



Infants' use of emotional cues to regulate their imitative responses: determinants of individual differences

Ina Bovenschen, Julia Bauer, Bianca Probst, Sybille Schlosser & Gottfried Spangler
Institute of Psychology, Friedrich-Alexander University of Erlangen-Nuremberg

Abstract

Theoretical background. From birth on, infants are sensitive to other people's emotional and attentional states and are increasingly adept at using this information to guide their own behavior. To date, researchers have mainly examined normative social-cognitive skills whereas scant attention has been paid to individual differences in these abilities. The present study examined how individual dispositions and social factors influence infants' use of indirect emotional cues to regulate their behavior.

Methods. In an emotion-imitation task (Repacholi & Meltzoff, 2007), infants watched the experimenter demonstrate actions on objects. In response to this action, a third person expressed neutral affect (N = 30) or anger (N = 28) toward the experimenter. Infants were then given 20s to play with the object, and the infants' imitative responses, looking behavior and facial expressions were assessed. Moreover, infant temperament, measured with the Toddler Temperament Scale (Fullard et al., 1984), and attachment security, assessed with the maternal Attachment Q-Set (Waters, 1995), were examined.

Results and Discussion. The present study didn't replicate the findings from Repacholi and Meltzoff (2007). Additionally, neither attachment security nor infant temperament predicted individual differences in infants' responses.

Theoretical background

From birth on, infants are sensitive to other people's emotional states and are increasingly adept at using this information to guide their own behavior. At the end of the first year, infants acquire social-referencing skills, i.e. they learn to use attentional and emotional cues to modulate their behavior toward novel, ambiguous objects (e.g. Moses et al., 2001). Additionally, Repacholi and Meltzoff (2007) found out that 18-month-old infants even learn from indirect emotional signals as their behavior varied as a function of emotions directed to a third party.

To date, researchers have primarily examined normative social-cognitive development whereas scant attention has been paid to individual differences in these abilities. Studies investigating individual differences in preschoolers' social-cognitive skills showed that individual differences in children's social understanding are mainly related to early social experiences, e.g. attachment quality (e.g. Meins et al., 1998; Symons & Clark, 2000) or family conversations about feelings (Dunn et al., 1991). However, there are few studies investigating individual differences in infants' social cognitive abilities. Thus, the primary goal of the current study was to explore if and how individual dispositions and social factors influence infants' use of indirect emotional cues to regulate their behavior.

Research Questions

1. Do infants use indirect emotional cues to regulate their behavior?
2. How do individual dispositions (temperament) and social factors (attachment security) influence infants' use of indirect emotional cues to regulate their behavior?

Methods

58 18 month-old German infants (30 girls, 28 boys) were tested in an emotion-imitation paradigm (Repacholi & Meltzoff, 2007). Infants watched the experimenter demonstrating an action on three novel objects two times. Subsequently, a third person (emoter) enters the room and watches the experimenter perform the action a third time. In response to the action, the emoter expressed either negative (anger condition, n = 28) or neutral affect (neutral condition, n = 30) toward the experimenter (see Figure 1). Infants were then given 20s to play with the object, and the infants' imitative responses, looking behavior and affect were assessed.



Figure 1. Examples of neutral (left) and anger condition (right)

Security of attachment was assessed using the maternal Attachment Q-Set (Waters 1995) yielding scores from +1.0 (very secure) to -1.0 (very insecure).

Infant temperament. The Toddler Temperament Scale (Fullard et al., 1984) assessing the global impression of the child on nine temperament dimensions was completed by the infant's primary caregiver. Afterwards, a „difficulty score“ based on the dimensions rhythmicity, approach, adaptation, intensity and mood was calculated.

Results

General analysis of infants' behavior. In order to analyze infants' imitative behavior, a 2 (condition) x 2 (gender) x 3 (trial) analysis of variance (ANOVA), with repeated measures on the last factor was conducted for number of imitations, latency to touch object, and duration of object touch. Contrary to expectations, analysis yielded no significant effects for condition (see Table 1).

However, analysis revealed a significant trial effect for number of imitations, $F(1.9, 104.6) = 4.81$, $p < .05$, latency to touch, $F(2, 107.3) = 3.19$, $p < .05$, and duration of touch, $F(2, 106.3) = 6.77$, $p < .01$. Post-hoc comparisons indicate that the infants became increasingly delayed in touching the test object ($t1 < t2, t3$), decreasingly imitated the observed action ($t1, t2 > t3$), and decreasingly spent less time touching the object ($t1 < t3$) over the three trials (all $p < .05$). No other effects were significant.

Table 1. Infants' imitative behavior as a function of experimental condition (Mean and SD)

	neutral (n=30)		anger (n=28)	
	M	SD	M	SD
Number of imitations	1.43	1.04	1.14	1.21
Latency to touch object (in s)	2.92s	5.21	5.08s	6.69
Duration of object touch (in s)	15.31s	5.28	13.24s	7.00

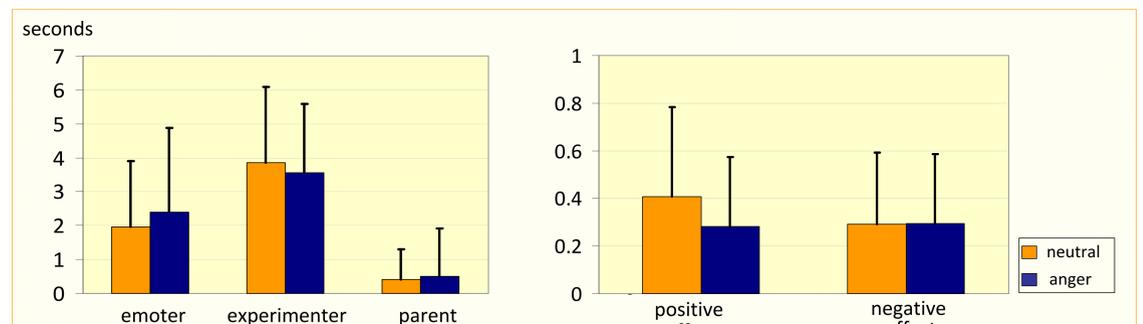


Figure 2. Infants' looking behavior (left) and affect (right) as a function of experimental condition.

Additionally, infants' looking behavior and affect were analyzed by means of a 2 (condition) x 2 (gender) x 3 (trial) analysis of variance (ANOVA). Contrary to expectations, no significant effects for condition were found (see Figure 2). Again, analysis revealed a significant trial effect for duration of looks to the experimenter, $F(1.9, 104.6) = 4.81$, $p < .05$ and emoter, $F(1.9, 104.6) = 4.81$, $p < .05$, as well as for infant's negative affect, $F(1.9, 104.6) = 4.81$, $p < .05$, and positive affect, $F(1.9, 104.6) = 4.81$, $p < .05$. Infants increasingly looked longer to the experimenter and shorter to the emoter over the three trials. Furthermore, infants increasingly showed less positive and more negative emotions. No other effects were significant.

Summary. Contrary to expectations, infants' behavior didn't vary as a function of indirect emotional cues directed to a third party in the present study. In contrast, trial effects were found for all variables.

Individual differences in infants' behavior: influence of attachment and temperament. First, bivariate correlations between attachment security score and infants' behavior and affect in the emotion-imitation paradigm were calculated separately for both conditions (anger, neutral). Analysis yielded only one marginal correlation: low attachment security corresponded with more positive affect in the neutral condition (see Table 2). In order to analyze the influence of infant temperament, bivariate correlations between difficulty score and infants' behavior in the emotion-imitation paradigm were calculated. Analysis yielded no significant correlation (see Table 3). In sum, neither attachment security nor infant temperament predicted individual differences in infants' responses.

Table 2. Bivariate correlations between attachment security and infants' behavior (separately for conditions)

	neutral (n = 27)	anger (n = 26)
N of imitations	-.30	.13
Latency to touch (s)	.01	-.15
Duration of touch (s)	-.07	.17
Looks emoter (s)	-.01	-.12
Looks experimenter (s)	.17	.16
Looks parent (s)	.17	.22
Negative affect	.14	.05
Positive affect	-.34*	-.07

Note. * $p < .10$.

Table 3. Bivariate correlations between difficulty score and infants' behavior (separately for conditions)

	neutral (n = 27)	anger (n = 25)
N of imitations	-.10	.09
Latency to touch (s)	-.04	.11
Duration of touch (s)	-.01	-.21
Looks emoter (s)	-.15	.11
Looks experimenter (s)	-.18	.28
Looks parent (s)	-.22	.09
Negative affect	-.11	-.27
Positive affect	-.19	.08

Discussion & Conclusion

The present study didn't replicate the results of Repacholi and Meltzoff (2007) as infants' behavior didn't vary as a function of indirect emotional cues directed to a third party. In contrast, trial effects were found for imitative behavior, looking behavior and affect. Possibly due to cultural differences in emotion understanding and emotion regulation, infants seem to be increasingly irritated and distressed by the experimental situation in both conditions.

Regarding individual differences in infant behavior, neither attachment security nor individual temperament could explain individual differences in infants' use of emotional cues to regulate their behavioral responses. Further studies including behavioral measurements of attachment and temperament may clarify if and how social experiences and individual characteristics contribute to individual differences in social-cognitive abilities.