

# The Stability of Temperament by Child and Mother Reports over Two Years

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**Abstract.** The stability of temperament dimensions in children, adolescents, and young adults was examined over a 2-year period through the use of multiple informants and a measure of temperament, presumably applicable to informants of all ages. The study is based on 220 children from 91 families at high- and low-risk for major depression by virtue of the presence or absence of major depression in their parents. The Dimensions of Temperament Survey was completed independently by the child and by the parents about their child. Results showed a fair to moderate stability for child self-report of temperament and moderate to good stability for mother reports of child temperament. Discussion focuses on factors that may influence the stability of temperament ratings such as age, sex, mother's depression, socialization pressures, and expectations of temperament held by others. *J. Am. Acad. Child Adolesc. Psychiatry*, 1990, 29, 3:386-391. **Key Words:** temperament, stability, DOTS, adolescents.

In recent years several researchers have reviewed the literature regarding the stability of temperament (Thomas, 1984; Plomin and Dunn, 1986; Rutter, 1987), yet controversy still exists. At the core of the controversy is the role of stability in the actual definition of temperament. Thomas and Chess, two of the earliest temperament researchers, state that stability does not have to be a defining characteristic of temperament (Thomas and Chess, 1977). Rather, the important issue is to see how temperament is affected by context and/or maturation (Lerner and Lerner, 1983). The reviewers (Thomas, 1984; Rutter, 1987) failed to find striking consistencies in temperament in longitudinal samples from infancy to late childhood, but they maintained interest in the patterns of change and possible influences.

Thomas and Chess identified nine categories of temperament: activity level, rhythmicity, approach/withdrawal, adaptability, sensory threshold, quality of mood, intensity of mood expression, distractibility, and persistence/attention span. They assessed the stability of temperament dimension aggregates such as those comprising the "difficult child," rather than the stability of individual dimensions (Thomas et al., 1968). Subsequent researchers have adopted this method of assessment.

Other temperament measures have been designed as well. Due to the use of variable measures used with different age groups, there have been discrepant results regarding the

stability of temperament. There has been some evidence of moderate stability in measurements from early childhood to young adulthood (Korn, 1984; Maziade et al., 1986; Plomin and Dunn, 1986), and from infancy to early childhood (Carey and McDevitt, 1978; Kagan et al., 1984, 1987, 1988; Maziade et al., 1985, 1989a, b; Reznick et al., 1986). Researchers examining stability from early to middle childhood have found an increase in the amount of change in temperament scores (Maziade et al., 1986; Persson-Blennow and McNeil, 1988) and variability among the individual temperament dimensions (Maziade et al., 1986).

Chess and Thomas (1984) propose that temperament dimensions may vary: some may be stable in early childhood but may be more variable in adolescence, others may undergo changes in stability during the course of maturation. Researchers suggest that temperament in infancy is more strongly influenced by biological factors, but that as development proceeds, temperament is more influenced by experience and context (Plomin and Dunn, 1986). Another reason for the lack of strong consistency in the findings is thought to be the role of environmental influences that may accentuate, modify, or be required for manifestation of temperament traits (Rutter, 1987). Other researchers view temperament as stable if one considers that the temperamental characteristic may undergo developmental changes in its manner of expression, but would keep its basic identity (Goldsmith et al., 1987; Thomas and Chess, 1977).

Another issue in the measurement of child behavior or traits is the use of multiple informants, i.e., the mother and child to report about the child. In a majority of temperament studies, temperament ratings for children were made by parents only, while those about teens and adults were made through contact with the individuals themselves (Thomas and Chess, 1977; Maziade, 1989a, b). The reliability of mother informants and their role in assessing psychiatric disorders in their children is a current research and clinical issue (Griest et al., 1979; Breslau, 1988). Edelbrock et al.'s (1985) study demonstrated age-related shifts in parents' perception and awareness of children's behavior; the reliability of the parent's report decreased as the age of the child increased. Although these findings address ratings of psychiatric symptoms, they nonetheless suggest the need for further investigation of the use of mothers as informants

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of children's behavior when mothers have a psychiatric illness.

This paper addresses the results derived from the use of Lerner's Dimensions of Temperament Survey (Lerner et al., 1982). The survey is designed for adults to report about their offspring and/or themselves and for children of all ages to report about themselves. The Dimensions of Temperament Survey (DOTS) is a 34-item instrument based on the Thomas and Chess dimensions of temperament. Lerner identified five factors: attention span/distractibility, adaptability/approach-withdrawal, activity level, rhythmicity, and irritability (Lerner et al., 1982).

Stability of temperament among children, adolescents, and young adults is examined over a 2-year period through the use of multiple informants and a measurement of temperament applicable to informants of all ages. A necessary first step is to look more closely at the change in dimensional patterns over time. Prior to this study, there had been little research on the stability of temperament over time, especially in terms of individual dimensions of temperament. Based on the few previous findings of moderate stability from teenage years to adulthood (Maziade, et al., 1986), it was hypothesized that there would be moderate to good stability overall. The authors expected to find some variability in stability among the different dimensions consistent with Thomas and Chess's view of maturational changes. They also wanted to examine whether there would be differences in the stability of the offspring's self-report in comparison to mothers' report of temperament and how the reports might vary.

## Method

### Sample

For a complete description of study design and assessment, see Weissman et al., 1987. This study is based on 220 children from 91 families at high- and low-risk for major depression by virtue of the presence or absence of major depression in their parents (probands). There are 65 families in which one or more parents had depression and 26 families in which neither parent had depression. Parents were participants in a family study of major depression who had children between 6 and 23 years of age. Six years elapsed between the time of the initial family study of adults and the study of children. When the initial family-genetic study of parents began, these children were ages 1 to 17. The parents' clinical status was reassessed when the children were interviewed 6 years later. At the time of the initial interview, 178 of 220 (81%) children completed temperament self-reports and mothers completed temperament reports on 193 (88%) children.

### Two-Year Follow-up

Two years after the initial interviews, all 91 families in the original high-risk sample were recontacted. Eighty-five (93%) of the 91 families, with a total of 203 children, from the original sample consented to participate. To be eligible for mother report at the second contact, children needed to be between 6 and 18 years old ( $N = 127$ ). For children

TABLE 1. *Child Reports and Mother Reports: Demographic Characteristics of Children at Initial Interview*

Sex of Child	Age of Child	Depression Status of Parent			
		Neither Parent Depressed		1 or More Parents Depressed	
		<i>N</i>	%	<i>N</i>	%
Child report by parental depression status ( $N = 145$ )					
Males	6-11	2	4.1	11	11.5
	12-17	11	22.4	12	12.5
	18+	5	10.2	21	21.9
Females	6-11	5	10.2	6	6.2
	12-17	11	22.4	21	21.9
	18+	15	30.6	25	26.0
Mother report by parental depression status ( $N = 59$ )					
Males	6-11	3	13.6	13	35.1
	12-16	9	40.9	9	24.3
	18+	15	30.6	25	26.0
Females	6-11	3	13.6	6	16.2
	12-16	7	31.8	9	24.3
	18+	15	30.6	25	26.0

ages 19 to 23 years ( $N = 93$ ), no parent interviews or parent reports of their offspring's temperament were obtained in order to reduce interview burden. At the 2-year follow-up, 159 of 220 (72%) children ages 8 to 25 years completed temperament self-reports and mothers completed temperament reports on 62 of 127 (49%) children.

The present study examines the stability of mother and child reports, including child reports on 145 of 220 (66%) children who completed self-reports at both contacts, and including mother reports on 59 of 127 (46%) children for whom mothers completed reports at both contacts (See Table 1). There were significantly more female children without mother reports at both contacts than with mother reports at both contacts (63% versus 42%). In contrast, significantly more female children completed self-reports at both contacts than those children without self-reports at both contacts (57% versus 43%). There were no significant differences in proband status for children with or without two mother reports and with or without two self-reports. The eligible children with mother reports at both contacts were significantly younger (15.1 versus 11.6 years of age) than those eligible children in the sample without mother reports at both contacts. There was no significant difference in mean age between children with and without self-reports at both interviews. There were no significant differences in socioeconomic status (SES) between those children with and without two self-reports. Similarly, there were no significant differences in SES between those children with and without two mother reports. All subjects in the study were white.

The stability of mother and child reports is also examined on an overlap sample of 53 of 127 (42%) children who had mother and child reports of temperament obtained at both contacts for a total of four temperament reports for each child. Fifty percent of the 20 children from the families in which neither parent had depression (low-risk) and 42% of the 33 children from families in which one or more parents had depression (high-risk) were female. Of the 24 female

TABLE 2. Temperament Scores and Agreement by Child and Mother Report

DOTS	Child Report				Mother Report			
	Initial Contact (Wave I) (N = 145) Mean	Follow-up (Wave II) (N = 145) Mean	Pearson Correlations (N = 145) r	Differ. Btw. Means (N = 145) <sup>a</sup> Mean (SD)	Initial Contact (Wave I) (N = 59) Mean	Follow-up (Wave II) (N = 59) Mean	Pearson Correlations (N = 59) r	Differ. Btw. Means (N = 59) <sup>a</sup> Mean (SD)
Activity Level	1.4	1.3	0.42***	0.1 (1.6)	0.7	0.6	0.46***	0.1 (1.3)
Attention Span	5.9	6.6	0.45***	-0.7 (3.0)**	6.1	6.08	0.50***	0.02 (3.0)
Adaptability	3.8	3.9	0.48***	-0.1 (1.8)	3.6	4.2	0.58***	-0.6 (1.9)*
Rhythmicity	3.4	3.9	0.34***	-0.5 (2.7)*	5.66	5.69	0.60***	-0.03 (2.0)
Irritability	2.4	2.0	0.43***	0.4 (1.7)**	1.5	1.6	0.40***	-0.1 (1.6)

<sup>a</sup>Paired *t*-tests or the difference between means of temperament reports between initial and follow-up contact.

\**p* < 0.05, \*\**p* < 0.01, \*\*\**p* < 0.001.

children, 37% were between the ages of 6 and 11 years old and 63% were between the ages of 12 and 16 years old. In the sample of 53, 50% of the 20 children from low-risk families and 58% of the 33 children from high-risk families were males. Among the male children, 41% were between the ages of 6 and 11 years old and 59% were between the ages of 12 and 16 years old. There was no significant difference in SES between those children with four temperament reports about themselves and those without all four reports.

Major depression in parents was defined according to the Research Diagnostic Criteria (modified to require 4 weeks duration of symptoms and impairment in a major social role) and was assessed using the Schedule for Affective Disorder—Lifetime Version (SADS-L) (Endicott and Spitzer, 1978). The parents comprising the nondepressed group, originally identified in a 1975 community survey, reported no history of psychiatric illness in at least five direct interviews (the last two using SADS-L) given over an 8-year period (Weissman and Myers, 1978).

#### Assessment

Each parent and offspring completed a battery of self-report measures at the initial contact and 2-year follow-up that contained, among other forms, the child and mother report versions of the DOTS. The DOTS is a measure of temperament designed to be continuous in the behavioral repertoire from early childhood to young adulthood. For further information regarding scale design and scoring see Lerner et al., 1982.

The mother and child report forms were completed independently by the subjects. Parents were asked to complete self-administered reports about themselves and their children. Offspring over 7 years of age were asked to complete the self-administered reports about themselves.

#### Data Analysis

Since there were no significant mean differences on dimensions for any temperament scores by assigned proband group, the children were analyzed as one group, rather than separately, according to their parents' proband status. As in other studies of stability, Pearson correlations were calculated to measure the consistency between the reports over

time (Thomas and Chess, 1977; Korn, 1984; Maziade et al., 1989b). Paired *t*-tests were used to assess the mean difference in temperament dimension scores from first to second interview. Regression analyses were conducted to examine the effects of age, sex of child, and parental depression on the stability of the temperament dimension scores.

## Results

#### Stability of Temperament: Child Reports

Table 2 shows the correlation between child DOTS self-reports at the initial and second interview. The Pearson correlations range from 0.34 to 0.48, demonstrating moderate stability. Rhythmicity demonstrates the lowest level of stability (*r* = 0.34) and adaptability the highest (*r* = 0.48).

As seen in Table 2, the paired *t*-test for the DOTS dimension scores show a tendency for the mean DOTS score to be slightly higher at the second interview than at the first for the attention span, adaptability, and rhythmicity dimensions. According to the paired *t*-tests, three mean differences including attention span (-0.7), rhythmicity (-0.5), and irritability (0.4) are significantly different from 0. Although the absolute values of the mean differences are quite small, relative to the dimensions' scales, they suggest that there is some change in temperament rating for these three dimensions. Paired *t*-tests stratified by age suggest that the changes in attention span occur more in offspring between the ages of 14 and 19 years old, while the changes in rhythmicity and irritability occur predominantly in those offspring 19 years and older.

Table 3 demonstrates the results from regression analyses examining the effect of age and sex of the child, and parental depression on the stability of temperament scores by child report. The regression analyses show that certain variables affect the stability of child report of temperament. As seen in the table, child's age has a significant effect on changes in irritability scores with a decrease in irritability as the child gets older. There is a nonsignificant trend for child's age to affect changes in activity level and rhythmicity as well. Older children describe themselves as experiencing a decrement in activity level and an increase in regularity in their routines of daily life. Child's sex has a significant

TABLE 3. *The Effect of Age, Sex, and Parent Depression on Temperament Stability in Children*

Variables	Act. Leve. b (SE)	Att. Span b (SE)	Adaptab. b (SE)	Rhythm. b (SE)	Irritability b (SE)
Child Report ( <i>N</i> = 145)					
Constant	2.2 (0.6)	3.3 (1.2)	2.3 (0.7)	0.7 (1.0)	1.7 (0.6)
Wave 1 score	0.4 (0.1)**	0.4 (0.1)**	0.5 (0.1)**	0.4 (0.1)**	0.4 (0.1)**
Parent depression	0.2 (0.2)	0.2 (0.5)	-0.2 (0.3)	0.01 (0.4)	0.3 (0.3)
Child's age	-0.04 (0.02)	0.03 (0.05)	-0.03 (0.03)	0.1 (0.04)	-0.1 (0.02)*
Child's sex	-0.6 (0.2)**	-0.1 (0.5)	0.1 (0.3)	0.5 (0.4)	0.1 (0.2)
Mother Report ( <i>N</i> = 59)					
Constant	0.8 (0.8)	4.4 (1.8)	0.4 (1.3)	3.7 (1.4)	1.3 (0.9)
Wave 1 score	0.4 (0.1)**	0.4 (0.1)**	0.6 (0.1)**	0.6 (0.1)**	0.3 (0.1)**
Mother depression	0.2 (0.3)	-0.9 (0.7)	-0.4 (0.5)	-0.5 (0.5)	0.8 (0.4)*
Child's age	-0.03 (0.1)	-0.03 (0.1)	0.1 (0.1)	-0.1 (0.1)	0.01 (0.1)
Child's sex	-0.1 (0.3)	0.03 (0.7)	0.1 (0.5)	0.1 (0.5)	-0.4 (0.3)

\*  $p < 0.05$ , \*\*  $p < 0.01$ .

effect on only one dimension, activity level. Relative to boys, girls experience a drop in activity level over time. The presence of depression in one or more parents does not have an effect on the stability of any temperament dimensions according to child self-report.

#### *Stability of Temperament: Mother Report*

The bottom of Table 2 shows the correlation between mother report of child temperament at initial interview and follow-up interview. The Pearson correlations range from 0.40 to 0.60, slightly higher than those for child self-report. Using paired *t*-tests (shown in Table 2), only one mean difference, adaptability (-0.6), is significantly different from 0. Paired *t*-tests stratified by age suggest that the change in adaptability occurs primarily in ratings of offspring between the ages of 12 and 18 years old. Scores for the other four dimensions appear to be relatively consistent over the 2-year period.

In addition, the bottom of Table 3 shows the regression analysis of the effect of age and sex of the child and maternal depression upon the temperament scores. There are no effects for children's age or sex on mother reports of children's temperament. The analysis demonstrates a significant effect for maternal depression on the stability of mother reports of children's irritability. For children whose mothers were depressed, mothers report an increase in irritability over time. At the initial contact, the sample included six mothers who had a current diagnosis of depression and there were mother reports on 13 of their 14 children. Current psychiatric status of mothers was based upon direct interviews with the mothers rather than by best estimate diagnoses. The authors had direct interviews with mothers of 184 of 220 children. The mean temperament scores of these 13 children were examined in comparison to those 171 children whose mothers were not in a current episode of depression at the initial contact. The analysis shows a significant trend for lower adaptability, more irritability, and lower rhythmicity in the children according to reports by mothers who were in a current episode of depression at the time of the initial contact.

TABLE 4. *Pearson Correlations for Agreement between Initial Interview and Two-Year Follow-up on Temperament Scores of Children by Mother and Child Reports*

	Child Report Pearson <i>r</i>	Mother Report Pearson <i>r</i>
DOTS		
Activity level	0.40**	0.49***
Attention span	0.52***	0.55***
Adaptability	0.34**	0.55***
Rhythmicity	0.27*	0.58***
Irritability	0.41**	0.45***

Note: *N* = 53.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

#### *Stability of Temperament: Sample with Both Sets of Mother and Child Reports*

Pearson correlations were also calculated for the sample of children (*N* = 53) who had mother reports and child reports at both the initial and second interview. According to Table 4, the Pearson correlations show moderate stability, ranging from 0.27 to 0.52 for child report and from 0.45 to 0.58 for mother report. Mothers' reports appear to be more stable than child reports of adaptability (0.55 versus 0.34) and rhythmicity (0.58 versus 0.27).

### Discussion

#### *Summary of Findings*

The authors investigated stability of child temperament over a 2-year period in children, adolescents, and young adults based on child and mother report. Prior research focused on younger children, and the few studies on adolescents suggested the presence of moderate stability. This study was unique in that there were two independent informant measurements of temperament.

Consistent with reports from earlier studies, the present results showed fair to moderate stability for child self-report of temperament, and moderate to good stability for mother reports of their offspring's temperament. There was no significant discrepancy in temperament stability between mother

and child reports, but mother reports were slightly more robust, particularly for dimensions of adaptability and rhythmicity. Mother reports differed slightly from child self-reports in that they were less influenced by the age and sex of the child, and that the presence of maternal depression did influence ratings of irritability in her offspring. Moreover, mothers' current depression also appears to influence her ratings of adaptability, rhythmicity, and irritability in her offspring. The adaptability/approach-withdrawal dimension according to both mother and child reports showed consistently better stability than the other dimensions over the 2-year period. Child's age had a significant effect on stability of irritability, while sex had an effect on changes in activity level by child report. Presence of parental depression had no effect on child self-reports.

### *Limitations*

The offspring in the sample were at high- and low-risk for depression by virtue of their parents' diagnostic status. Risk factors in the offspring's environment may adversely affect the stability of temperament in a unique way. In addition, the relationship between temperament in children and parental psychiatric disorders, such as depression or panic, is still unclear. Consequently, the findings would be important to replicate with other samples of nonreferred children before making firm conclusions about the stability of children's temperament.

Another limitation of this study is the wide age distribution of the offspring's self-reports, ranging from 6 to 23 years of age. The mother report sample ranges in age from 6 to 18 years by design; consequently, the mother and child report samples are not identical. The regression analyses showed few significant age effects for either child or mother reports. To further address this issue, Pearson correlations were conducted on the 53 offspring who had mother reports as well as child reports at both interviews so that the samples would be identical. The correlations for the sample of 53 did not alter the apparent temperament stability as the dimensions still demonstrated fair stability.

### *Implications*

The results show that overall stability of temperament did not vary significantly by informant and was generally in the fair to moderate range. Yet certain dimensions varied in how they were affected by such factors as age, sex, or mother's depression which raises questions about temperament variability. What are some of the factors that may be influencing temperamental change? Is the stability only fair to moderate because older children are more influenced in their behavior style by the context and other people with whom they interact? Several researchers have begun to posit the influence of expectations for behavior on the expression of temperament (Chess and Thomas, 1984; Windle and Lerner, 1984). For example, if a mother expects her child to be regular in his habits, structures him that way at home, and rewards him for it, in some way she may be affecting his rhythmicity or regularity, which may generalize to other situations.

Another question is whether variations in informant sta-

bility on particular dimensions, such as rhythmicity, mean that one informant's report is less accurate than the other, or whether they are influenced by the range of situations in which they observe the child. The child views himself/herself in a myriad of contexts, has different information about his behavioral style, and may see himself as less consistent over time as a result of continuous exposure to varying and new situations. The child may be temperamentally consistent within situations but not across situations. Any differences between mother and child reports may be due to exposure to temperament in different situations and may be in response to different expectations.

The difference in robustness of the stability findings between informants, and their varying susceptibility to influences supports Lerner's (1982, 1983), Thomas and Chess's (1977), and Chess and Thomas's (1984) view that temperament should not be examined in isolation of its contextual influences, and that, therefore, multiple informants are required. Similarly, Plomin and Dunn (1986) cite the psychosocial influence on temperament, of increased peer and social pressure on the child to conform with particular stereotypes and desired images as a child gets older. To incorporate and account for these variables, researchers should study temperament in varying contexts using observational techniques, and they should study the behavior's relationship to other people's situational expectations of temperament for the child. Surveying such situations should give a better idea as to the susceptibility of temperament to external influences. As McCall (1986) states, temperament may consist of some basic inherently stable dispositions, but that as the child gets older, the temperament becomes increasingly more influenced by his/her experiences and context. As temperament is studied over longer periods of time, the notion of contextual influences on stability is an important one and warrants further investigation.

The apparent stability of adaptability dimension in this study is consistent with Kagan and colleagues' (1988) findings of the stability of behavioral inhibition in children up until the age of 7 years. Research appears to suggest that approach-withdrawal patterns of behavior may be one of the more enduring behavioral styles over time.

The demonstrated effects of sex and mother's depression on mother reports of temperament further supports the need to examine the role of significant others' expectations on perceptions of temperament. Mothers' reports of varied activity levels by sex of the child may reflect the influence of socialization of girls toward sex stereotyped behaviors—that is, the expectation that girls should be less active and outgoing and more reserved and self-controlled as they get older. The presence of mother's depression at any time in her life showed a significant effect on mother report of irritability suggesting that she perceived her offspring as more irritable. Although the sample of currently depressed mothers is quite small, their current depression appears to influence their ratings of their children's temperament, indicating a perception of their children as less adaptable, more irritable, and less regular in their habits (rhythmicity). This finding needs to be examined in a larger sample of ratings by currently depressed mothers. The perception of

an increase in irritability may reflect the child's own increase in irritability from living with a depressed mother, it may be a projection onto the child of the mother's irritability or it may reflect her decreased tolerance due to depression.

Although the results demonstrated differences in temperament ratings due to informant characteristics, it is not known whether these differences are due to bias or whether they are accurate perceptions. The effect of maternal depression on perception of their offspring's behavior is still not clear and would be optimally investigated with observational techniques. If the mother's depression exerted a negative bias in her perceptions, one would expect it to be evident in the other dimensions as is suggested in the examination of the effects of mothers' current depression. It is possible that the presence of depression in the mother, at any time, affected only irritability because it is the dimension that most closely resembles salient symptoms of adult depression. The issue of maternal bias, its relationship to parents' own temperament and expectations, and its effect on perceptions of children's temperament need further exploration.

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