

## Maternal Perception of Infant Intentionality at 4 and 8 Months

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This study examines the degree to which mothers perceive infants as intentional and the relations among perception of intentionality, background variables, maternal emotional adjustment, and maternal interactive style. Forty mother-infant dyads were assessed when the infants were 4 months old, and 34 were retested at 8 months. Parent perception of infant intentionality (PPII) was measured via a rating of videotaped segments of infant behavior and an interview. Intentionality scores showed acceptable internal consistency and were positively intercorrelated at each age and across age. The two measures were aggregated to form an index of PPII at each age. Higher educational attainment was associated with lower PPII scores, experience with infants was associated with higher PPII scores, and academic knowledge about child development was not related to PPII. Mothers with more symptoms of anxiety had lower PPII scores, but high maternal separation anxiety was associated with higher PPII scores. Maternal symptoms of depression had a complex relation to PPII scores. Mothers rated as sensitive in mother-infant interactions had higher PPII scores. These variables accounted for 34% of the variance in PPII at 4 months and 49% at 8 months. There were also group differences: Mothers of 8-month-olds had higher PPII scores than mothers of 4-month-olds, mothers of girls had higher PPII scores than mothers of boys, and mothers attributed more intentionality in episodes with girls than in episodes with boys. The results are discussed in relation to mechanisms whereby PPII interacts with aspects of the parent and infant.

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intentionality   parent perception   maternal perception   depression   anxiety  
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Philosophers (e.g., Brentano, Husserl) traditionally have used the term *intentionality* to refer to a state that is *about* or *directed toward* some other state (e.g., the belief that it is raining is about the current state of the weather), but recent usage of intentionality is a narrower derivative of the verb *intend* and implies doing something on purpose. For example, Anscombe (1957) used "intentional action" to refer to an act that is instituted to bring about some state of

affairs, and Goschke and Kuhl (1993) used "intention" to denote that an individual is committed to performing an activity. This shift in focus makes intentionality a more folk psychological, action-oriented construct. In this article, we adopt the folk psychological usage and apply the quality "intentional" to an infant when an observer believes that the infant's actions are based on some degree of awareness and are executed deliberately.

Zeedyk (in press) offered a comprehensive and integrative survey of developmental accounts of intentionality. Infant behaviors that suggest intentionality include coordinated reaching and grasping (Bruner, 1973; Lockman, Ashmead, & Bushnell, 1984), means-ends behaviors (Mosier & Rogoff, 1994; Willatts, 1984), and communication via gestures or words (Bates, Benigni, Bretherton, Camaioni, & Volterra, 1979; Bruner, 1975; Harding & Golinkoff, 1979). Intentionality is also inferred in acts of shared reference in which infants follow an adult's direction of gaze or pointing (Murphy & Messer, 1977; Scaife & Bruner, 1975) or in acts of social referencing in which

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infants alter their goal-directed activity in response to emotional signals from an adult (Campos & Stenberg, 1981; Emde, 1984; Walden & Ogan, 1988). Given this range of behaviors that could be labeled intentional, there is little agreement regarding the exact birth date of intentionality. However, there is a broad consensus across various theoretical approaches that intentionality blossoms during the second 6 months of life, along with transitions in cognition, manipulative ability, mobility, and affective sharing.

We could ask if infants who display behaviors that look intentional are indeed behaving intentionally in the sense of being aware of mental states and goals, and thus acting deliberately, but for present purposes we are not interested in that particular question. Rather, our interest here is in the fact that *parents perceive infants as intentional*. There is a philosophical perspective here as well, in that many authors have proposed that the phenomenon we call "mind" emerges within the context of social interaction (e.g., Mead, 1934; Vygotsky, 1986; Wittgenstein, 1953). Parental perception of infant intentionality (PPII) has psychological significance because it implies the parent's explicit or implicit commitment to some model, theory, or set of beliefs about infant mental ability that may dictate parenting strategy and mediate the parent's ability to detect and respond to the infant's states and goals.

Consider three implications of the relation between PPII and parenting: First, PPII may affect the dynamics of the parent-child interaction, which many theorists have proposed as the context that fosters the human potential to behave intentionally (e.g., Kaye, 1982; Meacham, 1984; Newson, 1979; Trevarthen, 1978). Second, PPII may affect parental sensitivity, defined as the parent's ability to respond appropriately to the infant's states and goals. Parental sensitivity can have a significant effect on a range of infant behaviors including reaction to separations and reunions (Ainsworth, Blehar, Waters, & Wall, 1978; Crockenberg & McClusky, 1986; Isabella, 1993), cognitive competence (Crockenberg, 1983), emotionality (Fish, Stifter, & Belsky, 1991), and adrenocortical regulation (Spangler, Schieche, Ilg, Maier, & Ackermann, 1994). Finally, PPII may account for variance in how parents interpret the infant's behavior. Most parents enjoy their

infant's signs of increasing intentionality and react favorably when they occur. For example, parents rate 3-month-old infants who produce speech-like vocalizations as intentional and socially favorable (Beaumont & Bloom, 1993). However, other parents may view early emerging intentionality as the ominous beginning of the child's lifelong battle for autonomy and thus give the intentional infant little encouragement.

The goal in this research was to explore factors related to individual differences in PPII.<sup>1</sup> There is some consensus regarding the behaviors that parents regard as intentional (Zecdyk, 1994) but there is a wide range of individual variation for sensitivity to the presence of these criteria. As noted earlier, our strategy here is to finesse the relation between PPII and individual differences in infant behavior per se. Infants at a given age may differ in the quality and quantity of their seemingly intentional acts, but we focused on aspects of the parent that could mediate PPII. Specifically, we explored the relation between PPII and parental knowledge and experience, emotional adjustment, and sensitivity during interaction. Note that this set of variables was not chosen to be comprehensive. Rather, these variables reflect a range of parental behaviors that seem relevant to PPII. Also, although we were not interested in individual differences in infant intentionality, we did explore grouping variables (specifically, infant age and sex) that might have a general effect on PPII.

#### PPII AND PARENTAL KNOWLEDGE AND EXPERIENCE

There are many aspects of parental knowledge and experience that could affect PPII, so we chose only a limited subset for study here. Three variables were explored that seem relevant to how parents perceive infants: educational attainment, knowledge about child development, and previous experience with infants. Academic training is likely to lead parents to

<sup>1</sup> Parental perception of infant intentionality might be different for mothers and fathers due to gender-specific factors or confounding factors such as age, education, and childrearing experience. A thorough investigation of PPII would require assessment of mothers, fathers, and other caretakers as well, but due to practical constraints, we only assessed mothers. Subsequent research should be more inclusive.

adopt more rigorous standards for evaluating evidence. This could cause more educated parents to understate infant intentionality relative to parents who do not attempt to falsify hypotheses. This effect could be due to general cognitive ability but might also emerge due to specific parental knowledge about child development. Parents who are interested in learning more about child development can acquire information through various sources: This knowledge might affect their perception of infant intentionality. Finally, previous experience with infants could affect PPII, but the valence of this effect is unclear. Previous experience (i.e., having an older child or professional experience with infants and children) could sensitize parents to the sorts of intentional behaviors that infants can produce and thus boost PPII. Alternatively, previous experience could familiarize parents with the sorts of unquestionably intentional behaviors that emerge in late infancy and early childhood. From this perspective, the meager intentional accomplishments of the young infant might be devalued.

#### PPII AND PARENTAL EMOTIONAL ADJUSTMENT

Zeedyk (1994) found that mothers of 4-month-olds (but not 8-month-olds) who report more depressive symptoms perceive less intentionality in videotaped episodes of infant behavior. It is not clear why this effect should be transitory and whether depressive symptomatology reflects depression per se or a broader range of psychological disorder (Garrison & Earls, 1986). It seems reasonable that a depressed parent might discount or discourage infant intentionality, and the literature suggests that depressive symptoms (explored primarily in mothers) are associated with less positive parent–infant interactions (see Downey & Coyne, 1990, Field, 1992, Gelfand & Teti, 1990, for reviews). However, it is not clear whether this effect would be specific to depression, or might be associated with various psychopathologies. We explored the relation between PPII and emotional adjustment as indicated by symptom inventories for depression and anxiety. Anxiety can arise due to a wide range of circumstances. We attempted to focus this aspect of the research by also measuring maternal separation anxiety, defined as feelings of worry, sadness, or guilt evoked by separation from the infant.

#### PPII AND PARENTAL SENSITIVITY DURING INTERACTION

Early parent–infant face-to-face interaction includes many behaviors that rest upon assumptions about the infant's intentionality: mutual synchrony of gaze (Messer & Vietze, 1988; Stern, 1974), coordinated vocalizations (Feldstein et al., 1994), and the parent's imitation (Field, Vega-Lahr, Scafidi, & Goldstein, 1986) and elaboration of the infant's movements (Stern, 1985). We focused on parental sensitivity, which is an amalgam formed across several of these dimensions. A sensitive parent responds to the infant in a manner that is contingent upon the infant's behavior. In contrast, an intrusive (i.e., insensitive) parent interferes with the infant's activities, ignores the infant's communicative signals, discourages the infant's independent exploration of the environment, and is unwilling or unable to acknowledge, give meaning, or reframe the infant's actions and communications (Ainsworth et al., 1978; Egeland, Pianta, & O'Brien, 1993; Mayes & Carter, 1990; Stern, 1985). It seems likely that parents who have a low estimate of the infant's intentionality should discount the infant's autonomy and thus may be more likely to lead and control the interaction and, at times, appear to interact intrusively.

#### PPII AND AGE AND SEX OF INFANT

Mothers of older infants should attribute more intentionality than mothers of younger infants, but Zeedyk (1994) found that PPII rides a shifting set of criteria that alter the behaviors that parents consider intentional. This shift of criteria may cause parents to discount their interpretation of actions that previously seemed intentional so age effects could be paradoxical. In our study, we assessed PPII when infants were 4 and 8 months old. These particular ages were selected to map onto previous work, but more importantly to span an age range during which there is considerable ambiguity in the infant behaviors that could be intentional. Few parents and researchers attribute intentionality to infants younger than 2 months, and most attribute intentionality to 1-year-olds. Thus, PPII based on the behavior of 4- to 8-month-old infants is likely to be variable and diagnostic. It also seems likely that PPII will be greater for the older group.

Sex differences could affect PPII. For example, if male infants are more active than female

infants (Eaton & Enns, 1986), then they might be perceived as more intentional, but evidence for sex difference in activity is controversial (Cossette, Malcuit, & Pomerleau, 1991). Word-like verbalization and gestural communication can be interpreted as intentional (Beaumont & Bloom, 1993; Harding & Gollinkoff, 1979). Parents report higher scores on gesture, word production, and word comprehension for female infants from 8 months (Fenson, Bates, Dale, Thal, & Reznick, 1994). However, this difference could be based on bias in parental reports. Apart from sex differences in behavior, which may or may not exist, there is strong evidence suggesting parental *expectations* of sex differences. For example, Rubin, Provenzano, and Luria (1974) and Reid (1994) have documented gender stereotypes in the parents of newborns (e.g., parents expect strong sons and fragile daughters). There is also a vast literature in which parents give different behavioral ratings to the same videotaped behavior of an infant labeled as a girl or a boy (Stern & Karraker, 1989). We explored the effect of gender on PPII by comparing PPII for mothers of boys versus mothers of girls, and also PPII rated for videotaped segments of boys versus segments of girls.

## METHOD

### Participants

Forty mothers and their infants participated in this experiment. The infants were tested within 15 days of their 4-month birthday. All infants were recruited from birth records on file at the local Department of Vital Statistics and were normal and healthy. Sixty-five percent of the sample were firstborns. There was approximately equal representation of boys and girls (21 boys, 19 girls).

The majority of participants were European American of middle-class or upper middle-class socioeconomic background. The mothers ranged in age between 23 and 41 years, with a mean and median age of 32 years. All of the mothers had graduated from high school, and 65% had attended 4 or more years of college.

### Procedure

Mothers and infants participated in a laboratory visit at 4 months which took 45 to 60 min. All mothers and infants were invited to return for a second assessment when the infant was 8 months old. Most mothers complied with this request, yielding a sample of 34 infants tested within 20 days of their 8-month birthday. Those mothers who did not return to the laboratory cited returning to work, moving, or summer vacation as their reason for not participating. Statistical analysis on all independent and dependent variables revealed no differences between families who did or did not complete the second assessment. All participants were given a gift for participating in each phase of the study.

### Parent-Child Interaction

After the child had acclimated to the laboratory and the mother had signed an informed consent form, they were escorted to a testing room decorated and furnished to look like a living room. The mother sat beside a table, and the infant sat in a reclining seat on the table. One video camera was directed at the mother's face; the other at the infant. These two images were recorded in split screen. Mothers were instructed to "play freely with the child for a few minutes." After 3 min, the examiner entered the testing room, gave the mother a box with toys (e.g., rubber animals, colored plastic blocks, a soft doll, a colorful chain), and asked the mother to play with the child using these toys. Three min of "toy interaction" were filmed. The instructions for the parent-child interaction were the same at the 4- and 8-month visits, but age-appropriate toys were provided (e.g., a car, a ball).

### Infant Intentionality Tape

The mother and infant were escorted to an adjoining screening room. The experimenter, who was a mother herself, attempted to engage the mother in a dialogue to transmit an understanding of our definition of infant intentionality and to evoke the mother's best efforts to reflect upon the task at hand. The infant remained in the reclining seat, and the mother sat in front of a VCR and monitor. Mothers were instructed more or less as follows:

Intentionality in infants means that infants do things on purpose, that they mean to do things, and that they are aware of what they do. Because infants cannot tell us what they mean, we often infer intentionality from their actions or from what we think their actions mean. We ask you to help us understand infant intentionality by rating how much the infants you will see in the following videotaped episodes mean to do what they are doing. You will be seeing 30 vignettes in which infants are doing things or interacting with their parents in ways that might suggest that they are acting on purpose. Your task is to rate each vignette on an 8-point scale with 1 = "absolutely sure baby does not mean to do this," and 8 = "absolutely sure baby means to do this." Keep in mind that there are no right and wrong answers: We are interested in your opinion.

The experimenter gave the mother a card listing the scale's anchor points and read the definition of each point. Mothers were shown how to control the pause button on the VCR and how to rewind the tape when they were unsure of a response. Completion of the Infant Intentionality Tape took approximately 15 to 20 min.

Two versions of the Infant Intentionality Tape (IIT) were used.<sup>2</sup> Each contained 30 short segments of infants and their mothers, but the infants in the 4-Month Version were 4 months old, and the infants in the 8-Month Version were 8 months old. In each segment of each tape, an infant was engaged in some behavior or interaction that could be considered more or less intentional. Segments were chosen to range from hardly intentional to quite possibly intentional but were arranged in a random order. Episodes on the 4-month tape included some parent-child interactions in which intentionality could be inferred due to infant vocal-

<sup>2</sup> See Zeedyk (1994) for a more complete description of the development of the IIT.

izations, mutual gaze, or gaze aversion. Episodes on the 8-month tape included comparable parent-child interactions, but there were also situations in which intentionality could be inferred from the infant's actions on objects, locomotion, or gestures. Mothers of 4-month-olds viewed the 4-Month Version. When they returned for the 8-month visit, they viewed the 8-Month Version.

#### *Infant Intentionality Interview*

After the mother completed the IIT and the infant's needs were attended to, the experimenter introduced the next task:

This is another way for us to tap into your beliefs about the things that infants can do on purpose. I'll ask you a series of questions. Each can be answered on a 5-point scale, usually ranging from "a little" to "a lot" or some similar dimension. The interview is divided into four parts: the infant's awareness of her own states, the infant's awareness of her capacity to do something about her own needs, the infant's awareness of the states of others, and the infant's awareness of her capacity to affect the needs of others. We think that if infants mean to do something they must first be aware of a state or a need, and then must have a notion that they can do something to change it. Please do not answer a question until you feel that you fully understand it. Keep in mind that there are no right or wrong answers.

Most mothers asked for clarification on the meaning of several questions and completed the interview in 20 min or less.

The Infant Intentionality Interview (III) was developed for this study and contains questions that were generated based on a theoretical orientation that divides perception of infant intentionality into the awareness of needs and efficacy for the self and for others. Questions were segregated by component, with 10, 12, 10, and 10 questions respectively in sections labeled *Awareness of Own States*, *Self-Efficacy*, *Awareness of Others' States*, and *Efficacy in Others*. The III questions are listed in Table 1. Mothers answered the same set of III questions at each visit.

### Parental Information

Mothers provided additional information through questionnaires completed at the conclusion of the 4-month laboratory visit or completed at home and returned in the mail. One set of questions was about the parent's age, education, and other demographic information. Three additional questions asked about experience with infants: Did you care for infant siblings when you were growing up? Did you babysit for infants either in your teens or recently? How would you rate your level of experience with infants? Answers were recorded on a 1-5 scale. Cronbach's coefficient alpha (Cronbach, 1951) was .61. The mother answered a third set of questions about her knowledge of child development: her sources of knowledge (e.g., books, courses, television) and any formal training. These were followed by a short "quiz" to assess the mother's knowledge of developmental milestones (e.g., when infants crawl, walk, use two-word sentences) and psychological terms such as *sensory-motor stage*. Answers were scored numerically, and a mean was computed. Cronbach's coefficient alpha across the four items was .62.

Finally, three instruments were used to assess emotional adjustment, with each of the instruments administered once at

each visit. The State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970) uses separate scales (20 questions in each) to measure symptoms of anxiety expressed as a long-standing trait (i.e., stable individual differences in anxiety proneness) or a current state (i.e., transitory experience of anxiety). These two scales are usually highly correlated (Layton, 1987). Reliability and validity for the State-Trait Anxiety Inventory have been established in various studies (e.g., Dreger & Brabham, 1987; Gaudry, Vagg, & Spielberger, 1975). We obtained coefficient alphas of .81 and .88 at 4 and 8 months, respectively, for the trait anxiety form and coefficient alphas of .81 and .80 for the state anxiety form. The Maternal Separation Anxiety Scale (Hock, McBride, & Gnezda, 1989) asks 35 questions about anxiety-related behaviors in mothers and infants. We were particularly interested in the factor labeled *Maternal Separation Anxiety*. Hock et al. (1989) reported acceptable reliability and validity for this construct. We obtained coefficient alphas of .91 and .90 at 4 and 8 months, respectively. The Beck Depression Inventory (Beck, 1978) consists of 21 questions that assess the present level of depressive symptoms on a 3-point scale. This instrument has well-established reliability and validity (e.g., see Bumberry, Oliver, & McClure, 1978). We obtained coefficient alphas of .69 and .81 at 4 and 8 months, respectively.

### Parent-Child Interaction

Videotapes of the parent-child interaction and the parent-child-toy interaction were rated on dimensions adopted from Clark and Seifer (1983) and developed in previous research by Feldman and her colleagues (Feldman, Greenbaum, Mayes, & Erlich, in press). Three dimensions seemed particularly relevant to the construct *parental sensitivity*: (a) acknowledging—mother demonstrates by verbal response, facial expression, or movement her awareness of the infant's actions; (b) adaptation/regulation—mother adjusts her stimulus input (or presentation of toys) in accordance with feedback from the infant; and (c) encouragement of exploratory play—mother demonstrates and encourages the independent use of toys (coded for the parent-infant-toy interaction only). Low scores across these dimensions indicate intrusiveness. Each dimension was rated on a 5-point scale specific to that dimension. The rater was aware of the general nature of the study but had seen no other data from the participants.

Reliability of the coding was established by independently recoding 10 randomly selected dyads at 4 months and the same 10 dyads at 8 months. Percentage agreement (i.e., two independent raters used the same scale value) was 70% or better for each variable, and disagreements were never greater than 1 point on the rating scale. The agreement correlations were  $r = .73$ ,  $r = .82$ , and  $r = .92$  for acknowledging, adaptation/regulation, and encouragement of exploratory play, respectively.

## RESULTS

### Measuring Parent Perception of Infant Intentionality

#### *Infant Intentionality Tape*

The IIT was scored by calculating the average rating across the 30 episodes at each age. Cronbach's coefficient alpha across the episodes

**TABLE 1**  
**Infant Intentionality Interview Questions**

A: Awareness of Own States

Do you think your infant can feel:

1. happiness? (a little—a lot)
2. joy? (a little—a lot)
3. love? (a little—a lot)
4. fear? (a little—a lot)
5. sadness? (a little—a lot)
6. guilt? (a little—a lot)
7. surprised? (a little—a lot)
8. Do you think your infant is aware of being dirty, hungry, or tired? (A little—a lot)
9. Do you think your infant is aware of being dirty, hungry, or tired? (a little—a lot)
10. When your infant cries do you feel he is aware of the fact that he needs something? (not aware—very much aware)

B. Self-Efficacy

1. When your infant cries do you feel he means to tell you he is in distress or sad? (a little—a lot)
  2. When your infant is dirty, hungry, or tired do you think he feels he can do something about it? (a little—a lot)
  3. Do you think infants have mechanisms for “shutting out the world” when things become just a bit too much for them? (a little—a lot)
  4. When your infant cries do you think he is aware that he should do something to satisfy his need? (a little—a lot)
  5. Do you think infants are born with the ability to communicate their needs and make sure their needs are met? (a little—a lot)
- Describe your infant's capacity to have his needs met in the following domains:
6. cognitive needs (e.g., obtaining objects he finds interesting) (not capable—extremely capable)
  7. socio-emotional needs (e.g., making sure you are near and attentive to his social communications) (Not capable—extremely capable)
  8. motor needs (e.g., making sure you put him on the floor when he wants to explore) (not capable—extremely capable)
  9. When your infant is reaching for a toy, does it seem to you that he intends to get the toy? (seldom—often)
  10. When your infant is looking around, do you think it is because he wants to learn about the world? (a little—a lot)
  11. Do you believe infants seek emotional experiences and have ways of achieving this goal? (a little—a lot)
  12. Do you think infants know more than they can express? (a little—a lot)

C: Awareness of Others' States

1. Do you think some infants are born more socially attuned than others? (a little—a lot)
  2. Do you think your infant is aware of whether or not you had a bad day? (a little—a lot)
- Do you think infants can feel when their caretakers are:
3. worried? (a little—a lot)
  4. happy? (a little—a lot)
  5. sad? (a little—a lot)
  6. surprised? (a little—a lot)
7. Do you think infants can react to their mothers' insecurity? (a little—a lot)
  8. Do you feel your infant is more aware of your moods than the moods of others? (a little—a lot)
  9. Do you think infants are aware of problems in their environment, such as a domestic emergency (e.g., a broken pipe, an automobile problem)? (a little—a lot)
  10. Do you think your infant is aware of another child's distress? (a little—a lot)

D. Efficacy in Others

1. Do you feel that your infant is trying to tell you something? (seldom—often)
2. When your infant smiles, is it because he wants you to do something for him? (seldom—often)
3. When your infant cries do you feel he is aware of the fact that you are near and can take care of his needs? (a little—a lot)
4. When your infant cries do you feel he is aware of the fact that he can get help by crying? (a little—a lot)
5. Does your infant ever cry because he is angry at you? (seldom—often)
6. When your infant hurts you (e.g., biting when nursing or kicking during diaper-changing) do you think he does it on purpose? (not possible—definitely)
7. When your infant smiles, is it because he feels something is bothering you and he can make you feel better? (seldom—often)
8. Do you think some infants are spiteful? (not possible—definitely)
9. When your infant smiles do you think he intends to tell you something? (seldom—often)
10. Do you think your infant tries to help you when you are hurt? (seldom—often)

was .92 and .91 at 4 and 8 months, respectively, indicating considerable internal consistency. Inspection of item-to-total correlations revealed strong positive relations for all items. The distribution at each age was normal and without outliers but was weighted toward higher scores. This produced a negative skew but no indication of a ceiling effect.

There was a wide range of response to most episodes. A cross-tabulation of responses for each episode at each age indicated some representation for 85% of the 240 episode  $\times$  response categories. The response range was truncated for 43% of the episodes, and the pattern was asymmetric: 95% of episodes evoked a response of "8" (*absolutely sure baby means to do this*), but only 62% of episodes evoked a response of "1" (*absolutely sure baby does not mean to do this*). There was broad consensus that infants in 12 of the episodes were highly intentional (i.e., 75% or more of the respondents gave scores of 7 or 8). No episode evoked consensus on its lack of intentionality.

#### Infant Intentionality Interview

The IIT was scored by calculating the average rating across the 42 questions at each age. Cronbach's coefficient alpha across the items was .92 and .91 at 4 and 8 months, respectively, indicating considerable internal consistency. Item-to-total correlations were strong and positive except for questions with limited range. The distribution was symmetrical at each age, somewhat platykurtic, and without outliers. There was acceptable range at both ages for all but three questions: At both administrations over 75% of mothers agreed that it is unlikely that infants can feel guilt, will hurt a parent on purpose, or can be spiteful.

#### Combined Measure of Parent Perception of Intentionality

The IIT and III were significantly related,  $r(38) = .54$  and  $r(32) = .57$ , both  $p < .01$ , at 4 and 8 months, respectively. Given the theoretical similarity between the IIT and the III, and the strong statistical relation between them at each age, an aggregate index of PPII was formed by standardizing each measure across age and calculating the mean of the z scores for the IIT and III at each age.

#### PPII and Maternal Variables

The scatterplot for each paired set of variables was inspected to rule out the influence of bivariate outliers, restricted range, and nonlinear relations.

#### Education, Experience, and Knowledge

Higher maternal educational attainment was associated with lower PPII scores. (Correlation values are reported in Table 2.) Experience with infants was also related to PPII, with more experience associated with higher PPII scores, but this was not an effect of birth order per se—there was no relation between the birth order of the infant and the PPII score. Knowledge about child development was correlated with neither education nor experience and was not associated with PPII.

#### Emotional Adjustment

Symptoms of state and trait anxiety were highly correlated, .68 and .73, respectively. Given the theoretical and statistical similarity of these two measurements, they were averaged to form a single index of anxiety symptoms for each visit. This state-trait anxiety symptom score was correlated at the 4- and 8-month assessments, .46, so these two values were averaged to form a single index of anxiety symptoms. The aggregate index of anxiety symptoms was not significantly correlated with PPII at 4 months but was correlated at 8 months.

Maternal separation anxiety was highly correlated at 4 and 8 months, .85, so these two assessments were aggregated. The overall measure of maternal separation anxiety was related to PPII at both ages. In contrast to the Spielberger index of

**TABLE 2**  
Correlations Between Parent Perception of Infant Intentionality and Other Variables

| Variable                | Parent Perception of Infant Intentionality |                |
|-------------------------|--------------------------------------------|----------------|
|                         | 4 Months                                   | 8 Months       |
| Education               | -.44**<br>(38)                             | -.36*<br>(32)  |
| Experience              | .40**<br>(37)                              | .48**<br>(31)  |
| Knowledge               | .18<br>(37)                                | .29<br>(31)    |
| Anxiety Symptoms        | -.24<br>(38)                               | -.48**<br>(32) |
| Separation Anxiety      | .32*<br>(38)                               | .38*<br>(32)   |
| Sensitivity at 4 Months | .03<br>(38)                                | -.13<br>(32)   |
| Sensitivity at 8 Months | .25<br>(32)                                | .47**<br>(32)  |

Note. Degrees of freedom listed below correlation.  
\* $p < .05$ . \*\* $p < .01$ .

anxiety symptoms, mothers with higher scores on the Hock measure of separation anxiety perceived *higher* levels of infant intentionality. There was no significant relation between the Hock measure of maternal separation anxiety and the Spielberger index of anxiety symptoms.

Scores on the Beck Depression Inventory were not amenable to correlational analysis because of the presence of outliers: Two mothers had moderate scores of 16 at 4 months, and 1 had an extreme score of 26 at 8 months. It is interesting to note the PPII scores for these 3 individuals: One mother with many symptoms of depression at 4 months had the 11th lowest PPII score (of 40) at 4 months and the 6th lowest score (of 34) at 8 months. The other mother with many symptoms at 4 months was relatively *generous* in her assessment of PPII at 4 months (32nd lowest of 40) but less so at 8 months (14th lowest of 34). Finally, the mother with many symptoms at 8 months attributed little intentionality at 4 months (2nd lowest of 40) and at 8 months (2nd lowest of 34).

Inspection of the Depression Symptom  $\times$  PPII scatterplot suggested an additional subtle effect: Some of the lowest PPII scores were generated by mothers with extremely *few* symptoms of depression. The two lowest PPII scores at 4 months were from mothers with the lowest and the 8th lowest (of 40) depression scores, and the two lowest PPII scores at 8 months were mothers with the 4th and 12th lowest (of 34) depression scores.<sup>3</sup>

#### PPII and Mother-Infant Interaction

The three interaction variables were pooled to form an index of maternal sensitivity. Cronbach's alpha values were .75 and .71 at 4 and 8 months, respectively. Item-to-total correlations were large and positive for all items. The distribution of scores for each construct was relatively normal and without outliers. An age  $\times$  sex analysis of variance (ANOVA) indicated that mothers were more sensitive when their infants were 8 months

old,  $F(1, 32) = 12.92, p < .01$ , but no other effects were significant. The sensitivity scores at 4 and 8 months were not correlated.

Sensitive mothers had more knowledge about infants at both ages,  $r = .35$  and  $r = .43$ , and lower anxiety scores at 8 months,  $r = -.44$ . As indicated in Table 2, there was no relation between maternal sensitivity and PPII at 4 months, but at 8 months, more sensitive mothers rated their infants as more intentional. This effect was not altered when education was partialled out of the correlation.

#### Predicting Individual Differences in PPII

##### *Contemporaneous Prediction*

Education, experience, knowledge of child development, anxiety symptoms, separation anxiety, and maternal sensitivity were used to predict PPII at each age. Both models were significant,  $F(6, 32) = 2.75, p < .05$ , and  $F(6, 26) = 4.13, p < .01$ , at 4 and 8 months, respectively. The resulting  $R^2$  values of .34 and .49 at 4 and 8 months, respectively, indicate that the set of characteristics measured here accounts for a considerable portion of the variance in PPII. Note that the relation is not simply method variance (i.e., similarities in how mothers fill out psychological questionnaires)— $R^2$  values calculated separately for the III and the IIT were comparable.

##### *Longitudinal Prediction*

There was significant continuity between 4 and 8 months for individual differences in IIT,  $r(30) = .55, p < .01$ , III,  $r(30) = .75, p < .01$ , and for the composite index of PPII,  $r(30) = .70, p < .01$ . We also calculated a regression model in which the entire set of characteristics at 4 months including PPII was used to predict PPII at 8 months. This model was significant,  $F(7, 25) = 6.87, p < .01$ . The resulting  $R^2$  value of .66 indicates considerable continuity in PPII, but the effect is carried by two significant predictors: PPII,  $t = 3.48, p < .01$ , and anxiety,  $t = 2.35, p < .05$ .

#### Age and Sex of Infant

The IIT and III afforded different perspectives on the effects of age and sex. Specifically, different versions of the IIT were used at 4 and 8 months so that the segments would be age appropriate, but the III used at each assessment was the same. Also, the IIT had some episodes that clearly portrayed boys, and others that portrayed girls. The III posed questions with a

<sup>3</sup> The negative effect of a low Beck Depression Inventory symptom score is compatible with reports by Lyons-Ruth, Zoll, Connell, and Grunebaum (1986) and Field et al. (1991) indicating that an extremely low depression symptom score can be as bad as or worse than a high score. The extreme lack of symptoms might reflect either denial or hostile reporting.

masculine third-person pronoun, but most references were to "your child."

#### *Infant Intentionality Tape*

A sex  $\times$  age (4 and 8 months, within-subjects) ANOVA on the IIT score revealed a main effect of age,  $F(1, 32) = 34.54, p < .01$ , with higher IIT scores for mothers of older infants. The mean IIT scores at 4 and 8 months were 5.31 ( $SD = 1.04$ ) and 6.17 ( $SD = 0.88$ ). The IIT scores increased between 4 and 8 months for all but 4 mothers. This finding suggests increasing PPII as the infant ages, but the discontinuity in the instrument itself colors the interpretation of any developmental effects.

There was a marginal effect of sex,  $F(1, 32) = 3.82, p < .06$ , with higher IIT scores for mothers of girls.<sup>4</sup> But, the IIT affords an additional perspective on the effect of sex. There was no explicit effort made to label the sex of the infants portrayed in the episodes, but the designation was straightforward in episodes in which the infant was referred to by name (e.g., "Yea, Katie"), was referred to using a personal pronoun (e.g., "too far out of her reach"), was dressed in gender-specific clothing (e.g., a pink, frilly shirt), or had been associated with one of these cues previously in the IIT. These cues were used to categorize each episode as male, female, or indeterminate. Half of the episodes at 4 months were indeterminate, but 83% of the episodes at 8 months were male or female. Male-IIT and female-IIT scores were calculated as the mean across relevant episodes. A sex-of-parent's-child  $\times$  sex-of-child-in-episode ANOVA on the scores at 8 months revealed a main effect of sex-of-parent's-child,  $F(1, 32) = 7.56, p < .01$ , and an effect of sex-of-child-in-episode,  $F(1, 32) = 15.84, p < .01$ . Parents reported higher IIT scores if their own child was a girl or if the child in the episode was a girl.<sup>5</sup>

#### *Infant Intentionality Interview*

Developmental change in PPII as assessed using the III was explored in an age  $\times$  sex ANOVA. This analysis revealed a main effect of age,  $F(1, 32) = 29.43, p < .01$ , with higher scores for mothers interviewed when their infant was older. The mean III scores were 3.27 ( $SD = 0.57$ ) and 3.55 ( $SD = 0.48$ ) at 4 and 8 months, respectively. The III scores increased for all but 4 mothers (2 of these 4 were mothers who also showed no increase in the IIT score). There was a marginal effect of sex,  $F(1, 32) = 2.96, p < .10$ , with higher scores for girls.

#### *Cross-Sectional Comparison*

The effect of age in the previous analyses is confounded with effects due to repeated testing. To separate these influences, we administered the IIT and the III to an additional 40 mothers of 8-month-olds who had not been tested previously. These mothers were drawn from the same population and had a comparable distribution of age and education. The IIT and III scores for this sample averaged 5.93 ( $SD = 0.66$ ) and 3.63 ( $SD = 0.35$ ), respectively. Planned contrasts indicated that the scores for these mothers of 8-month-olds were higher than scores for mothers of 4-month-olds,  $F(1, 111) = 10.03, p < .01$ , and  $F(1, 111) = 9.72, p < .01$ , for IIT and III, respectively, but were not different from mothers of 8-month-olds tested longitudinally.

#### *Combined Measure of Parent Perception of Intentionality*

A sex  $\times$  age ANOVA on the composite PPII scores revealed a main effect of age,  $F(1, 32) = 46.09, p < .01$ , and a main effect of sex,  $F(1, 32) = 4.47, p < .05$ . The PPII scores were higher for 8-month-olds and for girls.

## DISCUSSION

These results indicate progress toward measuring PPII and identifying some correlates of individual variation. Response on the IIT and III had strong internal consistency. Many IIT segments evoked a consensus of mother report at 4 and 8 months, but the consensus was asymmetric. Most mothers agreed that certain episodes portrayed an intentional infant. Despite the fact that the segments were chosen to reflect a range of intentional behavior (i.e., segments were based on criteria reported by mothers in other studies), no segment at either

<sup>4</sup> We report marginal effects of sex because of the theoretical relevance of this variable and, more importantly, because of its persistent influence across measures of PPII.

<sup>5</sup> Episodes in the 8-month IIT that were labeled female were more likely to contain a vocalization. To explore the effect of this confound, we excluded episodes containing a vocalization and recalculated the sex-of-parent's-child  $\times$  sex-of-child-in-episode ANOVA. The  $F$  for sex-of-child-in-episode increased in magnitude,  $F(1, 32) = 42.04, p > .01$ , indicating higher scores for females.

age evoked consensus on its *lack* of intentionality. In contrast, the III provoked consensus on the lack of intentionality for some items (specifically, infants cannot feel guilt, will not hurt a parent on purpose, and cannot be spiteful). This pattern invites the interpretation that middle-class mothers adopt a socially sanctioned view of the infant as being intentional but not evil or mean. Future research should distinguish between parent perception of positive and negative connotations of infant intentionality.

The strong correlation between the IIT and the III allowed us to compute an aggregate index of PPII combining across two instruments with different formats (i.e., ratings of videotaped episodes of behavior and answers to interview questions). Aggregation ameliorates some of the problems of method variance and measurement error that plague constructs based on a single measurement technique. Additionally, the III can pose questions about behaviors that are not easily portrayed in film (e.g., feeling guilt or being spiteful). The correlation between the IIT and the III raises an interesting issue: It appears that mothers do not separate their rating of the intentionality in the behavior of an unknown infant from intentionality in their perception of their own infant. Further work could explore whether the temporal proximity of the two assessments in this study encouraged consistency, but the relation seems too strong to have emerged due to contamination. We suspect that the effect is more profound and occurs because mothers differ in the criteria they use to support the judgment that a behavior is intentional. Some mothers adopt relatively lenient standards for intentionality and apply them consistently to unfamiliar infants and their own infant. Other mothers are more conservative, but they too remain consistent in judging a stranger or their own infant. This consistency in criteria also spans 4 months of infant development, with robust and significant correlations over time for the IIT, the III, and the PPII composite.

#### Parent Variables

Higher educational attainment is associated with lower PPII scores: Academic knowledge about infants is not related to PPII. It is possible that highly educated mothers behave in some manner that undermines infant intentionality, but a more likely interpretation is that these mothers adopt higher standards of evi-

dence for the inference that an infant is intentional (e.g., they consider alternative hypotheses, or conduct systematic experiments to evaluate hypotheses). This higher standard is not due to enhanced knowledge about infants: This study replicates previous reports of no relation between knowledge about infants and various outcome measures (Stoiber & Houghton, 1993). In contrast, experience with infants is associated with *higher* PPII scores. This effect could emerge if hands-on experience with infants lowers one's standards for evidence suggesting intentionality, heightens one's sensitivity to the sorts of things that infants can do that can be viewed as intentional, or induces parenting practices that promote infant intentionality.

Higher levels of anxiety symptoms on the Spielberger Inventory were associated with lower PPII scores at 8 months. The Spielberger Inventory taps a range of symptoms characterized by feelings of tension and apprehension and heightened autonomic nervous system reactivity (e.g., feeling jittery or overexcited). One aspect of the relation between anxiety symptoms and PPII is that mothers with many symptoms may be distracted and thus not well attuned to their infant's intentional behavior. A more clinical interpretation would suggest that mothers perceive less intentionality because of their anxiety per se, but the mechanism for this effect is not obvious. Finally, mothers with more anxiety symptoms may interact in a way that undermines their infant's intentionality. The fact that the relation between anxiety symptoms and PPII only emerges at 8 months could reflect long-term effects of anxiety on the mother or child but could also be due to changes in the nature of the variance in PPII scores at the older age.

Mothers who scored high on maternal separation anxiety perceived high levels of infant intentionality, and this effect was independent of the influence of anxiety symptoms. Hock and her colleagues interpreted maternal separation anxiety as a disposition to experience worry, sadness, or guilt elicited in response to separation from the infant but acknowledged that specific characteristics of a situation might heighten or lower levels of separation anxiety (Hock et al., 1989). The lack of a positive relation between anxiety and separation anxiety argues against a monolithic construct

of anxiety. One interpretation of this discrepancy is that mothers with high scores on the separation anxiety scale are overly sensitive to the infant's states (i.e., the opposite of the effect posited for maternal anxiety) and will be notably alert to any signs of emerging infant intentionality. An alternative hypothesis is that separation anxiety is enhanced for mothers who view their infant as intentional and thus particularly vulnerable to experiencing a sense of loss, more likely to engage in futile activity when separated, or more likely to suffer a long-term negative effect from having been separated. This hypothesis is compatible with the counterintuitive finding that mothers of infants with optimal scores on the Brazelton Newborn Assessment Scale report high levels of separation anxiety (McBride & Belsky, 1988).

Only 3 mothers had an elevated symptom count on the Beck Depression Inventory, but all 3 of these mothers had relatively low PPII scores at one or both assessments. It seems reasonable that depression could lead to reduced PPII (e.g., a distressed mother could view intentional behavior in her infant as threatening or as making demands that she may be unable to fulfill), but larger samples and better clinical assessments will be needed to examine associations with clinical maternal depression.

#### Parent-Child Interaction

Ainsworth et al. (1978) described a sensitive mother as one who respects her infant's autonomy as evidenced by her tendency to intermesh with the infant's ongoing activities. Our findings indicate no relation between sensitivity at 4 months and PPII. The lack of an effect at 4 months probably reflects the fact that younger infants emit fewer behaviors that allow mothers to intermesh. However, we found a strong association between maternal sensitivity in the 8-month interaction and PPII scores. This relation has broad implications in the context of work suggesting various negative consequences of maternal lack of sensitivity. For example, intrusive parenting is one of the asynchronous dyadic interaction patterns that have been associated with avoidant and resistant behavior in the Strange Situation (Ainsworth et al., 1978; Belsky, Rovine, & Taylor, 1984; Egeland & Farber, 1984; Isabella & Belsky, 1991). Hutcheson, Black, and Starr (1993) reported a

relation between maternal intrusiveness and nonorganic failure to thrive. Finally, Egeland et al. (1993) found that high-risk children whose mothers were observed to be intrusive during interactions at 6 months did less well academically, socially, emotionally, and behaviorally in the first and second grades in comparison to a control group with nonintrusive mothers.

The results presented here suggest two mechanisms that could cause a relation between maternal sensitivity and perception of intentionality. First, some infants might be less intentional or give relatively few clear signals of intentionality. A mother who interacts with a seemingly unintentional infant may become increasingly intrusive. Long-term effects of intrusiveness could reflect continuity in the child's lack of intentionality or signals of intentionality, or could reflect secondary effects evoked by the mother's intrusive style (e.g., the mother's intrusiveness undermines the child's confidence). Second, some mothers may have a bias to ignore or avoid signs of infant intentionality, which they see as a symbol of the child's growing autonomy and separateness. One symptom of this bias might be an intrusive style in face-to-face interactions. Long-term effects could emerge due to this style per se, or other stylistic variations that evolve as a mother who ignores or thwarts intentionality copes with an increasingly autonomous child.

#### Age and Sex of Infant

As expected, mothers perceive more intentionality in an 8-month-old than in a 4-month-old. The discounting of criteria at 8 months reported by Zeedyk (1994) could have occurred because mothers in her study were judging the intentionality of 4-month-old behavior from the context of life with an 8-month-old. In our study mothers viewed a tape of 4-month-olds when their infant was 4 months old and a tape of 8-month-olds when their infant was 8 months old: Their perception of intentionality increased. Additionally, the III, which has identical questions at both ages, reveals increasing perception of infant intentionality. The age effect could reflect a shift toward adopting increasingly liberal criteria but more likely indicates that mothers are sensitive to the older infant's increasingly intentional instrumental behavior and emotional responsiveness. Note that the longitudinal design used here could have contributed

to this effect. Many mothers spontaneously commented that they were intrigued by the concept of infant intentionality and felt that it addressed an important aspect of their infant and their perception of their infant. This sensitization could have affected maternal behavior during the months between the two assessments, maternal perception of infant intentionality at 8 months, or both. However, cross-sectional data indicate that mothers tested initially when their infant is 8 months old have IIT and III scores that are not significantly different from mothers tested longitudinally.

Mothers of girls perceived infants as more intentional. This effect was weak but persistent across various analyses of the IIT and III and is consistent with the finding that IIT scores were highest for episodes in which the infant being rated was clearly a girl. The literature on gender differences in infant behavior lacks robust effects, but there is reason to believe that boys and girls differ on some behaviors that suggest intentionality (e.g., girls may use more words and gestures). More importantly, studies of mother–infant interaction reveal consistent differences in how mothers treat boys and girls. Grant (1994) reviewed nine studies of mother–infant interaction and drew the overall conclusion that mothers interacting with boys are more likely to stimulate, initiate, and goad, whereas mothers interacting with girls are more likely to be responsive and to maintain the interaction. Various interpretations have been offered for these differences. For present purposes, it seems that mothers of girls are more sensitive to infant signals and that girls produce more intentional behaviors. It will be interesting to assess PPII in fathers to determine whether the heightened intentionality for girls is a general effect across both parents or is gender specific (i.e., mothers rate higher intentionality for girls, and fathers rate higher intentionality for boys), which would suggest the influence of gender-based identification or empathy.

#### Conclusion

The variables coded here accounted for 34% of the variance in PPII at 4 months and 49% of the variance at 8 months. Other aspects of the mother's environment and personality should account for additional variance. Further research is needed to sift through various influences and explore the mechanisms by which they operate. It will

also be important to differentiate specific aspects of PPII (e.g., awareness and efficacy, or positive and negative aspects) and to contrast PPII with other relevant dimensions such as parent perception of the infant's sense of self (Hrusa, 1992), expressiveness (Tingley & Russell, 1992), communication ability (Borzellino, 1994), and potential for being "spoiled" (Solomon, Martin, & Cottingham, 1993).

This study does not allow us to assess the causal efficacy of PPII, and we have attempted to interpret each relation as bidirectional: PPII could affect the infant's emerging intentionality, or the infant's emerging intentionality could affect PPII. However, the more likely mechanism is an ongoing transaction between the two effects (Sameroff & Chandler, 1975). Positing this interaction is essentially a truism, but there is much more at stake if we consider the importance of individual differences. For example, some infants may be extremely likely or unlikely to manifest behaviors that look intentional. Parental response could either dampen or exaggerate these tendencies. Alternatively, there is probably a wide range of normal PPII, but perceptions at either extreme could be problematic: A parent who seriously underestimates the infant's intentionality could fail to provide appropriate stimulation, and a parent who seriously overestimates the infant's intentionality could become prone to engage in abusive parenting (e.g., to punish an 8-month-old for "intentionally" crying). These effects, which have been primarily explored for mothers, may be particularly likely among certain risk groups. For example, teenage mothers often have difficulty predicting their infant's imminent achievements and act in ways that undermine the emergence of new developmental skills (Trad, 1992). Also, mothers who abuse their child are less likely to respond contingently to the infant and to demonstrate enjoyment of, and responsiveness to, the infant's goal-directed behavior (Crittenden & Bonvillian, 1984; Lyons-Ruth, Zoll, Connell, & Stahl, 1987). The most important next steps in this research program are to determine the extent to which PPII (with parent defined as mother, father, or other significant caretaker) is affected by the infant's disposition to behave intentionally and to explore the effects that individual differences in infant intentionality and PPII have on the parent–child interaction, the infant's

immediate and long-term intentionality, and other aspects of the infant's cognitive ability and emotional well-being.

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