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Temperament Measures of African-American Infants: Change and Convergence with Age

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Abstract

Studies of infant temperament are inconsistent with regard to convergence across measurement sources. In addition, little published work is available that describes temperament in minority infants. In this study, measures of temperament at 3- and 6-months were made for 24 African-American infants. Although maternal ratings of activity and fussiness did not correlate with more objective measures at 3-months of age, ratings and the more objective assessments were significantly correlated at 6-months.

Keywords

African-American; temperament; fussiness

1. Introduction

Numerous studies have examined the relation between maternal reports of infant temperament and what are considered to be more objective assessments, such as behaviors witnessed by trained observers in the home or laboratory (Bridges, Palmer, Morales, Hurtado & Tsai, 1993; Carnicero, Perez-Lopez, Salinas & Martinez-Fuentes, 2000; Crockenberg & Acredolo, 1983; Isabella, Ward & Belsky, 1985). Although few might take the extreme stance of Vaughn and his colleagues, who some 25 years ago labeled one of the early temperament questionnaires to be more an “assessment of the mother” than of the infant (Vaughn, Taraldson, Crichton & Egeland, 1981, p. 15), the perception remains that there is only modest convergence between maternal ratings and those of other observers (Hane, Fox, Polak-Toste, Ghera & Guner, 2006). Over the years, most researchers have acknowledged the reality of maternal bias, as a mother’s ratings of temperament may reflect her infant’s behavior as well as her own personality and sensitivity (Bates & Bayles, 1984; Matheny, Wilson & Thoben, 1987; Leerkes & Crockenberg, 2003). However, the results from a number of investigations suggest that for some dimensions, at some ages, convergence between measures is attainable.

Although Crockenberg and Acredolo (1983) found no relation between maternally-rated infant distress and observed fuss/cry episodes at 1-month, they did find them to correlate at 3-months. Rothbart (1986), in turn, reported significant correlations for observed and maternally-rated negative reactivity at 3-, 6- and 9-month, with motor activity measures convergent at 6- and 9-, but not at 3-months. In separate reports, Eaton and colleagues found no associations between maternally-rated and actometer measures of activity in two studies of infants ranging from 12–20 weeks (Eaton & Dureski, 1986), but found a significant correlation with 6½-month-olds (Saudino & Eaton, 1991). Also using 6½-month-olds, Bridges et al. (1993) found anger

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observed in a laboratory to correlate with maternally-rated distress to limitations. More recently, Fox and his associates (Hane et al., 2006) found that maternal and observer ratings of infant negativity converged when their 9-month-old infants experienced higher degrees of negative affect during home-based activities.

The results from a few longitudinal studies may also be informative. In an early report, Isabella et al. (1985) found no associations between contemporaneous measures of observed and maternally reported fussiness at 3- or 9-months. Carnicero et al. (1999), who assessed a cohort of 60 infants in Spain at 3-, 6-, 9-, and 12-months, found no convergence between maternal ratings of activity or fear and observed activity or emotional tone, respectively, at 3-, 6-, or 9-months. At 12-months, however, activity correlated between measures and fear was negatively associated with emotional tone, indicating high fear as rated by the mothers corresponded to extreme upset as observed in the laboratory

Taken as a whole, the results of these studies suggest that activity and negative emotionality are temperament dimensions that are salient to mothers, and exhibit some convergence with behaviors scored by trained observers. In addition, agreement between mothers and observers seems to increase with the age of the infants. Only two of the cited studies showed convergence at 3-months for negative affect (Crockenberg & Acredolo, 1983; Rothbart, 1986), with activity likelier to show convergence at 6-months and beyond (e.g., Carnicero et al., 1999; Rothbart, 1986; Saudino & Eaton, 1986). Aside from this parsimonious summary, the previous work is limited in a number of ways. With two exceptions (Carnicero et al., 1999; Isabella et al., 1985), the bulk of the aforementioned work describes cross-sectional studies or one-time assessments. With one exception, and that being European Spanish mothers and infants (Carnicero et al., 1999), the US-based studies were comprised almost totally of white mother-infant dyads, who could additionally be characterized as reflecting middle-class socioeconomic status. Finally, little explanation has been provided as to why convergence is more often seen with older infants than with younger infants. Evidence suggests that although mothers' ratings of infant temperament are stable over time, they nonetheless change normatively (e.g., activity ratings increase), providing some support for maternal objectivity in response to a developing infant (Carnicero et al., 1999; Worobey & Blajda, 1989).

In the present study, low-income mothers who described themselves as African-American were visited at home when their infants were approximately 3- and 6-months of age. Participants were part of a larger study that enrolled black and Hispanic minority families—the African-American mothers comprised the largest subgroup among the variety of black and Latina subjects. Aspects of infant temperament were measured through questionnaires, a diary, and actigraph movement monitors. With all measures obtained in the families' homes, it was predicted that correlation coefficients for comparable temperament dimensions, if significant, would be higher at the second visit relative to the first visit, owing to the additional months the mothers were able to observe and to better know their infants.

2. Method

2.1. Subjects

The procedures of this study were approved by the Institutional Review Board of Rutgers University. The study participants were 24 African-American mother-infant dyads. Mothers ranged in age from 16–42 years ($M=26.6$, $SD=6.8$) with one-third being primipara. All infants were born full-term, with an average birth weight of 3143 grams ($SD=561$). Mothers on average were overweight, with a body mass index before pregnancy of 27.73 ($SD=5.67$). Mothers were recruited upon their enrolling for WIC benefits at a community center. The Supplemental Program for Women, Infants and Children (or WIC) is a US government sponsored assistance program, which provides nutrition information and food supplements for low-income women

who are pregnant or have children 5 years of age or younger (Worobey, 2005). With the assistance of the WIC receptionist, mothers were approached and asked to participate in a longitudinal study of infant feeding, growth and development. Mothers were given a \$10 coupon for groceries at a local market for agreeing to participate, after which family demographic information was requested and recorded.

2.2. Procedures

Home visits took place when the infants reached the ages of approximately 3 and 6 months. Two research assistants visited each home over two days. On day 1 the mothers were interviewed with regard to their perceptions of their infants' temperament, as well as aspects of infant feeding. Maternal ratings of activity were obtained using the activity items from the *Revised Infant Behavior Questionnaire* (RIBQ, Gartstein & Rothbart, 2003), and fussiness was measured with the fussy-difficult items from the *Infant Characteristics Questionnaire* (ICQ, Bates, Freeland & Lounsbury, 1979). Mothers were instructed in completing a 24-hour infant behavior diary, where they indicated episodes of sleeping, crying, playing, and feeding in half-hour intervals. To measure motor activity, infants wore a *MicroMini Motionlogger Actigraph* (Ambulatory Monitoring, Inc., Ardsley, NY) on their left ankle for 24-hours. These particular actigraphs were chosen because of their small size (3.49cm diameter, 25.5g) and being waterproof. More important, they have been validated with infants as young as newborns (Sadeh, Acebo, Seifer, Aytur & Carskadon, 1995). On day 2 the infant behavior diaries and actigraph monitors were picked up and the mothers were paid \$30 for their participation.

3. Results

Using the guidelines provided by the authors of the RIBQ and ICQ, summary scores were calculated for temperamental activity and fussiness at both times of measurement. For the purpose of the present analyses, the number of crying episodes was totaled for each infant over both visits. The actigraph monitors sample motility levels by the zero crossing mode at a constant rate of 16 Hz, with the zero crossings stored in memory in 1-minute epochs, which enabled continuous monitoring for 24 hours. Actigraphic data were downloaded using software based on the manufacturer's validated scoring algorithm. Descriptive statistics for the sample appear in Table 1. Relative to the 3-month measures, the maternal ratings of activity were higher at 6-months. None of the other measures showed a temporal difference.

As displayed in Table 2, partial support was provided for the stability of maternal ratings, as ICQ fussiness correlated significantly from 3- to 6-months, with the coefficient for RIBQ activity between 3- and 6-months approaching significance ($p < .10$). In contrast, the measures of observed crying and motor movements did not correlate over time. In terms of agreement across similar dimensions, neither the activity-related measures nor the crying-fussiness variables showed convergence at 3-months. However, maternal ratings of activity correlated with the actigraph estimates of movement at 6-months. Moreover, the 6-month maternal ratings of fussiness correlated with the crying episodes as recorded in the diaries.

4. Discussion

In their original New York Longitudinal Study, Thomas and colleagues (Thomas, Chess, Birch, Hertzog & Korn, 1963) enrolled low-income Puerto Rican, as well as white middle-class families. But apart from some cross cultural work (Carnicero et al, 1999; Prior, Kyrios & Oberklaid, 1986), few published studies make special note of race or ethnicity when describing infant temperament. Field and colleagues (Field, Widmayer, Stringer & Ignatoff, 1980) explored infant temperament with 150 black mothers of low income, but their aims were to test the efficacy of an intervention, and not to document their perceptions of behavioral style. While the present study could not examine differences in temperament by race or ethnicity,

the focus on African–American dyads adds to the literature on normative descriptions of temperament in this subgroup of the population. In the present sample, maternal ratings for activity and fussiness were in line with other published reports for infants of these ages, that is, similar magnitudes, with increasing scores for activity and decreasing scores for fussiness (Carnicero et al., 1999; Gennaro, Tulman & Fawcett, 1990; Rothbart, 1986). This suggests that black mothers are as in tune with their infants as has been demonstrated with mothers of other racial, ethnic or socioeconomic backgrounds.

The definitive evidence for their objectivity, however, as well as support for our prediction, is the convergence that was seen between maternal ratings and the other measures of temperament. Absent at 3-months, RIBQ activity and actigraph–measured movements were strongly correlated at 6-months, as were ICQ fussiness and reported crying episodes. That infants change remarkably over the first 6 months of postpartum life is well-established—growth is rapid, solid foods are introduced, patterns of wakefulness and sleep begin to reverse, and the expression of temperament is also modified. To adapt to such changes, mothers must be cognizant of these changes, with an increasing recognition of the individuality of their infants. Time with the infant assuredly helps in this process, so it makes intuitive sense that initial impressions of temperament would give way to more objective assessments. Particularly for the first-time mother, more and more daily interactions with her infant are likely coupled with the opportunity to observe other infants in the context of well-baby checkups, day care, or mother-run playgroups.

The present results therefore add to our understanding of much of the previous findings that show inconsistencies in convergence between maternal ratings and more objective measures. When previous investigators obtained measures at multiple time points, convergence was likelier shown at the later assessments, whether for activity, fussiness, or both (Carnicero et al., 1999; Rothbart, 1986; Saudino & Eaton, 1986). The present results therefore imply that while maternal ratings can be a useful tool in assessing early temperament, “how early” may be an important consideration. The results of this study suggest that 3-month ratings by mothers may be formative in nature, and that researchers can take greater confidence in maternal reports as being more than just perceptions after the mother has had sufficient time to better get to know her infant.

This study was limited by the relatively small sample size. While the homogeneity of the sample (black, low income) was by design, this specificity may also reduce our ability to generalize the findings beyond such subgroups of the US population. The maternal overweight status and the slight underweight status of the infants at birth may further limit the application of these data to other populations; however, this does provide further evidence that the sample is fairly representative of the characteristics of African-American mothers and their infants (David & Collins, 1997).

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Table 1

Descriptive statistics for 3-and 6-month infant measures

	Mean (SD) at 3 mos.	Mean (SD) at 6 mos.	t-value
Infant age in days	97.67 (12.32)	183.67 (8.67)	
RIBQ activity	4.27 (.69)	4.73 (.58)	-3.04 **
Movements/epoch	19.51 (6.17)	18.51 (5.43)	.53
ICQ fussiness	3.48 (.55)	3.42 (.43)	.63
Number of crying episodes	4.35 (2.73)	3.55 (3.50)	.92

*
 $p < .05$ **
 $p < .01$

Table 2
Pearson product-moment correlation coefficients between infant measures

	1	2	3	4	5	6	7	8
1. RIBQ activity-3mos		.00	.01	.09	.34	-.05	.23	.18
2. Movements-3mos.			.16	-.01	.00	.14	.20	-.13
3. ICQ fussiness-3mos.				-.10	-.22	.11	.51*	.53**
4. Crying episodes-3mos.					.13	-.03	.22	.24
5. RIBQ activity-6mos						.64***	-.11	-.46*
6. Movements-6mos.							-.06	-.19
7. ICQ fussiness-6mos.								.61**
8. Crying episodes-6mos.								

*
 $p < .05$

**
 $p < .01$

 $p < .001$