SE = 0.03$, $F(1, 181) = 9.39$, $p < .01$).

--Table 1 about here--

Children's positive emotional reactivity was significantly higher than their negative emotional reactivity (Paired samples test, T1: $t(208) = 14.11$; T2: $t(199) = 15.84$; T3: $t(186) = 11.83$; $p$s $< .000$). For that reason, we will present separate analyses for positive and negative emotionality throughout the paper. As shown in Table 2, children's expression of positive emotions was positively related to their expression of negative emotions. Most correlations between aspects of emotionality and perspective taking were nonsignificant.

--Table 2 about here--

Developmental gains in perspective taking (T3 minus T1) were negatively related to initial level of perspective taking at T1, younger cohort: $r(80) = -.49$; older cohort: $r(106) = -.52$, $p$s

< .000. Still, there was relatively high inter-individual consistency in INS scores across time in both the younger cohort, $r(80) = .52$, and the older cohort, $r(106) = .54$, $ps < .000$.

In both cohorts, correlations between T1 emotionality and T3 emotionality were low to moderate in size (positive emotions: reactivity, $r(80) = .28$, $p < .05$ and $r(107) = .30$, $p < .01$, falling reactivity, $r(80) = .47$ and $r(107) = .42$, $ps < .000$, respectively, for the younger and the older cohort; negative emotions: reactivity, $r(80) = .42$, $p < .000$ and $r(107) = .33$, $p < .001$, falling reactivity, $r(80) = .36$, $p < .001$ and $r(107) = .18$, NS, respectively, for the younger and the older cohort). In most cases, the same reporter provided information about emotionality at T1 and T3. For participants who were rated by different reporters ($n = 57$), correlations across time were still statistically significant and moderate in size (positive emotions: reactivity, $r = .48$, $p < .001$, falling reactivity, $r = .47$, $p < .001$; negative emotions: reactivity, $r = .59$, $p < .001$, falling reactivity, $r = .40$, $p < .01$).

*Regression Analyses: Relations of Perspective Taking to Emotional Reactivity*

It was hypothesized that good perspective-taking skills would be associated with relatively moderate levels of emotional reactivity. In testing this hypothesis, the absolute value of each child's centered score for emotional reactivity was used to indicate its deviation from the average in the group (deviation in emotional reactivity, DER).

*Concurrent correlations*. Concurrent relations between perspective taking and DER were examined in six hierarchical regression analyses (Table 3). Two control variables (sex and age group) were entered in the first step and the linear effect of perspective taking was entered in the second step. As suggested by Aiken and West (1991), we centered the predictors prior to computing the regressions. The overall model was found to be significant in four of the six analyses (positive emotions: $F(3, 204) = 7.57$, $p < .000$ at T1, $F(3, 194) = 2.83$, $p < .05$ at T2, $F(3, 182) = 3.26$, $p < .05$ at T3; negative emotions: $F(3, 204) = 6.66$, $p < .000$ at T1). All four analyses supported the hypothesis that high perspective-taking skills are associated with

moderate levels of emotional reactivity. For negative emotions, the overall model was nonsignificant at T2, $F(3, 194) = 0.30$, NS, and T3, $F(3, 182) = 1.41$, NS. However, at T3, although the inclusion of sex and age group at Step 1 did not contribute significantly to the model, $F(2, 183) = 0.15$, NS, the inclusion of perspective taking at Step 2 did result in a significant increase in $R^2$, $F(1, 182) = 3.93$, $p < .05$, which again suggests the existence of a positive relationship between perspective taking and moderate levels of emotional reactivity.

--Table 3 about here--

*Longitudinal findings.* Our longitudinal hypotheses were tested in two hierarchical regression analyses with DER at T3 as the dependent variable (one for positive and one for negative emotions). In Step 1 of the regression model, we controlled for the effects of sex, age group and DER at T1. In Step 2 of the model, perspective taking at T1 was entered as predictor of T3 DER. We anticipated that children with high initial perspective-taking skills at T1 would become more moderate in emotional reactivity over time. Finally, in Step 3 we entered perspective taking at T3 as predictor of DER at T3. This was done in order to examine whether there was correlated change over time in perspective taking and deviation in emotional reactivity. We anticipated that age-related increase in the capacity to differentiate and coordinate social perspectives would be associated with a move away from more extreme levels of emotional reactivity toward more moderate levels. For both regression analyses, the overall model was significant (positive emotions: $F(5, 180) = 6.50$, $p < .000$; negative emotions: $F(5, 180) = 4.04$, $p < .01$). As shown in Table 4, the analysis of positive emotionality revealed a longitudinal effect of T1 perspective taking on DER at T3 (Step 2). Relative to children with poor perspective-taking ability at T1, children with good perspective-taking ability at T1 became more moderate in their emotional reactivity during the following two years. Thus it seems that the effect of perspective taking on positive emotional reactivity was established early and continued to expand during the next two years.

--Table 4 about here--

For negative emotionality, we found an effect of T3 perspective taking on deviation in T3 emotional reactivity when controlling for the level of both variables at T1 (Step 3). This finding indicates that gains in perspective-taking ability between T1 and T3 were associated with a move toward more moderate levels of emotional reactivity during this period.

To evaluate the alternative model, in which emotional reactivity predicted growth in perspective-taking capacity, we also examined statistically the influence of DER at T1 on developmental gains in perspective taking from T1 to T3 (controlling for sex and age group). For both negative emotions and positive emotions, these analyses revealed that DER at T1 did not predict change in perspective-taking capacity during the next two years (*ps* > .05).

*Regression Analyses: Relations of Emotional Reactivity and Perspective Taking to Falling Reactivity*

*Concurrent correlations*. We hypothesized that it would be easier for children with high perspective taking skills than for children with low perspective-takings skills to return to a neutral state after emotional arousal. Moreover, we anticipated that emotional reactivity would moderate the relation between perspective taking and falling reactivity; good perspective-taking skills may be most important for the ability to regain a neutral state in children with high emotional reactivity. Main effects and interaction effects of emotional reactivity and perspective taking on falling reactivity at T1, T2 and T3 were examined in six hierarchical regression analyses. The control variables (sex and age group) were entered in the first step; the main effects of emotional reactivity and perspective taking, respectively, were entered in the second step; and the interaction effects of emotional reactivity and perspective taking were entered in the third step (Table 5). The predictors were centered before being entered into the analyses.

--Table 5 about here--

The overall model was highly significant in all the six analyses (positive emotions: $F(5, 202) = 41.93$ at T1, $F(5, 192) = 36.13$ at T2, $F(5, 180) = 23.06$ at T3, $ps < .000$; negative emotions: $F(5, 202) = 49.16$ at T1, $F(5, 192) = 90.19$ at T2, $F(5, 180) = 71.94$ at T3, $ps < .000$). As expected, emotional reactivity had a substantial effect on falling reactivity in all analyses. In contrast, a main effect of perspective taking on falling reactivity was found only at T1. However, there was fairly consistent support for an interaction effect of emotional reactivity and perspective taking on falling reactivity. As shown in Figure 1, perspective taking facilitated falling reactivity chiefly at higher levels of emotionality reactivity.

--Figure 1 about here--

*Longitudinal findings*. We examined whether change over time (T1 –T3) in the capacity to recover from emotional arousal was predicted by (a) perspective-taking skills at T1, and (b) change in perspective-taking capacity between T1 and T3. At Step 1 in these analyses of falling reactivity at T3, we controlled for the effects of sex, age group, falling reactivity at T1, and emotional reactivity at T1 and T3. At the second step, perspective taking at T1 and the term for the interaction between perspective taking and emotional reactivity at T1 were entered as predictors of falling reactivity at T3. We expected that good perspective-taking ability at T1 would predict long-term improvement in the capacity to recover from emotional arousal, particularly for children with high emotional reactivity. Finally, at the third step, perspective taking at T3 served as the predictor together with the term for the interaction between perspective taking and emotional reactivity at T3 (see Table 6). We expected that there would be an effect of perspective taking at T3 on falling reactivity at T3, even after controlling for the level of the two variables at T1.

Both overall models were highly significant, $F(9, 176) = 19.25$ and 56.08 for positive and negative emotions, respectively, $ps < .000$. Longitudinal support for the hypothesis that an increase in perspective-taking capacity is associated with an increase in the rate of recovery

from emotional arousal was obtained for positive emotion, such that the interaction between emotional reactivity and perspective taking at T3 predicted falling reactivity at T3 even after controlling for the level of these variables at T1. Thus, the association at T3 between perspective taking and falling reactivity was not only due to the association established at T1. Rather, the results indicate a continuing concurrent influence of perspective taking on falling reactivity at T3. In contrast, and contrary to our expectations, for negative emotions, high perspective-taking ability at T1, particularly in combination with high emotional reactivity, predicted a negative, rather than positive, change in falling reactivity over time. Thus, the longitudinal analysis of negative emotions indicated that the association between good perspective-taking skills and quick recovery from emotional arousal that was established at T1 became weaker, or disappeared, during the next two years.

--Table 6 about here--

## Discussion

The present study examined how perspective-taking ability affects emotionality during middle and late childhood. It was assumed that the ability to differentiate and coordinate social perspectives may affect both the initial phase of emotional reactivity and the ease with which the emotional response is subsequently down-regulated. Moreover, because cognitions may be used to up-regulate as well as down-regulate the intensity of an emotional response, we proposed that children may employ their ability to differentiate and coordinate social perspectives as a tool for optimal emotion regulation to achieve a moderate level of initial reactivity and an easy subsequent return to a normal state. Overall, the findings were congruent with this proposal.

### *Age-related Changes in Perspective Taking*

Consistent with theory and previous findings (Beardslee, Schultz, & Selman, 1987; Selman, Beardslee, Schultz, Krupa, & Podorefsky, 1986; Yeates, Schultz, & Selman, 1991),

perspective-taking ability increased with age and was higher in girls than in boys. Improvement was stronger between the ages of 8 to 10 than between the ages of 10 to 12, suggesting a developmental trajectory that levels off in late childhood. The average level of perspective taking at different ages was similar to that observed in other studies (e.g., Selman et al., 1986) with the majority of responses being at Levels 1 or 2 in Selman's INS model. Thus the smaller average gains in perspective-taking scores in late childhood were not due to a ceiling effect in the sense that they were necessitated by the scoring system. Actually, rather few of the oldest children gave Level 3 answers, so the age period studied can be described as a period in which Level 2 responses become increasingly predominant among most children. Developmental gains were negatively related to initial level of perspective taking. Still, there was a moderate level of inter-individual consistency in perspective-taking ability over time.

*Perspective Taking and Emotional Reactivity*

Overall, children with very high or very low reactivity tended to have less developed perspective-taking skills than children with more moderate levels of reactivity. This outcome supports the notion that perspective-taking skills serve to modulate reactivity to a moderate level of intensity. However, there are other possible explanations for this finding that need to be considered. First, there is the possibility that the association between high perspective-taking skills and moderate levels of emotional reactivity is due to both perspective taking and reactivity being affected by attentional processes. Good ability to focus and shift attention in a flexible way is likely to enhance both emotion regulation and performance on social cognitive tasks (Eisenberg et al., 1994). Indeed, effortful control of attention would seem to be integral to emerging perspective coordination in so far as the latter requires the encoding of relatively complex information and the ability to shift attention in a flexible way between relevant sides of the disagreement represented in social dilemmas. Thus, more research is needed to

determine whether cognitive perspective taking makes a unique contribution to emotion regulation beyond that of effortful control of attention.

A second possible explanation for the association between good perspective taking and moderate emotional reactivity is that emotional reactivity has an impact on perspective taking rather than the reverse. Previous research indicates that strong emotional responses may interfere with cognitive activity and that absent or weak emotional responses may fail to stimulate cognitions that are essential for effective self-regulation (Baumeister et al., 2007). Accordingly, it is possible that very high levels of emotionality may interfere with the development of perspective-taking ability and that very low emotional reactivity may fall short of stimulating developmental advances in this skill. Although we cannot rule out this account of the inverted U-shaped relationship between emotional reactivity and perspective taking, we may at least conclude that it was not supported by our longitudinal data. More "extreme" emotional reactivity at T1 (very high or very low) did not predict a relatively slower development in perspective taking during the following two years. In contrast, and more in line with the interpretation that perspective taking influences emotional reactivity, good perspective taking skills at T1 predicted a move toward moderate positive emotional reactions during the following two years.

For negative emotionality as well, we obtained longitudinal support for an association between perspective-taking skills and initial emotional reactivity. Children who made developmental gains in perspective-taking ability over a two-year period tended to become relatively more moderate in reactivity. This finding indicates that the influence of perspective taking on negative emotional reactivity is not finalized in early childhood, but continues throughout middle and late childhood.

Whereas perspective-taking skills tended to promote moderate levels of emotional reactivity, children's effortful control of attention and behavior seems to have a more

restraining effect on their emotional reactivity. Several studies have reported moderate, negative correlations between emotional reactivity and effortful control processes (e.g., Eisenberg et al., 1993; Eisenberg, Fabes et al., 1997; Rydell et al., 2003), which is consistent with the fact that the capacity for inhibititory control is central to definitions of effortful control and tapped in measures of this construct (the ability to inhibit a dominant response to perform a subdominant response; Rothbart & Bates, 1998). By contrast, in the present study, linear correlations between perspective taking and emotional reactivity tended to be nonsignificant, which is consistent with the suggestion that perspective-taking skills may be effectively used to stimulate as well as to dampen emotional reactivity.

*Perspective Taking and Rate of Recovery from Emotional Arousal*

How easily children returned to baseline after being emotionally aroused was primarily determined by their initial emotional reactivity. However, our findings indicate that perspective-taking ability contributes to individual differences in falling reactivity, beyond those accounted for by initial emotional reactivity. Thus, at T1, perspective taking was positively related to falling reactivity for both positive and negative emotions. Moreover, there was relatively consistent support for an interaction effect of perspective taking and emotional reactivity on falling reactivity, with good skills contributing to rate of recovery from emotional arousal mainly in highly emotional children. The latter finding is in line with prior studies showing that skillful regulation of attention and behavior has stronger implications for social competence in children with high emotionality than in children with moderate or low levels of emotionality (e.g., Eisenberg, Fabes et al., 2000). It appears that the advantages of having good cognitive resources for regulation become readily apparent mainly when there is a great deal of emotion to control and the task can be expected to tax the child's resources.

In children with high levels of positive emotional reactivity at T1, there was also longitudinal support for an association between gains in perspective-taking skills and improvement in the ability to down-regulate strong feelings. Thus, at T3, we found a positive link between perspective-taking ability and rate of recovery from strong positive emotions, even when controlling for earlier levels of these variables. This indicates that gains in perspective-taking skills between T1 and T3 were associated with improvement in the proficiency with which highly emotional children down-regulated positive emotions. We did not find a similar result for negative emotions. Thus, in children with high initial negative emotional reactivity relative to their peers at T1, longitudinal gains in perspective-taking capacity did not seem to improve their ability to down-regulate negative feelings. Rather, the relation between perspective taking and the ability to down-regulate negative feelings, which was established at T1, disappeared with age. It is possible that this outcome is related to the fact that, in general (as indicated by group averages), negative emotions were expressed at weaker intensities than positive emotions were. Thus, according to their teachers, most children in the present sample managed to keep their negative emotional reactivity at a relatively low level and, hence, did not face the demanding task of having to down-regulate frequent and strongly aroused, negative emotions. In contrast, it may be a continuing taxing task for many children throughout childhood to down-regulate strongly aroused feelings of joy and exuberance.

### *Limitations of the Present Study*

A major limitation of the present study is that measures of children's emotionality are restricted to the school context. Children develop different expectations regarding interpersonal responses to their emotional expressions in different social contexts and try to adapt their emotional behavior accordingly (Shipman, Zeman, Nesin, & Fitzgerald, 2003). This variability in emotional expression across contexts is reflected in the fact that teacher

ratings of children's emotionality tend to correlate rather modestly with ratings made by the children's parents (Eisenberg, Fabes et al., 2000). The present study focused on children's expression of emotions in the school setting, and the role their perspective-taking skills play in facilitating adaptation to this social context. In this setting, teachers can be considered to be fairly reliable informants because they observe the child's behavior on multiple occasions. The validity of their ratings, however, may not be equally high for all emotions. Teachers typically observe children in group situations, and therefore they probably have a more valid picture of children's regulation of exuberance and anger than they have of children's regulation of sadness and fear (Rydell, Thorell, & Bohlin, 2007).

For most of the participants, the same reporter provided information about emotionality at all time periods. To the extent that these reporters have stable, but inaccurate, perceptions of participants' emotionality, this may have inflated the estimates of interindividual consistency. However, there was only low to moderate stability in the individual's standing on emotionality relative to others across time in the present study, which is not a higher stability than expected in theoretical models of temperament (Goldsmith et al., 1987; Rothbart & Bates, 1998). Importantly, consistency was not lower for the substantial minority of children who were rated by different teachers at T1 and T3. Significant correlations across time for these children are important evidence of the validity of our teacher ratings.

INS dilemmas involve a child protagonist interacting with a "significant other" who is either familiar or unfamiliar to the child and who may or may not be of the same generation. In the present study, dilemmas included familiar and unfamiliar peers, but no dilemma involved interaction with an adult figure. Moreover, the scenarios we used depicted events taking place in a school setting. These are other factors that limit the generalizability of the present findings. Contextual variability in INS dilemma content influences children's level of reasoning (Adalbjarnardottir & Selman, 1989; Selman, Beardslee, Schultz, Krupa, &

Podorefsky, 1986; Yeates, Schultz, & Selman, 1991). However, although contextual variability may affect the average level of children's reasoning, intercorrelations between children's scores on different types of dilemmas tend to be moderate to high (Gurucharri & Selman, 1982; Yeates, Schultz, & Selman, 1991). This was the case also in the present study.

A basic assumption of the present research was that cultural standards determine how children use behavioral and cognitive skills to regulate emotion (Cole, Tamang, & Shrestha, 2006; Mesquita & Frijda, 1992). This view implies the possibility that the relation between perspective-taking skills and emotionality may be different across cultures. Accordingly, the present findings may be taken as evidence for an influence of perspective-taking skills on emotionality, but not as evidence for the universality of a fixed set of relationships between the two factors.

### *Conclusions and Future Prospects*

In summary, although the present study has several limitations and the size of the effects was often small, our longitudinal design provides relatively consistent support for the notion that developing social perspective-coordination skills contribute to children's capacity to modulate their emotions. The findings support earlier indications that children use cognitive strategies to manage emotions during middle and late childhood (Saarni, 1999; Stegge, & Meerum Terwogt, 2007). Developing perspective-taking capacities are likely to stimulate the use of cognitive strategies such as positive reappraisal and cognitive restructuring and promote metacognitive awareness of these strategies and their effects.

Our findings are important, not only for understanding emotion regulation in children, but also for providing new insights into the way perspective-coordination skills may influence social adjustment in a broader sense. Theoretically, there have been strong arguments and rationales for expecting perspective-taking skills to play an important role in children's and adolescents' social adjustment. However, researchers have often found weak and inconsistent

relations between INS scores and social behavior, which suggests that an indirect, rather than direct, path may exist between the two variables. Further investigation of the interaction between perspective taking and emotion processes could contribute to unravelling the processes that link perspective taking to social behavior and adjustment. For example, in future research, it would be interesting to explore how perspective-taking skills interact with emotionality in determining children's appraisal and coping styles (Lengua & Long 2002). Finally, because the current study focused on expressed emotion, we do not know whether perspective-taking skills have similar effects on children's experience of emotion. A replication of the present study based on children's self-reports of emotional experience would provide important information regarding the processes involved.

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Table 1

*Means and Standard Deviations of Study Variables at T1, T2 and T3*

| | Younger cohort | | | Older cohort | | |
|---|---|---|---|---|---|---|
| Measure | *N* | Mean | *SD* | *N* | Mean | *SD* |
| Perspective taking | | | | | | |
| T1 | 90 | 1.11 | 0.36 | 118[a] | 1.47 | 0.45 |
| T2 | 84[b] | 1.29 | 0.38 | 115 | 1.52 | 0.44 |
| T3 | 80 | 1.38 | 0.36 | 106[a] | 1.56 | 0.44 |
| Negative emotionality: | | | | | | |
| T1 Reactivity | 90 | 2.20 | 0.90 | 119 | 2.16 | 0.67 |
| T1 Falling reactivity | 90 | 4.04 | 0.83 | 119 | 3.99 | 0.69 |
| T2 Reactivity | 85 | 2.39 | 0.62 | 115 | 1.87 | 0.61 |
| T2 Falling reactivity | 85 | 3.90 | 0.56 | 115 | 4.26 | 0.53 |
| T3 Reactivity | 80 | 2.12 | 0.69 | 107 | 1.99 | 0.66 |
| T3 Falling reactivity | 80 | 4.06 | 0.54 | 107 | 4.20 | 0.57 |
| Positive emotionality: | | | | | | |
| T1 Reactivity | 90 | 2.67 | 1.00 | 119 | 3.07 | 0.78 |
| T1 Falling reactivity | 90 | 3.99 | 0.87 | 119 | 4.01 | 0.79 |
| T2 Reactivity | 85 | 2.88 | 0.68 | 115 | 2.91 | 0.65 |
| T2 Falling reactivity | 85 | 3.88 | 0.65 | 115 | 4.06 | 0.65 |
| T3 Reactivity | 80 | 2.56 | 0.80 | 107 | 2.88 | 0.73 |
| T3 Falling reactivity | 80 | 4.05 | 0.62 | 107 | 4.06 | 0.65 |

[a]Missing data for one child who was too silent to carry through the interview. [b]Missing data for one child due to technical problems.

Table 2

*Intercorrelations Among Measures at T1, T2 and T3*

| Measures of social functioning | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| T1 | | | | | |
| 1. Perspective taking | - | .12 | .00 | .12 | -.03 |
| 2. NE Reactivity | -.13 | - | -.81*** | .77*** | -.75*** |
| 3. NE Falling reactivity | .22* | -.62*** | - | -.62*** | .82*** |
| 4. PE Reactivity | -.12 | .49*** | -.39*** | - | -.83*** |
| 5. PE Falling reactivity | .23* | -.50*** | .84*** | -.54*** | - |
| T2 | | | | | |
| 1. Perspective taking | - | .11 | -.04 | .16 | -.02 |
| 2. NE Reactivity | -.04 | - | -.84*** | .55*** | -.69*** |
| 3. NE Falling reactivity | -.02 | -.79*** | - | -.43*** | .79*** |
| 4. PE Reactivity | .05 | .36*** | -.37*** | - | -.69*** |
| 5. PE Falling reactivity | .04 | -.39*** | .54*** | -.65*** | - |
| T3 | | | | | |
| 1. Perspective taking | - | .20 | -.19 | .24* | -.14 |
| 2. NE Reactivity | .03 | - | -.90*** | .82*** | -.78*** |
| 3. NE Falling reactivity | .01 | -.75*** | - | -.77*** | .81*** |
| 4. PE Reactivity | .01 | .05 | -.09 | - | -.81*** |
| 5. PE Falling reactivity | .18 | -.39*** | .72*** | -.41*** | - |

*Note*. NE = negative emotionality, PE = positive emotionality. The younger cohort's correlations are above the diagonal, and the older cohort's below.

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

Table 3

*Hierarchical Regression Analyses of Perspective taking Predicting Deviation in Emotional Reactivity at T1, T2 and T3*

| | T1 | | | T2 | | | T3 | | |
|---|---|---|---|---|---|---|---|---|---|
| Predictor | $\Delta R^2$ | B (*SE*) | β | $\Delta R^2$ | B (*SE*) | β | $\Delta R^2$ | B (*SE*) | β |
| *Deviation in Positive Emotional Reactivity* | | | | | | | | | |
| Step 1 | .06*** | | | .01 | | | .02 | | |
| Age | | -.14 (.04) | -.22** | | -.03 (.05) | -.04 | | -.02 (.05) | -.04 |
| Sex | | -.17 (.09) | -.13 | | -.11 (.09) | -.09 | | -.17 (.09) | -.14 |
| Step 2 | .04** | | | .03** | | | .03* | | |
| PT | | -.04 (.01) | -.21** | | -.04 (.01) | -.19** | | -.04 (.01) | -.19* |
| *Deviation in Negative Emotional Reactivity* | | | | | | | | | |
| Step 1 | .06** | | | .00 | | | .00 | | |
| Age | | -.14 (.04) | -.24*** | | .02 (.03) | .04 | | -.00 (.04) | -.00 |
| Sex | | .02 (.08) | .02 | | -.02 (.06) | -.03 | | -.05 (.09) | -.04 |
| Step 2 | .03** | | | .00 | | | 02* | | |
| PT | | -.03 (.01) | -.19** | | -.01 (.01) | -.05 | | -.03 (.01) | -.15* |

*Note*. PT = perspective taking.

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

Table 4

*Prediction of T3 Deviation in Emotional Reactivity from T1 and T3 Perspective-taking Skills While Controlling for T1 Deviation in Emotional Reactivity*

| | DER at T3 | | | | | |
|---|---|---|---|---|---|---|
| | positive emotions | | | negative emotions | | |
| Predictor | $\Delta R^2$ | B (*SE*) | β | $\Delta R^2$ | B (*SE*) | β |
| Step 1 | .11*** | | | .08** | | |
| Control variables[a] | | | | | | |
| Step 2 | .04** | | | .01 | | |
| PT at T1 | | -.04 (.01) | -.22** | | -.00 (.01) | -.01 |
| Step 3 | .00 | | | .02* | | |
| PT at T3 | | -.01 (.02) | -.06 | | -.03 (.02 ) | -.18* |

*Note*. DER = the absolute value of each child's centered score for emotional reactivity.

[a]Control variables included age, sex, DER at T1.

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

Table 5

*Regression Analyses: Relations of Perspective Coordination and Emotional Reactivity to Falling Reactivity at T1, T2 and T3*

| | T1 | | | T2 | | | T3 | | |
|---|---|---|---|---|---|---|---|---|---|
| Predictor | $\Delta R^2$ | B (*SE*) | β | $\Delta R^2$ | B (*SE*) | β | $\Delta R^2$ | B (*SE*) | β |
| | | | | *Falling reactivity for positive emotions* | | | | | |
| Step 1 | .48*** | | | .49*** | | | .35*** | | |
| Age | | .14 (.04) | .17** | | .10 (.03) | .15** | | .08 (.04) | .13* |
| Sex | | .06 (.08) | .04 | | .19 (.07) | .15** | | .12 (.08) | .09 |
| ER | | -.64 (.05 ) | -.71*** | | -.66 (.05) | -.67*** | | -.50 (.05) | -.60*** |
| Step 2 | .01* | | | .00 | | | .01 | | |
| PT | | .03 (.01) | .13* | | .01 (.01) | .06 | | .02 (.01) | .11 |
| Step 3 | .02** | | | .00 | | | .03** | | |
| PT X ER | | .04 (.01) | .15** | | .02 (.02) | .06 | | .04 (.02) | .18** |
| | | | | *Falling reactivity for negative emotions* | | | | | |
| Step 1 | .53*** | | | .69*** | | | .67*** | | |
| Age | | -.04 (.04) | -.05 | | -.01 (.03) | -.01 | | .02 (.03) | .04 |
| Sex | | .08 (.07) | .06 | | -.03 (.05) | -.03 | | .05 (.05) | .04 |
| ER | | -.71 (.05) | -.73*** | | -.72 (.04) | -.83*** | | -.68 (.04) | -.81*** |

(Continued)

(Table 5 continued)

| | T1 | | | T2 | | | T3 | | |
|---|---|---|---|---|---|---|---|---|---|
| Predictor | $\Delta R^2$ | B (*SE*) | β | $\Delta R^2$ | B (*SE*) | β | $\Delta R^2$ | B (*SE*) | β |
| Step 2 | .01* | | | .00 | | | .00 | | |
| PT | | .02 (.01) | .11* | | -.00 (.01) | -.01 | | .00 (.01) | .01 |
| Step 3 | .01* | | | 01** | | | .00 | | |
| PT X ER | | .03 (.01) | .12* | | .03 (.01) | .11** | | -.01 (.01) | -.03 |

*Note*. PT = perspective taking, ER = Emotional Reactivity.

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

Table 6

*Prediction of T3 Falling Reactivity from T1 and T3 Perspective-taking Skills While Controlling for T1 Falling Reactivity and Emotional Reactivity at T1 and T3*

| | Falling reactivity at T3 | | | | | |
|---|---|---|---|---|---|---|
| | positive emotions | | | negative emotions | | |
| Predictor | $\Delta R^2$ | B (*SE*) | β | $\Delta R^2$ | B (*SE*) | β |
| Step 1 | .47*** | | | .72*** | | |
| Control variables[a] | | | | | | |
| Step 2 | .01 | | | .02** | | |
| Pt at T1 | | .00 (.01) | -.00 | | -.01 (.01) | -.09* |
| PT X ER at T1 | | -.02 (.01) | -.08 | | -.03 (.01) | -.12** |
| Step 3 | .03* | | | .00 | | |
| PT at T3 | | .02 (.01) | .09 | | .00 (.01) | .01 |
| PT X ER at T3 | | .04 (.02) | .15* | | -.02 (.019 | -.06 |

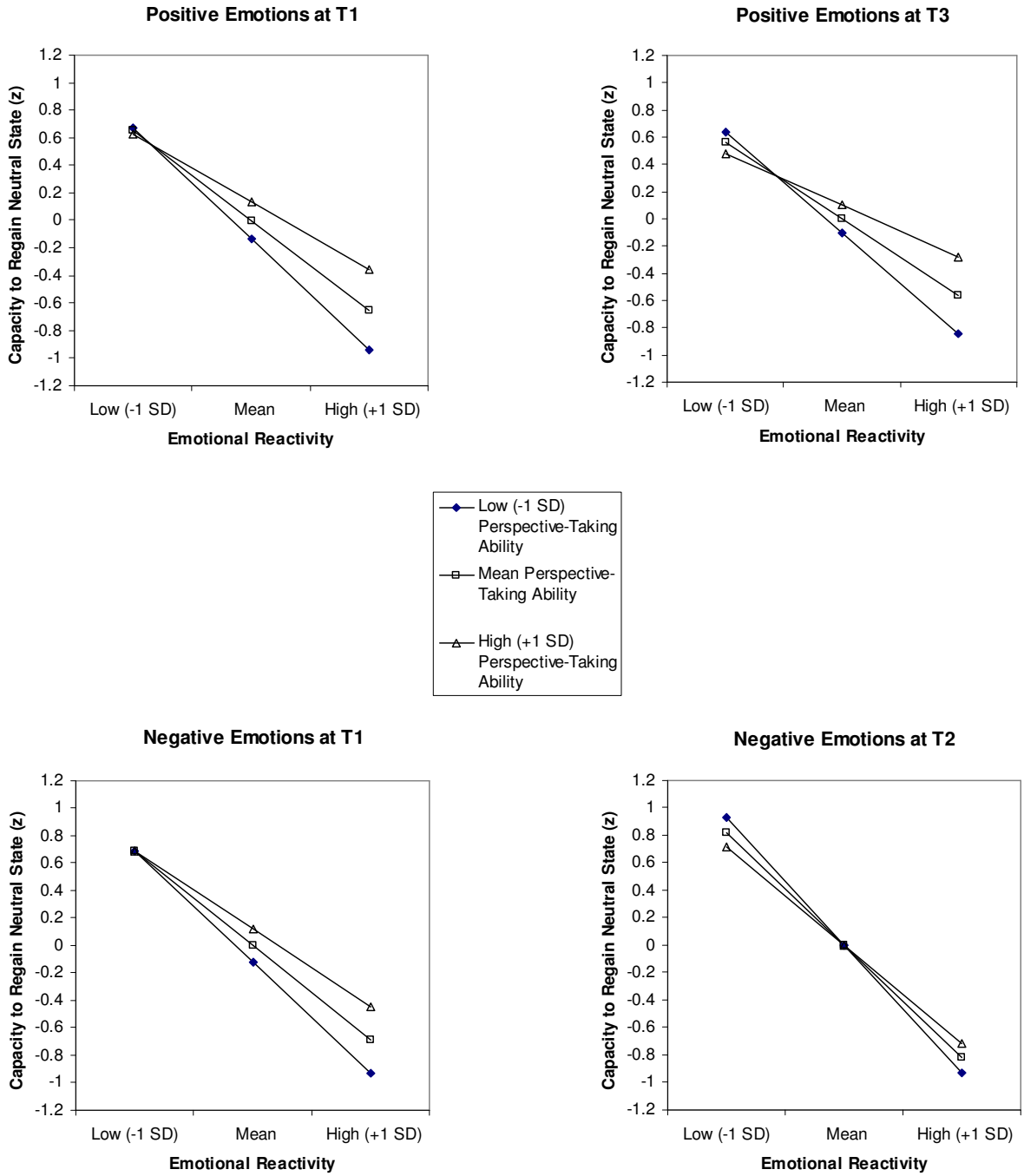
*Note*. PT = perspective taking, ER = Emotional Reactivity.

[a]Control variables included age, sex, ER at T1, ER at T3, falling reactivity at T1.

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

Figure Caption

Figure 1. A graphical presentation of the statistically significant interactions of (a) positive emotional reactivity and perspective taking in relation to falling reactivity at T1 and T3, and (b) negative emotional reactivity and perspective taking in relation to falling reactivity at T1 and T2.


Positive Emotions at T1
Positive Emotions at T3
Capacity to Regain Neutral State (z)
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
Low (-1 SD)
Mean
High (+1 SD)
Emotional Reactivity
Low (-1 SD) Perspective-Taking Ability
Mean Perspective-Taking Ability
High (+1 SD) Perspective-Taking Ability
Negative Emotions at T1
Negative Emotions at T2