Published in final edited form as:

Infant Behav Dev. 2012 December ; 35(4): 797–802. doi:10.1016/j.infbeh.2012.07.018.

Infant Humor Perception from 3- to 6-months and Attachment at One Year

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Abstract

Infancy is a critical time for the development of secure attachment, which is facilitated by emotionally synchronous interactions with parents. Humor development, which includes shared laughter and joint attention to an event, emerges concurrently with attachment, but little is known regarding the relationship, if any, between humor development and attachment in the first year. Thirty 3-month-old infants were videoed at home each month until they were 6-months old while their parents attempted to amuse them. Frequency of infants' smiles and laughs served as a measure of "state humor", and the smiling/laughing subscale of the Infant Behavior Questionnaire-Revised served as a measure of "trait humor". State and trait humor were not correlated. Lower trait humor at 6 months predicted higher attachment security on the Attachment Q-sort at 12-months ($r = .46$), suggesting that less good-humored infants elicit greater parental engagement, which works to the benefit of attachment, or vice versa. Future studies should examine the importance of smiling and laughter as they relate to other developmental phenomena in the first year.

Infancy is a critical period, particularly for the development of secure attachment, which has been related to positive outcomes including emotional regulation (Berlin & Cassidy, 2003), prosocial behavior (Markiewicz, Doyle, & Brendgen, 2001), and achievement (Cutrona, Cole, Colangelo, Assouline, & Russell, 1994) among others. Similarly, insecure attachment has been associated with long-term developmental challenges including anti-social behavior (Fagot & Kavanagh, 1990) and poor mental health outcomes like depression (Muris, Mayer, & Meesters, 2000). Secure attachment appears to be fostered, at least in part, by parenting that is responsive to and synchronous with the infant's emotional signals (Ainsworth, 1979). These criteria also characterize humorous interactions, which are arguably among the most pleasurable social-emotional exchanges. However, little is known regarding humor development in the first year of life and its relationship, if any, to the development of attachment.

Humor, generally referring to the ability to perceive and express amusement (Davies, 1998), is multi-faceted involving neural (Wild, Rhodden, Grodd, & Ruch, 2003), cognitive (Forabosco, 1992), behavioral (Lockard, Fahrenbruch, Smith, & Morgan, 1977), and social-

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emotional components (Chapman, 1983; Panksepp, 2005). Despite this complexity, infants smile (6 weeks) and laugh (3–4 months) early in the first year and long before their first gestures (6–8 months) or spoken words (12 months), suggesting that these universal means of emotional expression are of marked communicative, evolutionary (Caron, 2002; Kraut & Johnston, 1979; Provine & Fisher, 1989), and developmental significance (Reddy, 2008; Reddy, Williams, & Vaughan, 2002).

Research into infant humor is scant, particularly as it relates to cognitive and emotional milestones, but began with Wolff's (1963) descriptive study of smiling and laughing in the first year of life. That study resulted in a developmental timetable of humor beginning with social smiling (5–9 weeks) and followed by laughter in response to physical stimulation (3 months), social games (5 months), and visual events (7–9 months), and finally humor creation (9–11 months) and “clowning” (i.e., creating absurd events; 10 months). Sroufe and Wunsch (1972) followed with an observational study of 150 infants in order to describe changes in the frequency of laughter and type of stimuli that arouse it in 4 to 12 month olds. They found that the onset of laughter occurs at about 4 months of age, with an increase over time in the number of stimuli that will elicit it. Despite recognizing that “laughter may have a positive effect on caretaker-infant interaction” (p. 1340), Sroufe and Wunsch focused on the cognitive benefits of laughter as maintaining the infant's orientation toward an incongruous event, thus maximizing the infant's opportunity for comprehension. In fact, nearly all humor research has been based on a cognitive theoretical framework, meaning that researchers have focused on the intellectual experience and benefits of humor for infants. For example, Rothbart (1973) described the competing theories of infant humor, all of which are cognitive, (i.e., the “pleasurable stimulus” hypothesis, the arousal-safety model, the contingency-learning theory, and the incongruity hypothesis). Each of these models contributes to our understanding of infant humor as a cognitive process, causing Reddy (1991) to argue that humor is fundamentally interpersonal and is an “important part of the experience of interacting with babies in any extended and secure relationship” (1991, p. 143).

The focus on humor as an intellectual process has resulted in two major gaps in current knowledge about humor development and function. First, infants, especially those younger than 7 months, have been largely ignored due to their nonverbal status. In addition, the social and emotional aspects of humor have been overlooked (Reddy, 2001). As a result, considerable questions remain regarding humor perception and creation in very young babies. Specifically, it is not known if humor is related to personality variables like temperament. In adults, Ruch and Kohler (1998) differentiated trait humor, a relatively stable dispositional quality (colloquially called a “sense of humor”), from state humor, a transitory state of readiness to respond to or with humor. Ruch (1997) has demonstrated that one quality of trait humor, cheerfulness, is related to higher frequency, intensity, and duration of smiling and laughter, although this finding has yet to be studied in infants or children. Specifically, trait-cheerful adults exhibited a lower threshold for smiling and laughter. Given that temperamental variability is evident in infants, these state and trait dimensions may have important implications for the study of humor and related variables in infants.

Whether humor is related to social and emotional variables, including the primary emotional milestone of attachment (Bowlby, 1958), is also unknown. Humorous exchanges between infants and parents may enhance their opportunities to develop a satisfying relationship, an idea that is consistent with research on humor and relationship quality in adulthood. For example, among adults, humor has been associated with greater capacity for intimacy and the ability to establish deep affective relationships (Hampes, 1992) as well as empathic concern (Hampes, 2001) and trust (Hampes, 1999), the latter of which is considered

necessary for attachment. Cann, Norman, Welbourne, and Calhoun (2008) reported that the four main humor styles measured in adults closely parallel empirically-supported attachment dimensions. Specifically, adults with an avoidant attachment style were less likely to use humor to amuse others and enhance cohesiveness in relationships, a style known as affiliative humor (Kazarian & Martin, 2004). Humor has also been associated with greater perceived closeness in relationships (Cann et al., 2008), an effect robust enough to be observed among complete strangers (Fraley & Aron, 2004). Additionally, Aron, Norman, Aron, McKenna, and Heyman (2000) provided correlational and experimental support for the role of novel and arousing activities in boosting relationship quality; humorous exchanges often include both of these features.

We hypothesized that infant humor perception between 3 and 6 months of age would predict attachment security at 12 months of age, wherein infants who exhibited a higher state humor (i.e., greater frequency of smiling and laughing during episodes of amusement with their parents) and trait humor (i.e., more smiling and laughing in general) would have greater attachment security at one year of age. Thirty 3-month-old infants were videoed monthly until 6 months of age while their parents attempted to amuse them. Parents also completed monthly measures of infant temperament, and attachment quality was measured upon one-year follow-up.

1.1 Method

1.1.1 Participants

Thirty 3-month-old infants (16 females, 14 males), all of who were full-term at birth were recruited from northern Vermont to participate. Twelve of the infants were first-borns, and all were Caucasian. Maternal age ranged from 23 to 44 years ($M = 32$, $SD = 5.4$), and parental education ranged from 12 to 19 years ($M = 15.5$ years, $SD = 2.5$ years). All infants came from households in which parents were married, and the average combined annual household income was \$78,000 per year ($SD = \51.4 k/year). The majority of mothers (71%) and fathers (90%) were employed full-time upon infants' enrollment in the study at 3 months of age, and most infants were in full-time childcare (i.e., 20 hrs) during the week.

1.1.2 Measures

Two dimensions of humor, state and trait (Ruch, 1997; Ruch & Köhler, 1998; Ruch et al., 1996), were measured. State humor, defined as the *situational* "readiness to respond to a humor stimulus with positive affect" (Ruch & Köhler, 1998, p. 205) was measured using 10 minutes of videoed naturalistic observation at home, in which parents were directed to "Do whatever you normally do to get your baby to laugh or smile." Videos of each infant at 3, 4, 5, and 6 months were coded in tandem for infant laughing and smiling, which were collapsed due to the frequency of their co-occurrence. Since the procedure allowed parents considerable mobility, the intensity and duration of infants' smiles could not be reliably coded due to "floating camera angles". However, there was strong inter-rater reliability ($r = .95$) for frequency of infants' laughs/smiles, which was used as the measure of state humor in the analyses.

Infant Behavior Questionnaire-R (IBQ-R; Gartstein & Rothbart, 2003)—Trait humor, defined as the "temperamental disposition for good humor" (i.e., towards positive affect; Ruch & Köhler, 1998, p. 208) was measured using the smiling/laughter subscale of the IBQ-R. This subscale is comprised of 10 items requiring parents to rate (0 = never, 7 = always) the frequency of their infant's smiling/laughing in response to specific situations (e.g., bathing, playing, dressing, etc.) in the past week. Similar to the observational measure used in this study, smiling and laughing are collapsed on the IBQR. An average score is

obtained across the 10 items to represent the infant's tendency toward dispositional cheer or "good-humor". This was the only subscale of the IBQ-R utilized in this study for two reasons. First, it was the most valid indicator of trait humor available from this measure, and the best fit for cross-validating the observational measure of smiling/laughter. Second, because the procedure involved monthly visits and the IBQ-R is lengthy, we wanted to minimize participant fatigue, particularly given that other aspects of temperament were not the focus of this study. The IBQ-R has been demonstrated to have sound internal consistency and discriminant validity for babies in this age range (Gartstein & Rothbart, 2003). Parents completed this measure during the home visits at 3, 5, and 6 months. Low frequency of smiling/laughing at 3 and 5 months on the IBQ-R resulted in omission of those data. Internal consistency was strong for the smiling-laughter subscale in this sample of 6-month-olds ($\alpha = .88$).

Observer Attachment Q-sort (Waters & Deane, 1985)—Attachment security was measured using the Observer Attachment Q-sort, which is comprised of 90 items describing infant behavior (e.g., "When the baby is upset by mom's leaving, s/he continues to cry or even gets angry after mom is gone"). Mothers effectively rate each item on a scale of 1 (very much unlike my baby) to 9 (very much like my baby) by sorting the items into 9 piles of 10 items each, yielding a rectangular distribution. Following the recommendation by Teti and McGourty (1996), we modified the Q-sort procedure by mailing the items to mothers two weeks prior to the 12-month home visit to maximize the accuracy and efficiency of the sort by familiarizing mothers with the items. To score the Q-sort, mother's score on each item is correlated with that item's criterion score; the resulting correlation coefficient is transformed using Fisher's *r*-to-*z* for analyses (Waters & Deane, 1985). The Attachment Q-sort has been called the "gold standard" in attachment assessment due to its strong discriminant, convergent, and predictive validity (Van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004).

1.1.3 Procedure

Participants were recruited through newspaper ads, flyers, and direct mailings generated from local birth announcements. Informed consent was initially obtained from the principal investigator over the phone. A packet of demographic questionnaires was then mailed to participants prior to the first home visit, which was conducted by a research assistant. When possible, the same research assistant visited the same infants for the duration of the study, which was the case for all home visits from 3-to-6 months and approximately 75% of visits at 12 months. Infants and parents were videoed for 10 minutes during play at home when infants were 3, 4, 5, and 6 months of age with the purpose of trying to catch the infant in the act of smiling or laughing on video. Parents were directed to "Do whatever you normally do to make your baby laugh or smile." They were free to choose who attempted to amuse the infant (i.e., mother, father, or some combination thereof) and to move about the environment, as they deemed necessary. This non-standardized procedure was used for several reasons. First, these videoed observations were part of an original open investigation of humor perception and creation in young infants in their social interactions with parents. Second, the point of the video episodes was to try to catch infants in the act of laughing or smiling within a brief window of time, and parents were expected to best know how to achieve this goal. The procedure was carried out in infants' homes so as to minimize the competing distraction of a novel environment, allow parents access to materials and/or set-ups that they normally used in amusing their infants (e.g., favorite toys, rooms with mirrors, etc.), and lower parental inhibitions via the comfort of being at home, i.e., to observe interactions that were as close to typical as possible. A follow-up visit was conducted at 12 months at which time the research assistant and mother completed the Attachment Q-sort.

Participants were compensated with cash at each home visit in increasing increments for a total of \$155.

1.2 Results

Frequency counts of videoed observations of infant smiling and laughing, which were collapsed as one variable, were calculated for each infant at each age. Low frequency in smiling and laughter was observed among 3-, 4- and 5-month-old infants on both observational (“state humor” on video) and questionnaire (“trait humor” on the IBQ-R) measures, which were subsequently excluded from the analyses. This is not uncommon as smiling and laughing are generally found to increase throughout the first year (Gartstein & Rothbart, 2003). Complete data were available on 22 of the 30 infants in the original sample but indicated sufficient variability (see Table A.1). There was no correlation between state and trait humor at 6 months, $r(20) = -.05, p > .05$. A stepwise multiple regression analysis (*IBM SPSS Statistics v. 19*, using predictor entry/removal criteria of $p = .05$ and $p = .10$, respectively) indicated that trait humor predicted attachment security at 12 months, $F(1,20) = 5.302, p = .032$. The multiple regression correlation coefficient was .46, indicating that 21% of the variance in attachment security values at 12 months could be accounted for by trait humor, however the direction of prediction was not as anticipated (see Table A.2). Contrary to the hypothesis, the state humor variable did not enter into the model [$t(20) = .346, p > .05$].

1.3 Discussion

Secure attachment is considered the cornerstone of healthy emotional development in infancy (Bretherton, 1992) and is related to a variety of long-term positive developmental outcomes (Berlin & Cassidy, 2003; Cutrona et al., 1994; Markiewicz et al., 2001). Emotionally satisfying and synchronous interactions between parents and infants both reflect and facilitate attachment security (Ainsworth, 1979). Humorous interactions can be thought of as a microcosm of secure attachment dynamics, but as yet little attention has been paid to humor in infancy or its association with emerging processes like attachment, despite their concurrent development in the first year of life. Research examining adult relationships shows humor is related to a variety of attachment-like variables (Hampes, 1992, 1999, 2001), beckoning attention to the humor-attachment association in parent-infant relationships.

Using a prospective longitudinal design, we examined the association between infant humor development in the first six months of life and its relationship to attachment security at one year. We discovered a partial relationship between these variables such that trait humor but not state humor at 6 months predicted attachment security at 12 months. This in part may be a measurement artifact. Specifically, when directed to amuse their infants, most parents use absurd nonverbal behavior known as “clowning” (Reddy, 2001), and most 6-month-olds laugh at this behavior. Therefore, although the frequency of smiling and laughing increased at 6 months, it did so in a way that made it difficult to distinguish state humor between and among the infants in our sample. In short, frequency counts indicated a restricted range that provided a less sensitive measure of state humor. The finding favoring trait humor as a predictor of attachment also makes some theoretical sense given that a stable, trait-like characteristic should have a higher likelihood of predicting a stable relationship dynamic.

Perhaps most noteworthy is the surprising finding that trait humor was inversely related to attachment, meaning that 6-month-olds who scored lower in “good humor” scored higher as 12-month-olds on attachment security. One possibility is that less goodhumored infants elicit more emotional engagement from their parents, and this works to the benefit of

infants' attachment security. An analogous relationship has been observed between difficult infant temperament and cognitive ability, with one explanation being that parents talk more to infants of difficult temperament in an effort to make them more content, and this works to infants' cognitive advantage (Sostek & Anders, 1977). An alternative explanation for the inverse relationship between trait humor and attachment security is that more cheerful infants try to engage less-responsive parents, and the resulting pattern does in fact reflect parental behavior. Finally, the relationship between lower trait humor and high attachment security may be an artifact of the sample, which was comprised of middle-class parents who self-selected into a study on "emotional development"; these parents were already invested in optimizing their infants' emotional outcomes and worked hard to attain such a result, especially with infants who smiled and laughed with less frequency. These findings require replication given that infant positive and negative emotionality have generally been linked with more secure (Crockenberg, 1981; Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996) and less secure (Goldsmith & Harman, 1994) attachment, respectively, either directly or indirectly (Mangelsdorf, Gunnar, Kestenbaum, & Lang, 1990).

Conversely, state humor (i.e., frequency of smiling during parental attempts at amusement) did not enter the regression equation and was not correlated with trait humor on the IBQ-R. Consistent with this is Ruch's (1997) finding in adults that trait humor correlates with intensity and duration of smiling and laughing, more than frequency. Ruch and Kohler (1998) propose that trait and state humor are separate dimensions of the same construct, and that "trait humor forms a necessary but not sufficient condition for state humor, the former being affective and the latter being cognitive" (p.204). That these two dimensions were uncorrelated in this sample supports this assertion, but may also be related to the restricted range in the state humor data described above or to the small sample size.

This study adds to a small body of research regarding humor development in infancy, with implications for patterns of caregiving that emerge in the first year. Specifically, humorous exchanges between parents and infants are among the most satisfying and may be an important part of emerging attachment relationships. This study suggests that attachment quality may be influenced by or have an influence on infant temperamental qualities like trait humor, but is not without limitations. These findings were drawn from a small, homogeneous and self-selected sample, which limit their generalizability. In addition, measuring humor in early infancy continues to pose a challenge. However, given the early appearance of smiling and laughter, future investigations should continue to explore their importance as social-emotional communicative mechanisms, and their relationship to other emerging developmental phenomena in the first year. In short, humorous interactions should be taken more seriously given their part in the earliest positive social-emotional dynamic between infants and parents.

Acknowledgments

This research was funded by the Vermont Genetics Network project grants #2P20RR016462 and #PHSP20RR16462. The authors wish to thank Lynn Mireault for her careful proofreading and valuable feedback on the manuscript.

Role of the Funding Source

Please note that the Vermont Genetics Network had no role in the study design, nor in the collection, analysis and interpretation of data, the writing of the report, nor the decision to submit the article for publication.

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Highlights

- State and trait humor were not correlated in 6-month old infants, suggesting these are separate dimensions of the same construct as has been found with adults.
- Only trait humor at 6-months predicted attachment security at one year.
- The inverse relationship between trait humor and attachment security suggests that parents of less good-humored infants may work harder to emotionally engage their infants, which may favor attachment security

Table A.1

Descriptive Statistics for State and Trait Humor at 6 months.

	<u>Range</u>		Mean (SD)
	Potential	Actual	
Trait Humor (6 mos)	1 – 7	2.3 – 6.	4.5 (.99)
State Humor (6 mos)	0 – •	0 – 78	35.6 (16.1)
Attachment (12 mos)	±0 – 1.00	.06 – .87	.43 (.26)

N= 22

Table A.2.

Stepwise Multiple Regression Analysis Predicting Attachment Security at 12 Months From Trait and State Humor at 6 Months

Predictor	R^2	b	$SE\ b$	β
Step 1	.21			
Constant		.96	.24	
Trait Humor at 6 Months		-.12	.05	-.46*

Note:

* $t(20) = -2.30, p = .032$