Published in final edited form as:
Infancy. 2013 September 1; 18(5): . doi:10.1111/infa.12003.

Developmental Trajectories of Emotion Regulation Across Infancy: Do Age and the Social Partner Influence Temporal Patterns?

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Abstract

The ability to effectively regulate emotions is a critical component of early socio-emotional development. This longitudinal study examined the developmental trajectories of emotion regulation in a sample of 3-, 5-, and 7-month-olds during an interaction with mothers and fathers. Infants' negative affect and use of behavioral strategies, including distraction, self-soothing, and high intensity motor behaviors were rated during the still-face episode of the Still-Face Paradigm. Longitudinal mixed-effects models were tested to determine whether strategies were followed by an increase or decrease in negative affect. Results from mother-infant and father-infant dyads indicated that focusing attention away from the unresponsive parent and engaging in self-soothing behaviors were associated with a subsequent decline in negative affect and the strength of these temporal associations were stable across infancy. In contrast, high-intensity motor behaviors were followed by an increase in negative affect and this effect declined over time. No significant effects were found for the behavioral strategy of looking at the parent. Results underscore the importance of considering infant age and the social partner when studying the effectiveness of emotion regulatory strategies in early infancy.

Keywords

emotion regulation; infancy; temporal associations; Still-Face Paradigm; fathers; mothers

The ability to effectively regulate emotions is a hallmark of socio-emotional development during infancy (Kopp, 1989). During the first year of life, infants progress from relying on external sources for regulation (e.g., caregivers) to being able to initiate behaviors that facilitate the regulation of emotions (Kopp, 1982). There are a variety of behaviors that infants can utilize during frustrating situations to both down-regulate (i.e., decrease) and up-regulate (i.e., increase) negative emotions. Researchers have predominantly focused on a subset of behaviors that have been labeled *regulatory* because they are believed to down-regulate negative affect. These include, among others, attentional distraction (i.e., shifting attention away from the source of distress; Rothbart, Ziaie, & O'Boyle, 1992) and self-soothing (i.e., thumb-sucking; Crockenberg & Leerkes, 2004). There are also relatively few

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studies examining behaviors associated with up-regulation, such as banging arms and kicking legs (Crockenberg & Leerkes, 2004; Rothbart et al., 1992).

Previous research has examined the concurrent association between behavioral strategies and negative affect within a selected time frame, and concluded that a strategy was regulatory based on this association. In order for a strategy to be considered regulatory, however, there should be a *change* in negative affect resulting from the use of that strategy (Cole, Martin, & Dennis, 2004). Recently, an emerging literature has investigated the temporal associations between behavioral strategies and negative affect (e.g., Ekas, Braungart-Rieker, Lickenbrock, Zentall & Maxwell, 2011; Manian & Bornstein, 2009) by examining the degree to which certain behavioral strategies are associated with subsequent changes in negative affect. There have been no studies, however, examining the development of these temporal patterns. Much of our knowledge regarding infant emotion regulation is the result of examining the processes during mother-infant interactions. However, fathers play an important role in children's social and emotional development (Lamb & Lewis, 2010). Infant emotion regulation is one component that may be impacted by the social partner they are interacting with (e.g., Bridges, Grolnick, & Connell, 1997). In the current study, we addressed several important issues: (a) the temporal associations between putative regulatory behaviors and negative affect during a mildly frustrating situation, (b) the trajectories of the temporal patterns of emotion regulation across early infancy, and (c) the influence of the social partner (i.e., mothers vs. fathers) on these temporal associations.

Infant Emotion Regulation

Emotion regulation refers to a person's ability to monitor, evaluate, and modify emotional reactions to accomplish one's goals (Thompson, 1994). There are considerable developmental changes in emotion regulation abilities that take place during the first year of life. These changes correspond to increases in infants' capabilities in other domains of functioning (see Kopp & Neufeld, 2003 for review). During the first months of life, infants largely rely on innate, reflexive behaviors, such as sucking, rooting, and head turning, in their attempts to regulate emotions (Kopp, 1982). By 3-months of age, however, infants are able to engage in primitive behaviors, such as self-soothing (e.g., thumb sucking, self-touch) to regulate their arousal levels. There is an important developmental shift that takes place between 3-months and 7- to 9-months (Kopp, 1989). Infants become aware of their arousal states and are able to voluntarily modify these states. For example, infants may discover that seeking out an interesting toy may alleviate distress. Perceptually, by 6-months of age, infants are able to voluntarily shift their attention (Calkins & Hill, 2007). This has important implications for the down-regulation of negative affect. That is, infants can now shift their attention away from a distressing stimulus. Through repeated attempts they learn that they are in control and can modify their emotional states. Finally, Kopp (1989) also argues that this is a critical time of exploration. The infant begins to increase the number of behavioral strategies that they can use to regulate emotions. This is accomplished through the use of newly acquired cognitive skills that work in concert with developing motor skills. Therefore, we might expect to see certain strategies increase in use over time, as the infant learns that they are effective at modifying arousal, whereas other strategies may no longer be used because they are ineffective or have been replaced by more effective strategies. The ability to successfully regulate emotions early in life has long-term implications for children's behavioral and social functioning (Calkins, Gill, Johnson, & Smith, 1999). Therefore, it is important to examine the early development of these skills.

Although we know a considerable amount about the age at which infants begin using these behavioral strategies, we know less about their developmental progression. For example,

does the use of specific behavioral strategies increase or decrease with age? There have only been a handful of studies investigating *change* in the use of these strategies during infancy, with many focused on the second half of the first year. With respect to attentional strategies, Rothbart and colleagues (1992) observed infant responses to a variety of emotion-eliciting episodes, including frustration. They found that disengaging attention from a stimulus decreased from 6.5-to 13.5-months of age, whereas shifting attention toward the mother increased during the same period. Similarly, Braungart-Rieker and Stifter (1996) found decreases in disengaging strategies from 5- to 10-months of age. However, the ability to voluntarily shift attention is thought to develop between 3 and 6 months of age (Calkins & Hill, 2007). Therefore, it is possible that a decrease in disengagement occurs after 6-months because infants are trying newly acquired strategies. In the current study, we examined this behavior strategy among infants at younger ages (3- to 7-months). We predicted that the use of this strategy will increase across these early months as it is possible that we might be capturing the period in which this behavior is emerging.

The use of self-soothing behaviors was also found to decrease from 3- to 13.5-months of age (Rothbart et al., 1992). Because this is an early emerging behavior, the decrease found by Rothbart et al. (1992) may be due to the self-soothing strategy being replaced by more effective strategies such as attentional distraction, which begin developing around 3-months of age. Rothbart and colleagues (1992) found that motor behaviors, such as kicking and banging hands, remained stable from 3- to 6-months of age and then decreased from 6- to 10-months of age. Again, it is possible that infants are exploring the use of this new strategy during the early months and when more effective strategies develop we see the decrease in less sophisticated strategies. Overall, these results suggest that attentional distraction and self-soothing, strategies commonly thought to down-regulate negative affect, were decreasing during later months of the first year of life. In contrast, strategies thought to up-regulate negative affect (i.e., motor behaviors) were stable during early infancy and then declined. In the current study, we have chosen to employ a widely used situation, the *Still-Face Paradigm,* to examine a variety of infant regulatory behaviors during the early part of the first year of life, including attentional strategies, self-soothing, and high-intensity motor behaviors. This study was the first to examine these developmental changes from 3- to 7-months of age.

Still-Face Paradigm

The Still-Face Paradigm (SFP; Tronick, Als, Adamson, Wise, & Brazelton, 1978) provides an excellent context in which to examine infant regulation of negative affect. The SFP was designed to examine infant reactions when a parent suddenly becomes unresponsive and may reflect situations that an infant may encounter on a day-to-day basis (e.g., mother unable to respond despite infant's expectation of and desire for a response). During the still-face (SF) episode, the parent ceases interacting with his/her infant, maintains a neutral expression, and does not respond to the infant's bids for attention. In this episode, the unresponsive parent serves as the source of distress. Compared to episodes in which the parent is able to interact, the SF episode is associated with elevated levels of infant distress and gaze aversion (Mesman, van IJzendoorn, & Bakersman-Kranenburg, 2009). However, there is individual variability in these responses in that not all infants exhibit elevated levels of distress (Fogel, Diamond, Langhorst, & Demos, 1982). Indeed, expressions of negative affect were not included in Tronick et al.'s (1978) original descriptions of infant behavior during the SFP. The use of the SFP allows us to examine the regulation of mild levels of negative affect in the context of parental unresponsiveness.

There is a paucity of research, however, examining developmental changes in regulatory behaviors during the SFP. In one study, Moore, Cohn, and Campbell (2001) found increases

in shifting attention away from the mother from 2- to 4- to 6-months of age. In separate studies, looking away from the mother also increased from 3- to 6-months of age (Shapiro, Fagen, Prigot, Carroll, & Shalan, 1998; Toda & Fogel, 1993). In contrast, no age-related changes in self-soothing behaviors over this same time frame were found (Shapiro et al., 1998; Toda & Fogel, 1993). In sum, during the SF episode, infant's use of the more developmentally advanced strategy of attentional distraction increased with age, whereas no developmental changes in self-soothing were found. Researchers for both of the studies examined only the infants' use of behavioral strategies, because they assumed that those behaviors served a regulatory purpose. In the present study, we expanded this research by examining the temporal associations between infant behavioral strategies and negative affect in order to better understand the dynamics of emotion regulation.

Temporal Patterns of Emotion Regulation

Research investigating infant emotion regulation has traditionally focused on the correlation between the time spent using a behavioral strategy and the level of negative affect. For example, Diener, Mangelsdorf, McHale, and Frosch (2002) found infants who used greater amounts of attentional distraction displayed lower levels of negative affect, and concluded that attentional distraction is an effective down-regulation strategy. Unfortunately one critical piece of information was missing: Documentation of the *temporal* association between behavioral strategies and negative affect (Cole et al., 2004). By examining temporal associations, researchers can examine the extent to which the intensity of an infant's negative affect *changes* when an infant performs a specific behavioral strategy. If a behavioral strategy serves a regulatory purpose, then we would expect to see a decrease or increase in negative affect following the use of that strategy.

Fortunately, there have been several studies in recent years assessing these temporal patterns of emotion regulation. Using sequential analyses, Crockenberg and Leerkes (2004) examined the temporal associations between behavioral strategies and affect when 6-month-old infants were presented with a novel toy. Results of this study indicated that attentional distraction (i.e., looking away from the novel toy) and self-soothing behaviors were followed by a decrease in negative affect. Infant motor activities (e.g., kicking and banging) were not associated with a change in negative affect (Crockenberg & Leerkes, 2004). Using a modified SF episode, Manian and Bornstein (2009) examined the temporal contingencies between behavioral strategies and negative affect in 5-month-old infants of nondepressed and depressed mothers. When infants of nondepressed mothers shifted attention away from their mother they did not transition to a negative state, suggesting that this strategy was effective at reducing arousal levels. While these studies were noteworthy because they investigated temporal associations, they only incorporated one time point. It is possible that the temporal associations between behavioral strategy and affect change as infants develop.

To date, only a handful of studies have examined the temporal patterns of emotion regulation at multiple time-points during infancy. Stifter and Braungart (1995) examined the use of behavioral strategies during periods of increasing, decreasing, and stable levels of negative affect longitudinally from 5- to 10-months. At 5-months of age, disengaging attention occurred during periods of decreasing negative affect. This same effect, however, was not found at 10-months of age. Self-soothing behaviors also occurred during periods of decreasing negative affect, but this effect was only found at 10-months of age. In a cross-sectional study, Buss and Goldsmith (1998) examined changes in negative affect as a function of behavioral strategy use in 6-, 12-, and 18-month-olds. At each of the ages, attentional distraction was followed by a reduction in anger. The results of these two studies highlight the need to examine the developmental trajectories of these temporal associations. In the present study, we examined temporal associations in a longitudinal sample of infants

at 3-, 5-, and 7-months of age in order to ascertain whether these associations strengthened or weakened across early infancy. This is a critical time to investigate these associations because the behavioral strategies of attentional distraction and self-soothing are newly developed strategies. The important question is whether these strategies are effective at down-regulating negative affect and whether that effectiveness changes alongside that development.

The Influence of the Social Partner on Emotion Regulation

Over the last twenty years, increasing attention has been paid to the role fathers play in their young children's lives (Goldberg, Tan, & Thorsen, 2009; Phares, Fields, Kamboukos, & Lopez, 2005). During infancy, when compared to fathers, mothers tend to be more engaged with their infant; however, this difference decreases across the first year (Belsky, Gilstrap, & Rovine, 1984). When interacting with their children, fathers tend to engage in more physical, rough and tumble play (Lamb & Lewis, 2010) and have a tendency to excite and surprise their children (Paquette, 2004) more than mothers. Infants tend to prefer fathers during play times, but turn to their mothers during times of distress (Lamb, Frodi, Hwang, & Frodi, 1982). Although there are some differences in how mothers and fathers interact with their infants, in general, fathers are as sensitive and responsive as mothers (Braungart-Rieker, Garwood, Powers, & Notaro, 1998). In addition, infants are just as likely to form a secure attachment relationship with fathers as with mothers (Lamb & Lewis, 2010). Given that both mothers and fathers play important, albeit somewhat different roles during their infants' development, it is possible that these differences impact the infant's behaviors.

Despite the rise in the number of studies on fathers' influence on children's development, there is a relatively small literature examining emotion regulation with this social partner. In one study of 4-month-old infants, behavioral strategies and infant affect were examined during the SFP (Braungart-Rieker et al., 1998). Results indicated that infants used more parent orientation with fathers and more object orientation with mothers. In a study of older infants aged 12.5- to 14-months, emotional expressions and behavioral strategies were examined during a delay task in which the parent was instructed to remain passive (Bridges, Grolnick, & Connell, 1997). During this situation, there were cross-parent consistencies in the expression of negative affect; however, only the behavioral strategy of "attempting to engage the parent" was used consistently across parent contexts. There were also cross-parent consistencies between infant affect and behavioral strategies. For example, with mothers and fathers, attentional distraction was associated with lower levels of negative affect, whereas focusing on the source of distress was associated with increased levels of negative affect. In a study of 12- and 13-month-olds, Diener and colleagues (2002) also found cross-parent consistencies in the associations between behavioral strategy use and infant affect. Specifically, with mothers and fathers, attentional distraction was associated with decreased negative affect, whereas self-soothing was associated with increased negative affect. Although these studies examined the correlation between time spent using behavioral strategies and negative affect, they did not assess the dynamic, temporal associations between behavioral strategies and *change* in negative affect.

To date, only one study has examined the temporal patterns of emotion regulation with mothers and fathers (Ekas et al., 2011). In this study, 20-month-old toddlers participated in an age-appropriate modification of the SFP. Using techniques that captured second-by-second associations, the study found several cross-parent consistencies in the temporal associations between negative affect and behavioral strategies. For example, focusing on an unresponsive parent was followed by increases in negative affect, whereas focusing attention away from the parent (i.e., towards a toy) was followed by decreases in negative affect. There were, however, cross-parent differences in the duration of these effects. This

study examined toddlers and the cross-parent consistencies of the temporal associations may be different in younger infants. For example, it is possible that differences may emerge at younger ages because infants may spend less time with fathers (Lamb & Lewis, 2010). Further, because infants prefer their mothers during times of distress, they may provide more opportunities for the infant to practice emotion regulation strategies. Thus, infants are learning which behaviors are more effective at reducing their distress. To our knowledge, there are no existing studies longitudinally examining infant emotion regulation processes with mothers and fathers. Therefore, this study examined the developmental trajectories of the dynamics of emotion regulation when infants were 3-, 5-, and 7-months-old during interactions with two different social partners, mothers and fathers.

The Current Study

In the current study, we have expanded on our previous work that utilized sophisticated quantitative techniques to examine the temporal associations between behavioral strategies and negative affect (Ekas et al., 2011). Specifically, we used longitudinal mixed-effects models to examine whether the intensity of negative affect changed (i.e., increased or decreased) immediately following the use of a behavioral strategy. We have added an additional layer of complexity by examining, within a longitudinal framework, whether the strength of these temporal associations changed across early infancy. Thus, the present study was the first to examine the temporal patterns of emotion regulation during infancy with both mothers and fathers longitudinally.

The current study had two overarching aims:

1. Examine the developmental trajectories of negative affect and behavioral strategy use across early infancy with mothers and fathers.
    a. We did not expect to find any significant changes in negative affect from 3- to 7-months of age.
    b. We expected infant's use of attentional distraction to increase with age, whereas the strategy of looking at the parent would decrease across time. We also anticipated the use of self-soothing strategies would decrease with age. Finally, we explored the developmental trajectories of an additional infant behavior we labeled *high intensity motor behaviors* (i.e., kicking and banging). Due to the paucity of research with respect to this behavior, we did not have an a priori hypothesis.
    c. Given the differences in mother and father interaction styles we hypothesized that infant negative affect and behavioral strategies would differ depending on the social context. However, due to the paucity of longitudinal studies investigating these behaviors, we explored whether the patterns of negative affect and behavioral strategy use across infancy would be similar with mothers and fathers. It is possible that as father behavior becomes more similar to mother behavior over time (e.g., Belsky et al., 1984) that infants' use of strategies is also consistent across social contexts.
2. Examine the developmental trajectories of the *temporal associations* between infant behavioral strategies and negative affect with mothers and fathers.
    a. With mothers, it was anticipated that attentional distraction would be followed by decreases in negative affect (i.e., down-regulation). Consequently, we expected that looking at the unresponsive mother would be followed by increases in negative affect (i.e., up-regulation). We

hypothesized that the strength of these effects would increase across infancy.

b. We hypothesized that, with mothers, self-soothing behaviors would show down-regulation, resulting in decreases in negative affect with mothers; however, because the behavior is thought to be more rudimentary we expected the strength of the temporal associations to decline with age.

c. Finally, because of the paucity of research examining motor behaviors and emotional responses during infancy we explored, with mothers, whether motor behaviors exhibited an up-regulating process, thereby increasing levels of negative affect. If no associations exist then it is possible that these behaviors may simply be part of the expression of distress. We also explored developmental changes in the strength of this association.

d. The current study was the first to examine these temporal processes with mothers and fathers. On one hand, emotion regulation processes may differ across social contexts, given the differential roles mothers and fathers sometimes play (i.e., nurturing vs. play). Alternatively, mothers and fathers also share some similar qualities (i.e., similar levels of sensitivity; Braungart-Rieker et al., 1998) in which infants may not show differential patterns across social contexts. Therefore, we explored the extent to which the temporal associations between infant behavioral strategies and negative affect were similar across social contexts.

Method

Participants

The total sample consisted of 135 infants (52.6% female) and their parents who were recruited from a local community in the Midwestern United States for a larger longitudinal study. Several methods of recruitment were used: a child birth educator announced the study to her classes, flyers were sent home to new mothers from the hospital, business cards were distributed to various local community locations, and an informational booth was set-up at several community events. Inclusion criteria required that the infant was healthy and that both caregivers provided consent.

The family's first visit occurred when the infant was 3-months old; the remaining visits took place when the infant was 5-, 7-, 12-, 14-, and 20-months of age (+/− 14 days). The current study involved data from the first 3 visits. The majority of participants were Caucasian (mothers: 90.4%; fathers: 87.4%). Mean ages of mothers and fathers were 29.3 (SD = 5.32; range = 17 to 44) and 30.7 (SD = 5.62; range = 18 to 44) years of age, respectively. Most parents (86% of mothers and 74.4% of fathers) reported completing at least some college; remaining education levels were as follows: 3% of mothers and 6% of fathers reported completing some trade school, 10.3% of mothers and 16.4% of fathers reported completing some high school, 1% of mothers and 2% of fathers reported completing less than 9th grade. The sample also had variability in family income with the majority (24.4%) falling in the $45,000–$59,999 range, with remaining incomes as follows: 22.1% reported $30,000–$44, 999, 9.9% an income of $15,000–$29,999, 5.3% reported $60,000–$74,999, 6.1% an income of $75,000–$89,999, 6.9% reported $90,000–$104,999, and 2.3% an income greater than $120,000. Parents' living arrangements were: 84.4% were married and living together, 2.2% were married and living apart, 11.9% of the parents were not married and living together, and 1.5% of the parents were unmarried and living apart.

Attrition for this sample from 3-to 7-months was moderate (9.6%, $n = 13$). Five families dropped out of the study after the first time point, and 8 additional families dropped out after the second time point. The primary reasons for attrition were a lack of interest in continuing in the study (e.g., failure to return phone calls or respond to mailings) and moving away from the area. Statistical comparisons between the sample with complete data from 3- to 7-months ($n = 122$) and the entire sample ($n = 135$) revealed two significant demographic differences. The current sample had mothers who were older than those who dropped out of the study ($t(133) = 2.02$, $p < .05$; present sample: $n = 122$, $M = 29.64$, $SD = 5.22$ vs. dropped sample: $n = 13$, $M = 26.54$, $SD = 5.64$) and had higher education levels ($t(133) = 2.85$, $p < .001$; present sample: $n = 122$, $M = 6.80$ $SD = 1.77$ vs. dropped sample: $n = 13$, $M = 5.31$, $SD = 1.93$). Thus, findings from this longitudinal study pertain to a population that is more educated and slightly older than the original sample.

Several interactions were excluded from the analyses because of errors in data collection (e.g., infant's face was blocked by parent, no sound, etc; 3-months: mother $n = 2$, father $n = 1$; 5-months: mother $n = 2$; 7-months: mother $n = 1$). Thus, the final sample at 3-months was 132 mother-infant dyads and 131 father-infant dyads, at 5-months was 125 mother-infant dyads and 124 father-infant dyads, and at 7-months was 121 mother-infant dyads and 121 father-infant dyads.

Procedures

The interactions between the parents and infant were video recorded using two separate video cameras. One camera recorded the infant's behavior and the second camera recorded the parent's behavior. The video cameras recorded onto a split screen so coders were able to view both the parent and infant simultaneously. After signing consent forms, one of the parents was randomly assigned to participate first, while the other parent waited in another room. The first parent entered the playroom with the infant and placed him/her in a booster seat that was on a table. Then, the parent sat down in a chair and faced the infant directly. Parents were given instructions about the procedures and were given a "cheat-sheet" to refer to as needed.

The SFP (Tronick et al., 1978) involved four 90-second episodes: a face-to-face (FF), still-face (SF), reunion (RE), and soothing period. Because infants participated in consecutive sessions with mothers and fathers (2 SFP with 4 episodes each), the relatively brief length was chosen to prevent young infants from becoming fatigued. For the FF episode, parents were instructed to interact with the infant as they would at home until they heard a doorbell. During the SF, parents stopped interacting with their infant, sat back in their chair, and maintained a neutral expression on their face. When parents heard another doorbell, they resumed interaction with their infant (RE episode). After the final doorbell, parents were told that they could take the infant out of the seat during the soothing episode, if they so desired. This soothing episode lasted for a minimum of two minutes, but would continue for as long as the infant needed to return to a neutral or positive state. Finally, once the first SFP procedure was completed and the infant was in a neutral or positive state, the second parent entered the playroom with the experimenter and repeated the same procedure. The second SFP did not begin until the infant was in a neutral or positive state.

Measures

Infant Affect—Vocalizations and facial expressions were simultaneously rated on a second-by-second basis, using a 4-point scale from 0 to 3 (Braungart-Rieker et al., 1998). Ratings were as follows: 3 (*screaming, large grimace, mouth open*), 2 (*crying, frown, mouth slightly ajar*), 1 (*mild fuss or complaining sound, small frown, mouth closed*), 0 (*neutral expression, can have vocalizations but no real intonation in voice*). Positive affect was coded

using a similar scale; however, for the present study we only examined the negative affect data. Coders were trained to rate infant's affect until they achieved sufficient reliability (intraclass correlations ≥ .80). To avoid bias, coders were not allowed to code the same infant with both of their parents. One gold standard coder recoded a random subset of tapes (25%) from the coders in order to check reliability. Intraclass correlations were calculated to assess reliability and ranged from .75 to .95 (M=.85). For the purposes of preliminary analyses, a composite score was calculated by averaging infants' negative affect across the 90-s SF episode.

Infant Behavioral Strategies—A team of coders, different from those who rated negative affect, rated infant behavioral strategies from videotapes on a second-by-second basis. All behaviors were coded as present or absent. Similar to previous studies (e.g., Braungart-Rieker et al., 1998), the following behaviors were coded: l*ook at parent* (infant gazing at parent's face), *distraction* (infant gazing away from parent's face), *self-soothing* (thumb-sucking, rubbing/touching face or body), and *high-intensity motor behaviors* (rapid kicking of legs, banging hands on chair). Coders were trained using sample videotapes and did not code independently until they were reliable (Cohen's kappa ≥ .70) with a gold standard coder. To avoid bias, coders did not rate the same infant more than once (i.e., with mother and father). One gold standard coder recoded a random subset of tapes (25%) in order to assess reliability. Cohen's kappas were calculated to assess reliability and ranged from .71 to .98 (looking at parent M = .85; distraction M = .86; self-soothing M = .91; high-intensity motor M = .88). The proportion of time spent using each strategy was calculated for use in preliminary analyses.

Results

Data analyses were conducted in several steps. First, we tested whether potential covariates (i.e., maternal/paternal demographics and child gender) should be included in subsequent analyses and reported descriptive statistics for variables of interest. Second, for descriptive purposes, we examined cross-parent consistency in the use of behavioral strategies and negative affect within each age. Consistent with the first aim of the study, we examined infant's use of behavioral strategies and levels of negative affect across social partner and age. Longitudinal, mixed-effects models were used to examine developmental changes in the use of behavioral strategies. Following the second aim of the study, we examined associations between infant behavioral strategies and negative affect within social partner and age. Finally, we used longitudinal, mixed-effects modeling to determine the degree to which infant behavioral strategies predicted subsequent negative affect and whether the strength of those associations changed across infancy. Mixed-effects models were computed for mother-infant and father-infant data separately.

Descriptive Statistics

No significant patterns of associations between demographic variables (i.e., parent age, education, infant gender, and family income) and the composite negative affect and behavioral strategy scores were found. Descriptive statistics for all variables are presented in Table 1. Analyses of covariance (ANCOVAs) were conducted to evaluate the effects of the social partner (mothers vs. fathers) and parent order (first SFP vs. second SFP) on the variables of interest (infant behavioral strategies and negative affect). Results indicated that there were no significant differences between social partners for any of the variables of interest. However, there were several significant Social Partner X Parent Order interactions (see Table 1). For example, infants exhibited higher levels of negative affect during the second SFP with mothers at all ages. Infants spent a greater proportion of time engaged in distraction during the second SFP with mothers at 3-months, and greater time looking at the

mother during the first SFP at 3-months. Finally, infants spent more time using high intensity motor behaviors during the second SFP with fathers at 3- and 5-months.

Regardless of social context, infants experienced mild levels of distress as would be expected during the SFP. Overall rates of negative affect with mothers was 12.4% at 3 months (mild fuss = 5.5%, crying = 4.0%, screaming = 2.9%), 14.8% at 5 months (mild fuss = 9.5%, crying = 4.7%, screaming = .6%), and 11.8% at 7 months (mild fuss = 7.2%, crying = 3.1%, screaming = 1.4%). The rates of negative affect for fathers was 13.9% at 3 months (mild fuss = 6.7%, crying = 5.1%, screaming = 2.1%), 7.4% at 5 months (mild fuss = 3.6%, crying = 3.0%, screaming = .9%), and 9.6% at 7 months (mild fuss = 6.5%, crying = 2.5%, screaming = .5%).

Developmental Trajectories of Behavioral Strategy Use and Negative Affect

The first aim of the study was to examine the development of behavioral strategy use across early infancy with mothers and fathers. We performed a series of unconditional longitudinal mixed-effects models to examine the trajectories of infant negative affect and behavioral strategies predicted by infant age (uncentered), controlling for parent order. These models have the advantage of using all available data, as opposed to longitudinal correlations that utilize listwise deletion. Once again, we predicted that the use of attentional distraction would increase across time, whereas looking at the parent and self-soothing would decrease with age. No specific hypotheses concerning high intensity motor behaviors were generated. Each of the behavioral strategies showed significant age effects. More specifically, looking at the parent and self-soothing decreased with age, whereas distraction and high intensity motor behaviors increased from 3- to 7-months. These patterns were similar for mothers and fathers. Negative affect exhibited a significant decline from 3- to 7-months, but only with fathers (see Table 2).

Longitudinal Mixed-Effects Model Specification

To take advantage of the longitudinal nature of our data (i.e., 90-s of repeated measurement at 3 separate ages), we used mixed-effects modeling. This approach has the advantage of using all available data from each infant; therefore, infants with missing data were included in all analyses. We used Hierarchical Linear Modeling 6.06 (HLM; Raudenbush & Bryk, 2002) to examine changes in the intensity of negative affect following the use of a particular behavioral strategy and whether that association changed over time (i.e., from 3- to 7-months). Based on our previous research with 20-month-olds (for full details of model specification, please see Ekas et al., 2011) we focused on negative affect within 3-s following the performance of a strategy. Therefore, in our model, behavioral strategies at second t were hypothesized to affect the change in negative affect from second t to second $t + 1$, $t + 2$, and $t + 3$. To eliminate the possibility that the lagged effects of behavioral strategies on infant negative affect might be due to initial levels of infant negative affect (i.e., negative affect at second t), initial negative affect was included as a control variable. With the inclusion of the initial level of negative affect, the dependent variable can be interpreted as residualized change in negative affect from second t to second $t + 1$, $t + 2$, and $t + 3$ (Kessler & Greenberg, 1981). In other words, we were testing whether behavioral strategy use impacted infant's negative affect over the three subsequent 1-s intervals.

Our model specification was as follows:

$$NA_{t+1\rightarrow t+5}=b_0+b_1A+b_2NA_t+b_3S_t+b_4AxS_t+b_5O+b_6OxS_t+e$$

where A indicates the age of the infant (3-, 5-, or 7-months); NA_t is the infant's negative affect at second t; S_t is the presence or absence of the specified behavioral strategy at second t; $A \times S_t$ is the interaction term between age and strategy use allowing for the determination of whether associations between strategy use and negative affect change across infancy; O is the inclusion of the covariate of parent order during the SFP; $O \times S_t$ is the interaction term between parent order and strategy use allowing for the determine of whether parent order impacts the associations between behavioral strategy use and change in negative affect; and e is a residual component of change in the infant's negative affect. All variables were group centered when they served as predictors so that the coefficients represent average effects. In addition, our models specified each coefficient as random, allowing each child to have a unique estimate for each parameter.

Developmental Trajectories of the Temporal Patterns of Emotion Regulation

Tables 3 and 4 display the estimates for the mother-infant and father-infant SF episode. For each strategy, the intercept indicates the estimated average negative affect score in the SF episode over the three time points (3-, 5-, and 7-months). On average, infants displayed relatively low levels of negative affect. The age effect was non-significant with both social partners for all behavioral strategies, indicating no significant changes across infancy for the dependent variable of negative affect when all another variables were included in the equation. The estimate for each covariate indicates the relationship between the covariate and the change in negative affect 1, 2, and 3 seconds later.

With mothers, we hypothesized that attentional distraction would be followed by decreases in negative affect and that the effect would strengthen across infancy. Consistent with expectations, we found that the behavioral strategy of distraction was associated with a decrease in subsequent negative affect with mothers. The strength of this association, however, did not change from 3- to 7-months as indicated by the non-significant Age X Strategy interaction. However, this association was impacted by the timing of the SFP. That is, when infants interacted with their mothers first the effects were non-significant; however, when they interacted with their mothers second the effects were significant. We expected self-soothing to be associated with a subsequent decline in negative affect and that the effect would decline across time. Results were consistent with our expectations, but only for the first two seconds following the use of the behavior. We hypothesized that looking at the parent would be followed by an increase in negative affect, but this was not supported as no significant effects were found. Finally, we explored whether high intensity motor behaviors were associated with a subsequent increase in negative affect, and whether the infant's age impacted the associations. With mothers, high intensity motor behaviors were associated with increases in subsequent negative affect one second after using the behavior, and the strength of this effect showed significant declines from 3- to 7-months of age.

We also explored whether the temporal associations were similar with fathers (see Table 4). Similar to mothers, attentional distraction was followed by a significant decrease in negative affect that lasted for 3 seconds. Self-soothing was also followed by a significant decrease in negative affect; however, this effect only lasted for one second. High intensity motor behaviors were not significant associated with changes in negative affect. There was, however, a significant age X strategy interaction such that the strength of the association between high intensity motor behaviors and negative affect 2 seconds later decreased over time. No significant associations were found for looking at the father. In addition, the timing of the SFP did not impact any of the associations reported above.

Discussion

This longitudinal study investigated the developmental trajectories of infant emotion regulation and whether the social partner influenced regulatory processes. Specifically, the present study utilized temporal models to examine whether putative regulatory behaviors were associated with a change in negative affect and whether the strength of those associations depended on the age of the infant or the social partner with whom they were interacting. Overall, results from this study suggested that shifting attention away from the unresponsive parent and self-soothing were effective down-regulation strategies regardless of the infant's age and with which parent they were interacting.

The Development of Emotion Regulation

Consistent with our expectations, we found that infants spent more time looking away from the parent (i.e., attentional distraction) as they grew older. This is consistent with theory suggesting that as infants mature, the behavioral strategies they use to modulate arousal become more sophisticated (Kopp, 1982). The ability to flexibly deploy attention, such as shifting attention away from the source of distress, undergoes rapid changes during the first year of life (Rothbart et al., 1992). Previous research examining infant emotion regulation has found developmental changes that were consistent with our findings (e.g., Moore et al., 2001). Because the frequency of looking away from the parent increased with age, it was not surprising that the strategy of looking at the unresponsive parent decreased with age. It is likely infants' expectations about the parent's responsiveness were violated during the SF episode (Tronick et al., 1978) and was associated with mild levels distress because the parent cannot respond to their bids. As infants get older, they may realize this violation more quickly and look toward parents less frequently.

When investigating developmental changes in the use of behavioral strategies, researchers have not examined the actual processes involved in regulating emotions (Cole et al., 2004). Cole et al. (2004) argued that regulatory processes involve *changes* in emotional experiences. Our study not only examined whether certain behavioral strategies predicted changes in negative affect, but it also broke new ground by focusing on developmental changes in the temporal patterns of emotion regulation. We expected that the strategy of looking away from the unresponsive parent would be followed by a decrease in negative affect; results were consistent with this hypothesis across social partners. It is important to note, however, that the effect with mothers was only significant when they interacted with their mother during the second SFP. Therefore, with mothers, it is possible that this strategy was only effective under periods of heightened stress. Although this strategy was previously assumed to be associated with the down-regulation of negative affect, our study is the first to test this hypothesis during the first months of life. Because infants become more sophisticated in their ability to regulate their arousal over time (Kopp, 1982), we also expected that the effectiveness of this strategy would increase with age. However, the results of this study did not support this hypothesis. Instead, the effectiveness of this strategy in reducing negative affect was present at 3-months of age and persisted to 7-months of age, suggesting that this behavioral strategy is critical in regulating negative affect from a very early age.

In this study, we found that self-soothing behaviors declined across early infancy. Self-soothing behaviors are an early emerging behavior that may be more reflexive in nature (Kopp, 1982). Therefore, it is possible that the use of these behaviors decline over time because more sophisticated behaviors are emerging. In fact, as shown in this study, infants may use attentional distraction with greater frequency because of its' effectiveness at reducing levels of negative affect. Therefore, attentional distraction may replace the use of self-soothing over time. Consistent with our expectations, we found that self-soothing

behaviors were effective at down-regulating negative affect; however, the duration of this regulatory effect was short lived and was stable across early infancy. Our results are consistent with previous studies examining self-soothing and negative affect (Crockenberg & Leerkes, 2004; Stifter & Braungart, 1995) and provide further support for the importance of this early emerging behavior as a regulatory strategy that infants can continue to use to regulate negative emotions.

We also found that the use of high intensity motor behaviors (i.e., kicking, banging, etc.) increased with age. Rothbart and colleagues (1992) investigated developmental changes in similar motor behaviors and did not find linear patterns of change. It is possible that this is a behavior that is emerging during the period from 3- to 7-months of age and infants are continuing to explore its effectiveness. The behaviors involved in this strategy included kicking and banging, which may serve to stimulate the infant (Rothbart et al., 1992) and up-regulate negative affect. For example, infants may be using these behaviors in an attempt to get their parent's attention and when the strategy was not effective, they became more upset. It is also possible that these displays of motor behaviors may be indicative of heightened levels of arousal within the infant and if the behaviors do not effectively decrease his/her arousal, the infant's negative affect increases. Interestingly, the strength of this effect declined from 3- to 7-months of age. Although there is little research regarding this behavioral strategy, it is possible that the function of the strategy changes with age. For example, as the infant matures, this strategy may be used to distract the infant from the unresponsive parent. The lack of association between high intensity motor behaviors and negative affect within the father-infant context may further indicate that high intensity motor behaviors reflects multiple systems – positive arousal as in playfulness, negative arousal as part of emotional reactivity, and/or regulatory as a way to release energy. Further research examining regulatory behaviors, such as high intensity motor responses across contexts would provide further insight about regulatory systems.

We also examined whether there were developmental changes in the strategy of looking at the parent. Consistent with our hypotheses, the use of this behavior declined with age, regardless of social partner. Contrary to our expectations, looking at the parent was not followed by an increase in negative affect and this was consistent across time. Tronick and colleagues (1978) originally postulated that when the parent ceased interaction during the SFP that the infant would become upset because the lack of response violated expectations. Therefore, we expected that continuing to look at the parent would be distressing to the infant. It is possible, however, that the opposite process is occurring. Infants may become distressed and then look at the parent in order to attempt to reengage. In other words, the emotion is serving to regulate the behaviors being performed (Thompson, 1994). We did not explore this direction of temporal associations (i.e., negative affect predicting strategy use) as it was beyond the scope of the present study. Therefore, it would be important for future studies to examine this possibility. In addition, we only examined the 3-s immediately following the use of a strategy. It is possible that the infant needs to process the unresponsive parent as a violation of their expectations and a longer duration of time (i.e., beyond 3-s) is needed for changes in negative affect to occur.

The Effects of the Social Partner

From an early age fathers' interactions with their infant are different from mothers' interactions (Lamb & Lewis, 2010). During early infancy, fathers typically spend less time with their infants (Belsky et al., 1984) and when they do play with their infant it is generally more physical (Lamb & Lewis, 2010). These early interaction differences may translate to differences in infant reactivity and regulatory abilities during a period of parental unresponsiveness. We predicted that there would be differences in strategy use; however, because of the paucity of research examining emotion regulation with mothers and fathers

during early infancy, we made no explicit predictions concerning differences in longitudinal patterns of change. We found only minimal differences between social partners. For example, levels of infant negative affect declined across infancy, but only with fathers. It is possible that infants are becoming more familiar with fathers, possibly due to increased amounts of interaction (Belsky et al., 1984). However, the interaction patterns with fathers are more likely to be associated with play whereas they tend to prefer mothers to help them regulate emotions (Lamb et al., 1982). Therefore, it's possible that infants may not perceive father unavailability during the still-face episode to be particularly distressing. The similarity between social partners is consistent with research at older ages (Ekas et al., 2011) and suggests that regulatory processes may be relatively unaffected by the social context. Future research should include a novel social context, such as a stranger, to test whether these processes generalize outside the family environment.

Limitations and Conclusions

The current study was the first to examine the developmental trajectories of the temporal associations between behavioral strategies and negative affect during infancy. There are, however, several limitations that should be mentioned. First, the SFP for mothers and fathers occurred back-to-back. Although we did ensure that infants had returned to a neutral or positive state between each SFP, the second SFP was understandably more stressful than the first (Gunnar, Talge & Herrera, 2009). Indeed, in the current study, parent order affected the effectiveness of attentional distraction with mother. We took care to control for this in our analyses; however, future research would benefit from having the SFP performed on separate days. Second, our analyses did not allow us to determine when during the SF episode the temporal associations occurred. For example, it is possible that infants do not become distressed until the SF episode is well under way. Therefore, the effectiveness of looking away from the parent may not be present until the second half of the SF episode. With respect to the SFP, our sample exhibited mild levels of negative affect. It is possible that the length of the SF episode (90-s) may not have been long enough to elicit heightened levels of distress. Future research may find stronger, or different, effects if the SF episode was 2 to 3 minutes in length. Finally, the relative effectiveness of a strategy may depend on the level of distress exhibited and when the behavior was employed. That is, a certain strategy may only be effective when employed at the initial onset of a behavior. Unfortunately, our modeling techniques were unable to capture these subtle dynamics and future research should work toward developing models that are able to do so.

Our study focused on the effects of behavioral strategies on the regulation of negative affect and did not include positive affect as a potential strategy. That is, infants may use positive affect (i.e., smiles and social bids to the parent) in an attempt to regulate their distress. Indeed, Tronick et al. (1978) observed that during the SF episode infants make intermittent social bids to the parent in an attempt to reengage the parent. Future studies should examine the temporal associations between positive and negative affect, to determine whether infant positivity can influence distress levels. In addition, this study only followed infants from 3- to 7-months of age and it is possible if infants were followed for a longer time period (i.e., beginning at a younger age and continuing to a later age) different patterns in the temporal associations would be observed. Moreover, the effects of the social context may also change depending on the age of the infant. Future research should also consider the role of exogenous (e.g., parental sensitivity, involvement, etc.) and endogenous (e.g., temperament) characteristics in the development of the temporal patterns of emotion regulation. Studies on the regulation of discrete emotions may also indicate differential effectiveness of certain regulatory strategies, depending on which emotion is being felt. Finally, the limited diversity in our sample may restrict the generalizability of our results.

In summary, when examining the temporal associations between behavioral strategies and negative affect, we found that shifting attention away from the source of distress was an effective strategy for down-regulating negative affect. This regulatory effect was present as young as 3-months of age and persisted to 7-months of age. Moreover, these temporal associations were also found in father-infant dyads. This study was an important first step in understanding the *processes* involved in the development of emotion regulation in early infancy.

Acknowledgments

This research was supported by NICHD: 5R03 HD39802 granted to the third author. The authors wish to thank the families who generously donated their time. We would also like to thank our numerous research assistants who diligently coded the data for this manuscript.

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Table 1

Descriptive Statistics for Negative Affect and Strategy Variables

	Mother-Infant		Father-Infant		Social Partner Effect		Social Partner X Order Effect		Between Partner
	First SFP *M(SD)*	Second SFP *M(SD)*	First SFP *M(SD)*	Second SFP *M(SD)*	*F(df)*	η_p^2	*F (df)*	η_p^2	*r*
3 months									
Negative Affect	.06 (.21)	.22 (.37)	.12 (.27)	.26 (.48)	1.68 (1, 115)	.01	12.26 (1, 115)**	.10	.06
Look at Parent	.51 (.27)	.38 (.25)	.53 (.25)	.41 (.25)	.61 (1, 115)	.01	21.45 (1, 115)***	.16	.20*
Distraction	.45 (.28)	.57 (.27)	.44 (.26)	.44 (.26)	.44 (1, 115)	.00	14.43 (1, 115)***	.11	.22*
High Intensity Motor	.04 (.05)	.11 (.10)	.04 (.05)	.12 (.10)	.52 (1, 115)	.00	64.85 (1, 115)***	.36	−.07
Self-Soothing	.25 (.27)	.22 (.23)	.24 (.24)	.25 (.26)	.14 (1, 115)	.00	.14 (1, 115)	.00	.39***
5 months									
Negative Affect	.06 (.17)	.31 (.44)	.06 (.19)	.20 (.50)	1.89 (1, 118)	.02	23.16 (1, 118)***	.16	.18*
Look at Parent	.25 (.22)	.22 (.17)	.22 (.18)	.24 (.21)	.08 (1, 118)	.00	1.01 (1, 118)	.01	.26**
Distraction	.75 (.22)	.75 (.20)	.76 (.21)	.75 (.20)	.07 (1, 118)	.00	.11 (1, 118)	.00	.23*
High Intensity Motor	.14 (.15)	.17 (.13)	.10 (.14)	.17 (.14)	2.57 (1, 118)	.02	16.64 (1, 118)***	.12	.48***
Self-Soothing	.22 (.27)	.19 (.17)	.21 (.25)	.19 (.23)	.00 (1, 118)	.00	.86 (1, 118)	.01	.26**
7 months									
Negative Affect	.03 (.08)	.24 (.37)	.05 (.15)	.19 (.33)	.24 (1, 114)	.00	28.44 (1, 114)***	.20	.01
Look at Parent	.20 (.18)	.25 (.15)	.23 (.18)	.20 (.16)	.11 (1, 114)	.00	.14 (1, 114)	.00	.16
Distraction	.80 (.18)	.74 (.16)	.77 (.18)	.78 (.18)	.01 (1, 114)	.00	.80 (1, 114)	.01	.17
High Intensity Motor	.19 (.16)	.21 (.14)	.17 (.14)	.18 (.15)	3.43 (1, 114)	.03	1.18 (1, 114)	.01	.50***
Self-Soothing	.15 (.24)	.13 (.18)	.08 (.16)	.17 (.20)	.39 (1, 114)	.00	2.27 (1, 114)	.02	.22*

Note:

*** $p < .001$;

** $p < .01$;

* $p < .05$.

Table 2

Unconditional Models for the Effect of Age on Negative Affect and Behavioral Strategies During Mother-Infant and Father-Infant Interaction

	Mother-Infant		Father-Infant	
Variable	**Est. (*SE*)**	**Variance Component**	**Est. (*SE*)**	**Variance Component**
Negative Affect				
Intercept	.24(.05)***	.30***	.31(.06)***	.48***
Age	−.02(.04)	.18***	−.13(.05)**	.30***
Look at Parent				
Intercept	.42(.02)***	.08***	.44(.03)***	.09***
Age	−.12(.02)***	.05***	−.13(.02)***	.06***
Distraction				
Intercept	.51(.03)***	.10***	.50(.03)***	.10***
Age	.16(.02)***	.06***	.16(.02)***	.07***
Self-Soothing				
Intercept	.26(.03)***	.08***	.25(.03)***	.08***
Age	−.06(.02)**	.06***	−.07(.02)**	.05***
High Intensity Motor				
Intercept	.07(.01)***	.02***	.09(.01)***	.01***
Age	.07(.01)***	.01***	.04(.01)***	.01***

Note:

* $p<.05$,

** $p<.01$,

*** $p<.001$

Table 3

The Effects of Behavioral Strategies on Subsequent Negative Affect During Mother-Infant Interaction

	Mother-Infant		
	Second *t* + 1	Second *t* + 2	Second *t* + 2
Strategy	**Est. (*SE*)**	**Est. (*SE*)**	**Est. (*SE*)**
Look at Parent			
Intercept	.21 (.02)***	.21 (.02)***	.21 (.02)***
Age (*A*)	.00 (.01)	.00 (.02)	−.01 (.02)
Negative Affect *t* (NA_t)	.57 (.02)***	.40 (.03)***	.29 (.03)***
Strategy **(S_t)**	**.01 (.00)**	**.01 (.01)**	**.00 (.01)**
Age X Strategy **(AxS_t)**	**.01 (.00)**	**.01 (.01)**	**.01 (.01)**
Order (*O*)	−.08 (.03)**	−.13 (.05)**	−.19 (.06)**
Order X Strategy (OxS_t)	−.01 (.01)	−.02 (.01)	−.02 (.02)
Distraction			
Intercept	.21 (.02)***	.21 (.02)***	.21 (.02)***
Age (*A*)	.00 (.01)	.00 (.02)	.00 (.02)
Negative Affect *t* (NA_t)	.56 (.02)***	.40 (.03)***	.29 (.03)***
Strategy **(S_t)**	**−.02 (.01)****	**−.02 (.01)****	**−.02 (.01)****
Age X Strategy **(AxS_t)**	**.00 (.01)**	**−.01 (.01)**	**.00 (.01)**
Order (*O*)	−.09 (.03)**	−.15 (.05)**	−.21 (.06)***
Order X Strategy (OxS_t)	.03 (.01)*	.04 (.01)**	.04 (.02)*
Self-Soothing			
Intercept	.21 (.02)***	.21 (.02)***	.21 (.02)***
Age (*A*)	.00 (.01)	.00 (.02)	−.01 (.02)
Negative Affect *t* (NA_t)	.57 (.02)***	.40 (.03)***	.29 (.03)***
Strategy **(S_t)**	**−.01 (.01)***	**−.02 (.01)***	**−.01 (.01)**
Age X Strategy **(AxS_t)**	**.01 (.01)**	**.00 (.01)**	**.00 (.01)**
Order (*O*)	−.08 (.03)**	−.13 (.05)**	−.19 (.06)**
Order X Strategy (OxS_t)	.00 (.01)	−.01 (.02)	−.01 (.02)
High Intensity Motor			
Intercept	.21 (.02)***	.21 (.02)***	.21 (.02)***
Age (*A*)	.00 (.01)	.00 (.02)	.00 (.02)
Negative Affect *t* (NA_t)	.57 (.02)***	.41 (.03)***	.29 (.03)***
Strategy **(S_t)**	**.02 (.01)****	**.01 (.01)**	**.01 (.01)**
Age X Strategy **(AxS_t)**	**−.02 (.01)****	**−.02 (.01)***	**−.02 (.01)***
Order (*O*)	−.08 (.03)**	−.15 (.05)**	−.20 (.06)**
Order X Strategy (OxS_t)	−.01 (.01)	.00 (.01)	.01 (.02)

Note:

* $p<.05$,

** $p<.01$,

*** $p<.001$

Variables of interest are bolded and italicized.

Table 4

The Effects of Behavioral Strategies on Subsequent Negative Affect During Father-Infant Interaction

	Father-Infant		
	Second *t* + 1	**Second *t* + 2**	**Second *t* + 2**
Strategy	**Est. (*SE*)**	**Est. (*SE*)**	**Est. (*SE*)**
Look at Parent			
Intercept	.17 (.02)***	.17 (.02)***	.17 (.02)***
Age (*A*)	−.01 (.01)	−.02 (.02)	−.03 (.02)
Negative Affect *t* (NA_t)	.57 (.03)***	.39 (.03)***	.31 (.03)***
Strategy (S_t)	**.01 (.00)**	**.01 (.01)**	**.00 (.01)**
Age X Strategy (AxS_t)	**.00 (.01)**	**.00 (.01)**	**.00 (.01)**
Order (*O*)	.03 (.02)	.04 (.03)	.06 (.04)
Order X Strategy (OxS_t)	−.01 (.01)	−.01 (.02)	−.01 (.02)
Distraction			
Intercept	.17 (.02)***	.17 (.02)***	.16 (.02)***
Age (*A*)	−.01 (.01)	−.02 (.02)	−.02 (.02)
Negative Affect *t* (NA_t)	.57 (.02)***	.39 (.03)***	.31 (.03)***
Strategy (S_t)	**−.02 (.01)*****	**−.02 (.01)****	**−.02 (.01)***
Age X Strategy (AxS_t)	**.01 (.01)**	**.01 (.01)**	**.01 (.01)**
Order (*O*)	.03 (.02)	.04 (.03)	.06 (.03)
Order X Strategy (OxS_t)	−.01 (.01)	−.01 (.02)	−.01 (.02)
Self-Soothing			
Intercept	.16 (.02)***	.17 (.02)***	.17 (.02)***
Age (*A*)	−.02 (.01)	−.03 (.02)	−.03 (.02)
Negative Affect *t* (NA_t)	.58 (.03)***	.40 (.03)***	.31 (.03)***
Strategy (S_t)	**−.01 (.00)***	**−.01 (.01)**	**−.01 (.01)**
Age X Strategy (AxS_t)	**.00 (.01)**	**.00 (.01)**	**−.01 (.01)**
Order (*O*)	.02 (.02)	.04 (.03)	.06 (.04)
Order X Strategy (OxS_t)	−.02 (.01)	−.03 (.02)	−.03 (.02)
High Intensity Motor			
Intercept	.17 (.02)***	.17 (.02)***	.17 (.02)***
Age (*A*)	−.02 (.01)	−.03 (.02)	−.03 (.02)
Negative Affect *t* (NA_t)	.58 (.03)***	.40 (.03)***	.32 (.03)***
Strategy (S_t)	**.00 (.01)**	**.01 (.01)**	**.01 (.01)**
Age X Strategy (AxS_t)	**−.01 (.01)**	**−.03 (.01)****	**−.02 (.01)**
Order (*O*)	.02 (.02)	.05 (.03)	.06 (.04)
Order X Strategy (OxS_t)	.01 (.01)	.01 (.01)	.00 (.01)

Note:

*$p<.05$,

** $p<.01$,

*** $p<.001$

Variables of interest are bolded and italicized.