

## Regular Article

# Parent–infant relationship global assessment scale: A study of its predictive validity

YUTAKA AOKI, MD,<sup>1</sup> CHARLES H. ZEANA, MD,<sup>2</sup> SHERRYL SCOTT HELLER, PhD<sup>2</sup>  
AND SUDHA BAKSHI, MD<sup>3</sup>

<sup>1</sup>Department of Psychiatry and Behavioral Science, Tokai University School of Medicine, Iseharashi Bouseidai, Japan, <sup>2</sup>Institute of Infant and Early Childhood Mental Health, Tulane University School of Medicine, New Orleans, LA and <sup>3</sup>Children's Hospital of Philadelphia, Philadelphia, PA, USA

### Abstract

The Parent–Infant Relationship Global Assessment Scale (PIRGAS; Zero to Three, 1994) provides a continuously distributed scale of infant–parent relationship adaptation, ranging from ‘well-adapted’ to ‘dangerously impaired’. The present study examines the predictive validity of the PIRGAS in a high-risk sample by coding relationship adaptation level from a single sample of 10 min of unstructured free play between mothers and their 20-month-old infants and examining its relationship to subsequent interaction with mothers and behavior problems at 24 months. Relationship adaptation assessed reliably from observations of only 10 min of free play between mothers and their infants at 20 months of age using PIRGAS predicted subsequent mother–infant interaction in a laboratory based problem-solving paradigm (Crowell procedure) at 24 months and internalizing symptomatology of Child Behavior Checklist at age 24 months. These results contribute to the predictive validity of the PIRGAS as a measure of mother–infant relationship adaptation.

### Key words

infant mental health, Parent–Infant Relationship Global Assessment Scale, relationship adaptation.

## INTRODUCTION

The assessment and treatment of very young children poses special challenges for infant mental health clinicians, including infant psychiatrists. The importance of a contextual understanding of infant behavior, development and psychopathology has been repeatedly emphasized by researchers, clinicians and theoreticians.<sup>1–5</sup> Because of the importance of infants' primary caregiving relationships for development and psychopathology, the emphasis in assessing and treating young children includes a major emphasis on assessing the qualities of infants' primary caregiving relationships as useful indices of their overall psychological adaptation and well being.<sup>6</sup> Not only are relationships with caregivers indices of how well infants

are in negotiating developmental challenges in the here and now, they are also predictive of individual adaptation in subsequent periods of development.<sup>7</sup>

For all these reasons, the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (DC:0–3; Zero to Three)<sup>8</sup> incorporated this emphasis in its proposed classification of infancy disorders by including an axis of relationship disorders. In order to determine whether or not a relationship disorder is present, the clinician is instructed to use the Parent–Infant Relationship Global Assessment Scale (PIRGAS; Zero to Three, 1994) to assess the adaptive qualities of a particular relationship.

Although the PIRGAS was included for use with Axis II assessments in DC:0–3, the scale has been subjected to limited validation only. For example, von Hofacker and Papousek reported that PIRGAS scores of distressed and disturbed mother–infant relationship adaptation were associated with duration of regulatory problems in the infant, the number of affected behavioral domains, maternal psychopathol-

Correspondence address: Dr Yutaka Aoki, Department of Psychiatry and Behavioral Science, Tokai University School of Medicine, Iseharashi Bouseidai, Japan. Email: yaoki-sm@poem.ocn.ne.jp

Received 21 February 2001; revised 4 February 2002; accepted 8 April 2002.

ogy and cumulative risk scores in infants referred for regulatory difficulties.<sup>9</sup> Thomas and Clark reported that PIRGAS scores were related to types of disorders in a sample of clinic-referred children presenting with disruptive behaviors.<sup>10</sup> Furthermore, lower PIRGAS scores were marginally related to parents' reports of the child's aggressive behavior ( $r = -0.23$ ;  $P < 0.06$ ). Boris *et al.* found that young children diagnosed with attachment disorders had more serious disturbances in their primary caregiving relationships (average scores in the severely disordered range) than children referred for other reasons (average scores in the disturbed range).<sup>11</sup> Taken together, these results provide preliminary evidence that lower PIRGAS scores are related, in expected ways, to clinical symptomatology in infancy, to cumulative family risk factors and to types of clinical disturbances. However, all these results describe concurrent associations in which the direction of effects is unclear. Much remains to be established about the scale, particularly with regard to predictive validity.

In the present study, we examined the predictive validity of the PIRGAS in a high-risk sample of infants and parents by coding the level of relationship adaptation from a single observation of 10 min of unstructured free play between mothers and their 20-month-old infants in a laboratory setting as a predictor of infants' subsequent interactions with mothers and mothers' reports of behavior problems at 24 months. The specific hypothesis we tested in the present study was that the level of mother–infant relationship adaptation at 20 months (assessed by the PIRGAS) will predict mother and infant behavior in a laboratory based problem-solving paradigm at 24 months and will predict internalizing and externalizing symptomatology at 24 months.

## METHODS

### Subjects

Mothers were recruited prenatally from a clinic in the north-eastern US that served those on public assistance or who had no medical insurance for a longitudinal study of infant development during the first 2 years of life. Requirements were only that the mother have at least one living child in addition to the index child with whom she was pregnant and that she be fluent in English. A total of 53 mothers and their infants (29 boys and 24 girls) were recruited to participate. The mean age of the mothers was 25 years (range 19–35 years). Only 34% of mothers were married, 74% received public assistance and 28% had histories of previous involvement with child protec-

tive services. Ethnically, the sample was defined as 44% African–American, 44% Caucasian, 4% Latina, 2% American Indian and 6% mixed/other.

## Measures and procedures

### Free play procedure

At 20 months of age, infants and their mothers who were participating in a longitudinal study of infant development were observed playing in a laboratory playroom with a standard set of toys for 10 min. An examiner observed the play from inside the room. Mothers were instructed to play with their children as they usually do at home. Sessions were videotaped for later review.

### Parent–Infant Relationship Global Assessment Scale (PIRGAS)<sup>8</sup>

The PIRGAS was derived from a model proposed by Anders that defined relationship perturbations, disturbances and disorders.<sup>12</sup> This scale provides a continuously distributed scale of infant–parent relationship functioning, ranging from 90 (well adapted) to 10 (dangerously impaired; see Table 1).

In using the PIRGAS, there are three components of an infant–parent relationship to assess: behavioral quality of the interaction, affective tone and psychological involvement. Nine anchored points define differing levels of relationship adaptation. For example, '90 well-adapted' designates relationships that are functioning exceptionally well. They are not only mutually enjoyable and conflict free, but they are also growth promoting for the development of both parties. In contrast, '30 disordered' refers to relationships that are characterized by relatively stable, maladaptive interactions and distress in one or both parties. In fact, rigidly maladaptive interactions,

**Table 1.** Anchors for the Parent–Infant Relationship Global Assessment Scale

90	Well adapted
80	Adapted
70	Perturbed
60	Significantly Perturbed
50	Distressed
40	Disturbed
30	Disordered
20	Severely disordered
10	Grossly impaired

particularly if they involve distress in one or both parties, are the hallmark of disordered relationships. Finally, ‘10 grossly impaired’ relationships are extremely disorganized and dangerous for the infant. Interactions are disturbed so severely and/or so frequently that the infant is in imminent danger of physical harm.

Two coders, blind to other data, reviewed videotapes of the free play sessions and independently rated the overall level of relationship adaptation using the PIRGAS. Inter-rater reliability was more than adequate ( $r=0.83$ ).

#### *Crowell problem-solving procedure*<sup>6,13</sup>

This structured interaction involves a series of eight episodes of free play, clean-up, four teaching tasks, a 3 min separation and a reunion. The purpose of the procedure is to assess in a standardized way different aspects of the parent–child relationship as reflected in interactions between mothers and infants.<sup>6</sup> Mothers and infants were videotaped in this procedure when infants were 24 months of age and the sessions were rated later according to a coding system drawn from the work of Crowell and Feldman.<sup>13</sup> Only the first 43 subjects of 53 total completed Crowell Procedures due to premature termination of the study when the principal investigator relocated. All analyses derived from the Crowell Procedure involve 43 subjects. There were no differences in PIRGAS scores of the 43 subjects who completed the Crowell Procedure and the 10 who did not.

Maternal variables of supportive presence and quality of assistance were coded based upon mothers’ behavior in tasks 3 and 4, the tasks that were too difficult for the child to accomplish without help from mother. Because these variables were highly intercorrelated ( $r=0.90$ ), they were combined in subsequent analyses. Inter-rater reliability on the mothers’ help and support score was  $r=0.75$ .

Child behavior was coded using continuous seven-point anchored scales on the following variables: affection, avoidance, negativity, controlling, task persistence, enthusiasm, reliance for help, anxiety, compliance and overall experience. Inter-rater reliabilities for all scales exceeded 0.75. For purposes of data reduction, a principal components analysis using varimax rotation was applied to the child variables. This analysis yielded a three-factor solution: positive relatedness (overall experience, reliance, control, enthusiasm, negativity, avoidance, affection), task persistence (persistence) and compliance (compliance, anxiety). Factor scores derived from these three factors were retained for subsequent analyses.

#### *Child behavior checklist 2–3*<sup>14</sup>

This is a widely used and well-validated measure of child behavior problems. Mothers reported on 100 different child behaviors when their children were 24 months old, using a 0, 1 or 2 scale and yielding scores on a variety of scales and subscales. Summary scores of internalizing and externalizing problem behaviors were used in subsequent analyses in this investigation.

## RESULTS

### Control analysis

No differences on independent or dependent variables were apparent based on the gender of the child, the age of the child or mothers’ education or ethnicity.

### Relationship adaptation at 20 months

Scores of relationship adaptation using the PIRGAS, based upon 10 min of free play at 20 months, ranged from 20 (‘severely disordered’) to 80 (‘adapted’). The mean score was 57.8 (distressed; SD 15.6), which is reasonable considering the high-risk nature of this sample of mothers and infants.

### Relationship adaptation and mother–child interaction

Overall level of relationship adaptation at 20 months was examined as a predictor of mother and child behavior in the Crowell problem-solving paradigm at 24 months. The PIRGAS scores were significantly related to mothers’ help and support in the Crowell Procedure ( $r=0.41$ ;  $P<0.01$ ). Furthermore, PIRGAS scores were also predictive of infant compliance ( $r=0.46$ ;  $P<0.002$ ) and marginally predictive of infant positive relatedness ( $r=0.27$ ;  $P<0.07$ ). However, there was no relationship between PIRGAS scores and infant persistence ( $r=0.004$ ;  $P>0.98$ ; Table 2).

**Table 2.** Correlation between relationship adaptation and mother–child interaction

Crowell procedure	PIRGAS score	
	<i>r</i>	<i>P</i>
Mother’s help and support	0.41	<0.01
Infant compliance	0.46	<0.002
Infant positive relatedness	0.27	<0.07
Infant persistence	0.004	<0.98

PIRGAS, Parent–Infant Relationship Global Assessment Scale.

**Table 3.** Correlation between relationship adaptation and child behavior problems

Child behavior checklist 2–3	PIRGAS score	
	<i>r</i>	<i>P</i>
Internalizing	–0.34	< 0.035
Externalizing	–0.27	< 0.10

PIRGAS, Parent–Infant Relationship Global Assessment Scale.

### Relationship adaptation and child behavior problems

Overall level of relationship adaptation at 20 months was predictive of child internalizing symptomatology ( $r = -0.34$ ;  $P < 0.035$ ), but not externalizing symptomatology ( $r = -0.27$ ;  $P < 0.10$ ) at 24 months (Table 3).

## DISCUSSION

The most important finding in the present investigation is that infant–parent relationship adaptation, assessed reliably from observations of only 10 min of free play between mothers and their infants at 20 months of age, predicted subsequent mother–infant interaction at 24 months and child internalizing symptomatology at age 24 months. Specifically, PIRGAS scores rated from unstructured free play at 20 months of age predicted mothers' help and support with their infants and infant compliance with mothers 4 months later in a structured laboratory problem-solving paradigm. Furthermore, PIRGAS scores rated from unstructured free play at 20 months predicted child internalizing symptomatology (rated by mothers) at 24 months of age. These results contribute to the predictive validity of the PIRGAS as a measure of mother–infant relationship adaptation.

Although the predictions that we made were over a relatively short time interval of only 4 months, the fact that scores were derived from only 10 min of unstructured interaction at 20 months and that they predicted not only mother's ratings, but also mother and infant behavior in a more structured activity is impressive.

While the PIRGAS rating predicted the child's compliance (and positive relatedness with mother marginally), it did not predict the task persistence of infants in the Crowell procedure. This suggests that task persistence is less clearly related to mother–infant relationship adaptation than compliance and positive relatedness. Indeed, although temperamental traits like persistence may be affected by relationship

characteristics, they are also likely to have more endogenous contributors. In contrast, compliance and relatedness are hallmarks of what Bowlby termed the 'goal-corrected partnership' of attachment<sup>15</sup> and these are clearly features deriving from individual differences in relationship adaptation, as has been demonstrated previously.<sup>16</sup>

Interestingly, PIRGAS scores predicted internalizing but not externalizing behavior problems in this sample. If replicated, this provides an important finding for developmental psychopathology, because previous research has delineated pathways to externalizing problems but not to internalizing problems.<sup>17</sup> In fact, pathways for externalizing behavior in girls are not known. The fact that nearly half of our sample was female may mean that the failure to demonstrate links between mother–infant relationship adaptation and externalizing behavior is because we lacked a large enough sample of boys to demonstrate the link.

These findings are congruent with both attachment theory and separation individuation theory. Bowlby suggested that the goal-corrected partnership becomes apparent at around 18–20 months of age and extends into the 3rd and 4th year of life.<sup>15</sup> This partnership is characterized by the infant's enhanced capacity to appreciate the other's perspective and of the need to negotiate for need gratification. The child's ability to cooperate with the caregiver and to maintain positive relatedness facilitated joint achievement of problem solving.

In contrast, Mahler's theory of separation–individuation conceptualized the rapprochement phase and the rapprochement crisis as central to the 20–24 month age range.<sup>18</sup> Individual differences in infants' problem behaviors at these ages are believed to reflect individual differences in the successful self development of the infants. Mahler *et al.* carefully documented how individual differences in mother–infant relationships predicted how successfully the child handled the rapprochement crisis.<sup>18</sup>

Developmentally, our findings are compatible with both theories in that we found that infants who are relating well to their mothers at 20 months are also relating well to them at 24 months and are showing fewer problem behaviors. These findings indicate that infants who are able to take on new challenges enthusiastically (such as attempting to solve problems) but, at the same time, are able to accept help without conflict when help is needed, have achieved a balance between independence and dependence that both separation–individuation and attachment theory emphasize as the most salient index of mental health in the latter part of the second year of life. Conversely, infants who have problematic relationships

with their mothers early in the rapprochement phase and early in the goal-corrected partnership demonstrate more problems of sad or anxious mood, withdrawn behavior and less satisfying interactions with their mothers later in these same developmental phases.

Originally, the PIRGAS was developed to be used at the conclusion of a comprehensive clinical assessment of a parent and infant dyad. It remains to be seen whether coding PIRGAS scores from longer periods of observation and more varied types of interactions between mothers and infants leads to even stronger evidence for concurrent and predictive validity.

Although there are some limitations in our findings, these results are encouraging that meaningful patterns of interaction between mothers and infants may be detected even in relatively brief periods of observation. Furthermore, these patterns appear to reflect meaningful levels of functional adaptation for the dyad, as evidenced by the lawful relationships between these patterns of interaction and subsequent mother and infant behavior.

These preliminary findings invite replication not only in US, but also in Japan, and invite examination of more complex models of the predictive validity of mother–infant relationship adaptation, as assessed by the PIRGAS, and subsequent mother and infant behavior.

Because the PIRGAS is supposed to measure a relational construct, relationship adaptation ought to be more than merely the sum of the interactive behavior of mothers and infants. In fact, this can be tested empirically in subsequent research. If relational measures can be incorporated into clinical and developmental investigations, this will substantially enhance our contextual understanding of infant adaptive behavior.

## REFERENCES

- Lieberman AF, Silverman R, Pawl J. Infant–parent psychotherapy: Core concepts and current approaches. **In:** Zeanah Jr CH (ed.). *Handbook of Infant Mental Health*, 2nd edn. Guilford Press, New York, 2000; 472–484.
- Sameroff AJ, Fiese B. Models of development and developmental risk. **In:** Zeanah Jr CH (ed.). *Handbook of Infant Mental Health*, 2nd edn. Guilford Press, New York, 2000; 2–19.
- Sroufe LA. Relationships. Self, and individual adaptation. **In:** Sameroff AJ, Emde RN (eds). *Relationship Disturbances in Early Childhood*. Basic Books, New York, 1989; 70–94.
- Stern DN. *The Interpersonal World of the Infant*. Basic Books, New York, 1985.
- Zeanah CH, Boris N, Scheeringa M. Psychopathology in infancy. *J. Child. Psychol. Psychiatry* 1997; **38**: 81–99.
- Zeanah CH, Larrieu JA, Valliere J, Heller SS. Infant–parent relationship assessment. **In:** Zeanah Jr CH (ed.). *Handbook of Infant Mental Health*, 2nd edn. Guilford Press, New York, 2000; 222–235.
- Crockenberg S, Leerkes E. Infant social and emotional development in family context. **In:** Zeanah Jr CH (ed.). *Handbook of Infant Mental Health*, 2nd edn. Guilford Press, New York, 2000; 60–90.
- Zero to Three/National Center for Clinical Infant Programs. *Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (PIRGAS)*. Zero to Three/National Center for Clinical Infant Programs, Arlington, 1994.
- von Hofacker N, Papousek M. Disorders of excessive crying, feeding and sleeping: The Munich Interdisciplinary Research and Intervention Program. *Infant Mental Health J.* 1998; **19**: 180–201.
- Thomas JM, Clark R. Disruptive behavior in the very young child. Diagnostic classification: 0–3 guides identification of risk factors and relational interventions. *Infant Mental Health J.* 1998; **19**: 229–244.
- Boris N, Zeanah CH, Larrieu J, Scheeringa M, Heller S. Attachment disorders in infancy and early childhood: A preliminary study of diagnostic criteria. *Am. J. Psychiatry* 1998; **155**: 295–297.
- Anders TF. Clinical syndromes, relationship disturbances and their assessment. **In:** Sameroff AJ, Emde RN (eds). *Relationship Disturbances in Early Childhood*. Basic Books, New York, 1989; 125–144.
- Crowell JA, Feldman SS. Mother’s internal models of relationships and children’s behavioral and developmental status in mother–child interaction: A study of mother–child interaction. *Child. Dev.* 1988; **59**: 1275–1285.
- Achenbach TM. *Manual for the Child Behavior Checklist 2/3 and 1992 Profile*. University of Vermont Department of Psychiatry, Burlington, 1992.
- Bowlby J. *Attachment and Loss, Vol. 1. Attachment*. Basic Books, New York, 1969.
- Matas L, Arend RA, Sroufe A. Continuity of adaptation in the second year: The relationship between quality of attachment and later competence. *Child. Dev.* 1978; **49**: 547–556.
- Shaw DS, Gilliom J, Giovanelli J. Aggressive behavior disorders. **In:** Zeanah Jr CH (ed.). *Handbook of Infant Mental Health*, 2nd edn. Guilford Press, New York, 2000; 397–411.
- Mahler M, Pine F, Bergman A. *The Psychological Birth of the Human Infant: Symbiosis and Individuation*. Basic Books, New York, 1975.