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Individual differences in infant attention skills, joint attention, and emotion regulation behaviour

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This study examined the concurrent and predictive relations between infant attention skills, joint attention, and emotion regulation. Infants' gaze following skills and duration of orienting were assessed at 6 months of age, and collaborative joint attention and emotion regulation skills were assessed at 24 months of age. The results indicated that infants' ability to follow direction of gaze at 6 months was significantly correlated with emotion regulation strategy use at 24 months of age, and that collaborative joint attention at 24 months was significantly correlated with emotion regulation strategy use at 24 months of age. The results of this study are consistent with previous research finding associations between collaborative joint attention and children's emotion regulation behaviour. These data also suggest that children's preexisting visual attention skills may contribute to their ability to regulate emotion.

Parents are viewed as the primary contributors to the development of children's ability to regulate emotion (Bridges & Grolnick, 1995; Cassidy, 1994; Kobak & Sceery, 1988; Kopp, 1989; Thompson, 1994; Tronick, 1989). Research has demonstrated that parental responses to infant emotional behaviour influence the type of emotion expressed by infants (Grolnick, Kurowski, McMenamy, Rivkin, & Bridges, 1998; Grossman, Grossman, & Schwan, 1986; Malatesta & Haviland, 1982), as well as the types of behaviours used by infants to regulate emotion (Braungart & Stifter, 1991; Cohn & Tronick, 1989). A variety of perspectives exist concerning how parents might contribute to the development of emotion regulation. For example, theorists have proposed that caregivers influence emotion regulation through the sensitivity and responsiveness of their interactive behaviour during the first year of life (Cassidy, 1994; Tronick, 1989), and through the direct and indirect feedback provided to children about the effectiveness of emotion regulation strategies in meeting social and emotional goals (Thompson, 1994).

More recently, researchers have examined behavioural mechanisms within joint attention contexts that may influence socioemotional development. Of particular interest for the current research was a study conducted by Raver (1996) to investigate the importance of social contingency in the development of emotion regulation. Following Dunham and Dunham (1995), Raver proposed that social contingency within joint attention may provide an optimal social structure for the development of emotion regulation skills. More specifically, Raver suggested that ''socially contingent interaction with parents may provide toddlers with important self-regulatory skills such as directing attention away from sources of distress'' (p. 851). An important finding in her study was that 2-year-old children who spent more time in joint focus with their mothers during a free-play session were indeed better able to use self-directed regulatory strategies (e.g., self-distraction) when confronted with a distressing situation, and spent less time seeking parental assistance to regulate distress, thus partially confirming her hypothesis. As noted by Raver, however, one limitation of her study was that a cross-sectional design was used. As such, questions remain regarding the contributions of children's preexisting visual attention skills to emotion regulation.

Although social contingency and joint attention may provide an optimal social structure for the development of emotion regulation, a skills approach would also suggest that differences in children's attentional behaviour may need to be considered when examining the development of emotion regulatory skills (Mundy & Gomes, 1997). The skills approach focuses on how individual differences among young children in the development of nonverbal communication skills may contribute to socioemotional and cognitive outcomes. Utilising this approach, researchers have shown that infant's ability to follow the line of adult's visual regard is related to language acquisition (Morales et al., 2000a), as well as behavioural outcome in typically (Morales, 1999) and atypically developing populations of children (Sheinkopf, Mundy, Claussen, & Willoughby, 2002). Consistent with a skills approach, Raver suggested an alternative explanation for her findings may be that children who demonstrate superior preexisting attentional skills may be better able to distract themselves when faced with a source of distress than children who demonstrate these skills to a lesser degree. This hypothesis is consistent with theory suggesting the importance of attention for emotion regulation. However, it is interesting to note that to date, no longitudinal research has focused on the linkage between early attentional skills and later developing emotion regulation skills. Thus, the

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current study provides information on an important, yet neglected, area in the literature examining the development of emotion regulation skills.

The purpose of the current study was twofold. First, our study was designed to provide further examination of the associations between joint attention and emotion regulation. It was predicted that children who engaged in joint attention with their parents for longer periods of time would use more self-directed emotion regulation strategies during a frustrating situation than would children who spent less time engaged in joint attention with their parents. To investigate this hypothesis, joint attention was assessed during one of two delay situations. During the delay situation, children had to wait to obtain an object of interest and parents were allowed to interact with their child as they wished (parent-active situation). By examining joint attention within a context that required children to regulate their emotion, we were able to evaluate how individual differences in joint attention behaviour were related to children's emotion regulation behaviour in the second delay situation in which children were required to regulate emotion more independently. During the second delay situation, children again had to wait for an object of interest; however, parents were asked to remain passive while completing a predetermined task (parent-passive situation).

A second goal of our study was to examine the prediction that preexisting attentional skills would be related to children's emotion regulation strategy use. To explore this hypothesis, infants' attentional skills were assessed in two ways. First, infants' gaze-following skills were assessed using a joint attention paradigm developed by Scaife and Bruner (1975) to examine the age of onset of joint attention skills. This procedure began with parents engaging in a face-to-face interaction with their infants, followed by the parents turning and looking in a prespecified direction. Infant responses to their parent's looking behaviour were then noted. In prior work using this paradigm, infant gaze-following skills were related to cognitive (Morales, Mundy, Delgado, Yale, Neal, & Schwartz, 2000b) and behavioural outcome (Morales, 1999; Sheinkopf et al., 2002), thus suggesting that gaze following during infancy may provide a meaningful early index of attention skills. Second, infant attention skills were assessed using a parent-report measure of infant orienting behaviour, or infant's duration of orienting. Past research has shown that duration of orienting may be related to emotionality. For example, in one study, infants who demonstrated longer durations of orienting were found to be less labile in state (Strauss & Rourke, 1978), while in a second study, those who more easily disengaged their attention were found to show lower levels of distress (Johnson, Posner, & Rothbart, 1991). Using these measures of attention, we examined the relations between infant attention skills and later emotion regulation behaviour. It was predicted that children who demonstrated superior attentional skills during infancy, would use more self-directed emotion regulation strategies than would infants who demonstrated less sophisticated attentional skills.

Method

Participants

Participants included 22 children aged 24 months (9 girls, 13 boys) and their mothers who were participating in a larger longitudinal study of nonverbal communication skills. These participants were selected because all of the measures of interest (i.e., 6-month and 24-month measures) were available for this group. The current sample did not differ from the larger longitudinal sample on the characteristics of parent's level of education, marital status, parent's age, or number of children in the household. Children's ability to follow the direction of gaze, referred to here as responding to joint attention (RJA), and their duration of orienting were assessed when they were 6 months of age ($M = 6.29$, $SD = 0.21$). Collaborative joint attention (CJA) and emotion regulation (ER) were assessed when children were 24 months of age ($M = 24.25$, $SD = 0.26$). Children came from two-parent middle- to upper-middle-class families. Six children were white (non-Hispanic), 3 children were Hispanic, and 13 were of multi-ethnic background (10 Hispanic & Anglo, 3 African American & Anglo).

Procedure

Responding to joint attention was assessed using a modified version of the Early Social Communication Scales RJA Task (for details, see Mundy, Hogan, & Doehring, 1996). This procedure is based on the joint attention paradigm initially developed by Scaife and Bruner (1975). During the RJA task, infants were seated in a high chair, and the parent was seated facing her infant. Mothers were then instructed to present three consecutive trials to their infant in which they turned and fixated a target that was 90 degrees to the right or left of the infant, or 180 degrees behind the infant. During each head turn trial, parents said their child's name emphatically three times, but they maintained their gaze on the referent target throughout the trial. After each trial, mothers returned their gaze to midline before executing the next trial. Each session was videotaped for later coding of responding to joint attention.

Duration of orienting was assessed using the Infant Behavior Questionnaire (IBQ). The IBQ is a 94-item parent-report questionnaire designed to assess six dimensions of temperament in 3- to 12-month-old infants (for psychometric information on IBQ, please see Rothbart, 1981). Duration of orienting is defined as children's vocalisations, looking behaviour, and/or interaction with a single object for any extended period of time when no sudden changes in stimulation have occurred. The IBQ presents parents with descriptions of common situations that elicit behaviours related to each dimension of temperament. Parents are then asked to rate the frequency with which their child engages in these behaviours on a Likert-type scale that ranges from *Never does this* (1) to *Always does this* (7).

Emotion regulation behaviour was assessed using a laboratory procedure that consisted of placing children in two mildly frustrating forced-delay situations (for details, see Morales & Bridges, 1996). During each situation children were presented with an attractive object (either food or a wrapped gift) and required to wait 6 minutes to obtain it. Following presentation of the object, it was placed on a shelf out of the child's reach, yet within the child's view. In one situation, the parent-active condition, mothers were instructed to interact with their child as they wished, with the only restriction being that they should not retrieve the stimulus object for their child. During the other situation, the parent-passive condition, mothers were asked to fill out questionnaires and to interact with their child as little as

possible. Toys were available to the child and parent during each situation. Each situation was videotaped for later coding of emotion regulation behaviour. Collaborative joint attention was assessed during the parent-active condition of the forced delay situations.

Independent coders rated videotaped sessions for RJA, ER, and CJA. Responding to joint attention was defined as the percentage of six trials on which an infant correctly turned his or her visual regard in the same direction as the visual regard of the parent. A sample of 10 participants was randomly selected for reliability coding. Paired sample correlations calculated for first correct and first incorrect infant response were $r(10) = .99$, $p < .0001$, and $r(10) = .94$, $p < .0001$, respectively.

Emotion regulation behaviour was assessed using a coding system developed by Grolnick, Bridges, and Connell (1996). Seven different behavioural strategies were coded including active play alone (e.g., using toy for intended purpose, other task-directed play), active engagement of the parent (e.g., attempts to get the parent to play, ongoing reciprocal activity with parent), low-level play alone (e.g., looking at toys or objects in the room, wandering around the room), self-soothing physical (e.g., mouthing hands, clothing, hugging, mouthing a toy or object), passive focus on delay object (e.g., looks at frustration object from a distance, points at object), active attempts to retrieve delay object (e.g., tries to retrieve frustration object, calls for parental assistance), and comfort-seeking (e.g., touching parent, primarily includes proximal forms of comfort seeking behaviours directed toward the parent). Emotion regulation strategy use was rated within 5-second intervals across the first 5 minutes of the delay situations. Multiple ER strategies were possible in the same interval. Summary scores used in data analyses consisted of the percentage of intervals (of a total of 60 intervals per situation per subject) containing each specific regulatory strategy. Based on a random subsample of five participants, Cohen's Kappas were computed. Overall Kappa coefficients for strategy codings were parent-active = .97, and parent-passive = .98. A measure of latency to retrieve the delay object was also obtained during the delay situations. This measure consisted of the number of seconds from the beginning of each session before a child attempted to obtain the delay object (e.g., tries to reach object, asks parent to obtain object).

Collaborative joint attention was defined as instances in which parent and child were visually focused on the same toy for at least 2 seconds and in which children indicated awareness of their joint focus by periodically looking toward the parent's face, or by talking about the object of joint focus. The behavioural indicators of looking toward the parent, or talking to the parent about the object to demonstrate an awareness of joint focus, were used to help ensure that what was deemed joint attention was the more social-cognitive construct rather than what might be better characterised as gaze-following behaviour on the part of the child (Tomasello, 1995). Collaborative joint attention was computed from onset and offset times during the first 5 minutes of the parent-active delay situation. A sample of 10 participants was randomly selected for reliability coding. Paired sample correlations calculated for onset, offset, and duration of CJA were $r(10) = .97$, $p < .0001$, $r(10) = .93$, $p < .0001$, and $r = .99$, $p < .0001$, respectively. Descriptive statistics for ER, duration of orienting, RJA, and CJA are presented in Table 1.

Table 1

Means and standard deviations of emotion regulation behaviour, responding to joint attention, duration of orienting, and collaborative joint attention

Variable	*M*	*SD*
Emotion regulation, parent-active situation		
Active play alone	6.67	9.92
Active engagement of parent	42.82	23.22
Low-level play alone	6.52	6.67
Self-soothing physical	6.21	12.37
Passive focus on delay object	2.28	4.26
Active attempt to retrieve delay object	7.88	10.53
Comfort-seeking	20.85	28.99
Latency to attempt to retrieve delay object	152.50	135.74
Emotion regulation, parent-passive situation		
Active play alone	10.00	16.73
Active engagement of parent	5.60	8.03
Low-level play alone	26.29	18.37
Self-soothing physical	9.55	10.08
Passive focus on delay object	7.05	6.82
Active attempt to retrieve delay object	13.26	13.67
Comfort-seeking	36.74	33.94
Latency to attempt to retrieve delay object	108.18	121.74
Attention measures		
Responding to joint attention	22.98	21.50
Duration of orienting	4.30	0.93
Dyadic measure		
Collaborative joint attention	96.55	62.43

Results

Pearson correlation coefficients were computed to examine the relationship between emotion regulation strategy use, each measure of attention, and CJA. Also, because of the variability that existed in strategy use among children, nonparametric correlation coefficients (i.e., Spearman's Rank-correlation coefficients) were computed to attenuate the effect that outliers may have had on the Pearson *r*s in this small sample. The results of each of these analyses are presented in Table 2. The findings indicated that CJA at 24 months was significantly related to emotion regulation strategy use during the parent-passive delay situation. Children who spent more time in joint attention during the parent-active episode were more likely to use active regulation strategies, and to gaze at the delay object during the parent-passive delay. These children were less likely to engage in low-level play, and showed a tendency to not engage in self-soothing physical behaviours and to wait longer before attempting to retrieve the delay object.

Infants' ability to follow direction of gaze and duration of orienting at 6 months were also significantly correlated with emotion regulation strategy use at 24 months of age. Children who demonstrated a greater capacity to follow direction of gaze were more likely to use active play strategies during the parent-active delay episode. Moreover, there was a tendency for these children to not use comfort-seeking and for them to wait longer before attempting to retrieve the delay object during the parent-active episode. In respect to duration of orienting, children whose parents reported that they spent more time focused on a single object were less likely to engage in low-level play, more likely to focus on the frustration object, and more likely to seek comfort from their parent during the parent-passive episode. These children also showed a tendency to not

Table 2
Predictive and concurrent correlations between responding to joint attention, duration of orienting, collaborative joint attention, and emotion regulation strategy use[a]

Variable	*RJA*	*Orienting*	*CJA*
Emotion regulation, parent-active situation			
Active play alone	.47* (.50**)	.22 (.18)	
Active engagement of parent	.15 (.08)	.27 (.06)	
Low-level play alone	.21 (–.01)	–.29^{+} (–.25)	
Self-soothing physical	–.27 (–.16)	–.19 (–.12)	
Passive focus on delay object	.12 (.17)	.02 (.13)	
Active attempt to retrieve delay object	.06 (–.03)	–.32^{+} (–.14)	
Comfort-seeking	–.32^{+} (–.37*)	.15 (–.03)	
Latency to attempt to retrieve delay object	.31^{+} (.15)	.05 (.02)	
Emotion regulation, parent-passive situation			
Active play alone	–.02 (.05)	–.21 (–.54**)	.50** (.44*)
Active engagement of parent	.05 (.04)	–.12 (–.07)	.34^{+} (.39*)
Low-level play alone	–.20 (–.24)	–.44* (–.46*)	–.50** (–.55**)
Self-soothing physical	.01 (–.01)	.17 (.18)	–.31^{+} (–.36*)
Passive focus on delay object	.19 (.13)	.41* (.37*)	.37* (.36*)
Active attempt to retrieve delay object	–.11 (–.13)	–.14 (–.27)	–.22 (–.16)
Comfort-seeking	.16 (.21)	.48* (.35^{+})	.16 (.19)
Latency to attempt to retrieve delay object	.15 (.34)	.20 (.00)	.31^{+} (.20)
Attention measures			
Responding to joint attention	–	.21 (.13)	.07 (.16)
Orienting	–	–	.08 (.07)

[a] Spearman Rank correlation coefficients are in parentheses.
$^{+}p < .10$, $*p < .05$, $**p < .01$.

engage in low-level play and to not try to retrieve the frustration object during the parent-active situation.

No significant associations were found between RJA at 6 months, duration of orienting at 6 months, and CJA at 24 months. However, two of the emotion regulation strategies during the parent-passive situation, low-level play alone and passive focus on the delay object, were correlated with both duration of orienting and CJA. Hierarchical linear regression analyses indicated that duration of orienting and CJA together predicted low-level play alone, $R = 0.64$, $R^2 = 0.41$, $F(2, 19) = 6.54$, $p < .01$, and passive focus on delay object, $R = 0.53$, $R^2 = 0.28$, $F(2, 19) = 3.66$, $p < .05$. Regression coefficients for these two variables indicated that duration of orienting and CJA contributed equally to the prediction of low-level play alone (duration of orienting, $B = -0.40$, $p < .05$; CJA, $B = -0.46$, $p < .05$) and passive focus on delay object (duration of orienting, $B = 0.37$, $p < .10$; CJA, $B = 0.34$, $p < .10$).

Discussion

The primary goals of this study were to provide a reexamination of the association between joint attention and emotion regulation, and to examine the contribution of preexisting attention skills to children's ability to regulate emotion. In respect to the first goal, the results of this study provided a partial replication of Raver's (1996) findings. In her study, she found that children who engaged in more collaborative joint attention with their mothers during a free-play situation were more likely to actively deploy their attention away from a delay object to other objects in the room and were less likely to seek comfort from their parent during the delay situation. Consistent with this finding, we found that children who spent more time engaged in collaborative joint attention during the parent-active delay task were more likely to deploy their attention away from the delay object to other objects in the room. However, no association was found between collaborative joint attention and comfort-seeking behaviour. Additionally, we found that children who spent more time in collaborative joint attention were also more likely to try to initiate play with the parent, and to gaze at the delay object, but were less likely to engage in low-level play and self-soothing physical behaviour. Given the connections between collaborative joint attention and emotion regulation behaviour, the current findings provide additional support for the suggestion that parents who establish and maintain shared attention on objects during interaction may promote the development of children's ability to use their own attention to modulate distress (Dunham & Dunham, 1995; Raver, 1996).

The second question addressed by this study was whether or not children's preexisting attention skills might contribute to their ability to regulate emotion. Interestingly, findings indicated that there may be a significant line of continuity between differences in the early development of infant's skill in establishing joint attention with others and later competence in self-regulation. Consistent with our hypothesis, children who, at 6 months of age, were better able to follow the direction of their mother's gaze, demonstrated more independent active play or self-directed emotion regulation behaviour, and less comfort-seeking behaviour at 2 years of age than those who were less able to follow the direction of their mother's gaze. However, in contrast to our prediction, duration of orienting was significantly related to comfort-seeking behaviour in the parent-passive condition. One reason that duration of orienting may have been related to comfort-seeking behaviour was because children who show longer durations of orienting also focused more on the delay object. Focusing on the delay object is considered a less optimal strategy than directing attention

away from the delay object as the former behaviour could increase children's distress (Grolnick et al., 1996). Consistent with this suggestion, the ability to disengage attention has been associated with lower levels of distress in 4-month-old infants (Johnson et al., 1991), and the ability to shift attention away from highly arousing stimuli was associated with lower levels of negative affect in 13.5-month-old infants (Rothbart, Zaiae, & O'Boyle, 1992). In the current study, post hoc analyses showed a significant association between passive focus on the delay object and comfort-seeking behaviour ($r = 0.51$, $p < .05$), suggesting that increased distress could have led children to seek out the parent for comfort.

In summary, the results of this study add to a growing body of research suggesting that children's preexisting attention skills may contribute to early socioemotional development. Perhaps children's visual attention skills allow them to more easily follow changes in their care-giver's visual regard earlier in life, providing them with greater experience in utilising self-distraction as an emotion regulation strategy. Alternatively, the ability to follow the visual regard of others or to focus on one aspect of the environment for an extended period of time may involve emotion and attention regulation processes (Kawashima et al., 1999). However, future research using larger samples will be necessary to examine these questions more fully, as well as to answer questions regarding potential cultural differences in the relationship between children's attentional behaviour and emotion regulation. Until then, the results of this study provide an interesting first step in exploring the contribution of early developing attentional skills to socio-emotional development.

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References

Braungart, J. M., & Stifter, C. A. (1991). Regulation of negative reactivity during the strange situation: Temperament and attachment in 12-month-old infants. *Infant Behavior and Development*, *14*, 349–364.

Bridges, L. J., & Grolnick, W. S. (1995). The development of emotional self-regulation in infancy and early childhood. In N. Eisenberg (Ed.), *Social development* (pp. 185–211). Thousand Oaks, CA: Sage.

Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. In N. Fox (Ed.), The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development*, *59* (2–3, Serial No. 240), 228–249.

Cohn, J. F., & Tronick, E. Z. (1989). Specificity of infant's response to mother's affective behavior. *Journal of the American Academy of Child and Adolescent Psychiatry*, *28*, 242–248.

Dunham, P., & Dunham, F. (1995). Optimal social structures and adaptive infant development. In C. Moore & P. J. Dunham (Eds.), *Joint attention: Its origins and role in development* (pp. 159–188). Hillsdale, NJ: Lawrence Erlbaum Associates Inc.

Grolnick, W. S., Bridges, L. J., & Connell, J. P. (1996). Emotion regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child Development*, *67*, 928–941.

Grolnick, W. S., Kurowski, C. O., McMenamy, J. M., Rivkin, I., & Bridges, L. J. (1998). Mother's strategies for regulating their toddler's distress. *Infant Behavior and Development*, *21*, 437–450.

Grossmann, K. E., Grossmann, K., & Schwan, A. (1986). Capturing the wider view of attachment: A reanalysis of Ainsworth's strange situation. In C. E. Izard & P. B. Read (Eds.), *Measuring emotions in infants and children* (pp.124–171). New York: Cambridge University Press.

Johnson, M. H., Posner, M. I., & Rothbart, M. K. (1991). Components of visual orienting in early infancy: Contingency learning, anticipatory looking, and disengaging. *Journal of Cognitive Neuroscience*, *3*, 335–344.

Kawashima, R., Sugiura, M., Takashi, K., Nakamura, A., Hatano, K., Ito, K., Fukuda, H., Kojima, S., & Nakamura, K. (1999). The human amygdala plays an important role in gaze monitoring: A PET study. *Brain*, *122*, 779–783.

Kobak, R. R., & Sceery, A. (1988). Attachment in late adolescence: Working models, affect, regulation, and perception of self and others. *Child Development*, *59*, 135–146.

Kopp, C. B. (1989). Regulation of distress and negative emotions: A developmental view. *Developmental Psychology*, *25*, 343–354.

Malatesta, C. Z., & Haviland, J. M. (1982). Learning display rules: The socialization of emotion expression in infancy. *Child Development*, *53*, 991–1003.

Morales, M. (1999, April). *Responding to joint attention and behavioral outcome in a typically developing sample*. Poster session presented at the Biennial Meeting of the Society for Research in Child Development, Albuquerque, NM.

Morales, M., & Bridges, L. J. (1996). Associations between nonparental care experience and preschooler's emotion regulation in the presence of the mother. *Journal of Applied Developmental Psychology*, *17*, 577–596.

Morales, M., Mundy, P., Delgado, C. E. F., Yale, M., Messinger, D., Neal, R., & Kern, H. (2000a). Responding to joint attention across the 6- to 24-month age period and early language acquisition. *Journal of Applied Developmental Psychology*, *21*, 283–298.

Morales, M., Mundy, P., Delgado, C. E. F., Yale, M., Neal, R., & Schwartz, H. K. (2000b). Gaze following, temperament, and language development in 6-month-olds: A replication and extension. *Infant Behavior and Development*, *23*, 231–236.

Mundy, P., & Gomes, A. (1997). A skills approach to communication development: Lessons learned from research with children with developmental disabilities. In L. Adamson & M. Romski (Eds.), *Research on communication and language disorders* (pp. 107–132). New York: Paul Brooks.

Mundy, P., Hogan, A., & Doehring, P. (1996). *A preliminary manual for the abridged Early Social-Communication Scales*. Coral Gables, FL: University of Miami [www.psy.miami.edu/ faculty/pmundy].

Raver, C. C. (1996). Relations between social contingency in mother–child interaction and 2-year-olds' social competence. *Developmental Psychology*, *32*, 850–859.

Rothbart, M. K. (1981). Measurement of temperament in infancy. *Child Development*, *52*, 569–578.

Rothbart, M. K., Ziaie, H., & O'Boyle, C. G. (1992). Self-regulation and emotion in infancy. In N. Eisenberg & R. A. Fabes (Eds.), *New directions for child development: Vol. 55. Emotion and its regulation in early development* (pp. 7–23). San Francisco: Jossey-Bass.

Scaife, M., & Bruner, J. S. (1975). The capacity for joint visual attention in the infant. *Nature*, *253*, 265–266.

Sheinkopf, S., Mundy, P., Claussen, A., & Willoughby, J. (2002). *Infant joint attention skill and preschool behavioral outcomes in at-risk children*. Manuscript submitted for publication.

Strauss, M. E., & Rourke, D. L. (1978). A multivariate analysis of the Neonatal Behavioral Assessment scale in several samples. In A. J. Sameroff (Ed.), Organization and stability of newborn behavior: A commentary on the Brazelton Neonatal Behavior Assessment Scale (pp. 81–91). Monographs of the Society for Research in Child Development, 43(5–6, Serial No. 177).

Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. Fox (Ed.), The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development, 59* (2–3, Serial No. 240), 25–52.

Tomasello, M. (1995). Joint attention as social cognition. In C. Moore & P. J. Dunham (Eds.), *Joint attention: Its origins and role in development* (pp. 103–130). Hillsdale, NJ: Lawrence Erlbaum Associates Inc.

Tronick, E. Z. (1989). Emotions and emotional communication in infants. *American Psychologist*, *44*, 112–119.