

THE JUNIOR TEMPERAMENT AND CHARACTER INVENTORY:  
PRELIMINARY VALIDATION OF A CHILD  
SELF-REPORT MEASURE<sup>1</sup>

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*Summary.*—A preliminary effort to validate the Junior Temperament and Character Inventory with a convenience sample of 322 children ages 9 to 12 years is described.

The Temperament and Character Inventory was recently developed to measure four temperament and three character traits of adults in general and clinical populations. Substantial empirical support for the validity and reliability of the measure has been established (Cloninger, Przybeck, Svrakic, & Wetzel, 1994). Based on the feasibility of administering this self-report measure to large samples, the known reliability and validity of the adult Temperament and Character Inventory as well as the over-all validity of the biosocial model of character and personality from which it was constructed, the development of a version of the Temperament and Character Inventory for use with child populations was thought necessary to extend these investigations into the development of temperament and character during childhood. A version for children could facilitate study of the role of the biosocial model in development of childhood personality. The field enjoys a number of well-validated measures of temperament (both observational and parental report) for use with infants, toddlers, preschoolers, and adolescents, e.g., Infant Behavior Questionnaire (Rothbart, 1978), Revised Dimensions of Temperament Survey (Windle & Lerner, 1985), Laboratory-Temperament Assessment Battery—Preschool Version (Goldsmith, Reilly, Lemery, Longley, & Prescott, 1995), and the Laboratory Temperament Assessment Battery—Locomotor Version (Goldsmith & Rothbart, 1996). Validated measures appropriate for middle childhood, however, are currently lacking.

The potential utility for a valid self-report measure of temperament and emerging personality during middle childhood is underscored by the findings from numerous investigations documenting an association between child-

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hood temperament and risk for later problems in behavior and adaptation (e.g., Graham, Rutter, & George, 1973; Windle, Hooker, Lerner, East, Lerner, & Lerner, 1986; Windle, 1991; Hirshfeld, Rosenbaum, Biederman, Bolduc, Faraone, Snidman, Reznick, & Kagan, 1992; Rende, 1993). Based on such data, an easily administered self-report measure of temperament designed for child informants of middle childhood would be worthwhile.

Related to the fundamental importance of childhood temperament as a robust risk factor for later mental disorders, recent analyses from the Dunedin longitudinal study have shown for the first time that observed ratings of behavioral style and temperament as early as 3 years of age are predictive of specific mental disorders as late as early adulthood (Caspi, Moffit, Newman, & Silva, 1996). This study provides the first empirical link of early behavioral style and mental disorder across such a long developmental time span. At 3 years of age, children who were observed during formal cognitive testing to be "inhibited" were more likely to meet DSM-III-R diagnostic criteria for depression at age 21, while those who appeared "undercontrolled" were more likely to meet formal criteria for antisocial personality disorder.

The Dunedin study utilized an observational measure of temperament rather than a parental or child's self-report. This is a methodological difference of known significance. Both observational and self-report measures suffer from different potential biases; however, it is notable that the five dimensions of temperament derived from Caspi and colleagues' sample of very young children were conceptually similar to the four derived in adult populations using the Temperament and Character Inventory.

Cloninger, Sigvardsson, and Bohman (1988) provided findings consistent with the Dunedin study that are highly suggestive of the potential utility of investigations utilizing the biosocial model and the Temperament and Character Inventory in middle childhood populations. These investigators evaluated 431 Swedish individuals at 27 years of age for alcoholism who had also had comprehensive childhood behavioral assessments at 11 years of age. From these assessment records basic dimensions of the Temperament and Character Inventory were derived and compared with current behavioral assessments. Findings indicated that high scores on Novelty Seeking and low scores on Harm Avoidance during middle childhood were strongly predictive of alcohol abuse in early adulthood. This work further underscores the potential utility of the Temperament and Character Inventory in early childhood to identify possible risk factors and temperamental precursors of later adult psychiatric disorders.

Fergusson and Lynskey (1996) found that resilience, defined as absence of externalizing behavior problems despite high exposure to family adversity during childhood, was explained by low novelty seeking in a prospective longitudinal study of 940 New Zealand children up to 16 years of age.

Other studies in early childhood (Tremblay, Pihl, Vitaro, & Dobkin, 1994; Masse & Tremblay, 1997) and in early adolescence (Wills, Vaccaro, & McNamara, 1994) have shown that novelty seeking interacts nonlinearly with other aspects of temperament to influence the risk of developing antisocial conduct and substance abuse. None of these studies, however, used a self-report of personality prior to 12 years of age. Tremblay and associates used expert ratings of preschool (Tremblay, *et al.*, 1994) or kindergarten behavior (Masse & Tremblay, 1997), and the others (Wills, *et al.*, 1994; Fergusson & Lynskey, 1996) tested personality between 12 and 16 years of age.

The general question of whether children can serve as reliable or valid reporters of their own characteristics of mental and emotional states remains controversial. Lack of concordance between parents' and children's reports of psychiatric symptoms on traditional standardized survey measures have led many investigators to doubt the validity of children's self-reports in general and to rely more heavily on parents' and teachers' reports. However, concerns about the potential bias of these adult respondents in a number of specific areas, e.g., maternal reports of children's depressive symptoms, lack of awareness of some symptom manifestations in children, e.g., teachers' low rating of internalizing behaviors, and the more obvious lack of knowledge that parents or teachers may have in other areas, e.g., children's drug abuse or children's exposure to violence, call into question the adequacy of relying solely on these adult informants.

There is emerging evidence that the ability of the child to serve as a valid self-reporter depends at least in part on what they are asked to report. Harter (1986), using a cartoon measure of self-esteem, found that children under 9 years of age tended to inflate their own skills and abilities and to report idealized rather than accurate images of themselves. In contrast, several recent studies suggested that children as young as 4 years of age can validly and reliably report on their own exposure to violent experiences using a similar standardized cartoon assessment (Fox, unpublished data; Luby, unpublished data).

These seemingly contradictory findings using similar methodological approaches might suggest that young reporters are better able to report objectively on concrete events or experiences and less able to report on their own personal characteristics. Self-esteem, however, is a construct associated with clear social desirability already evident to a young child. The measure of self-esteem may be qualitatively different than that of temperament, a construct associated with less obvious social judgments. With these considerations in mind, a preliminary study of the validity of the Junior Temperament and Character Inventory, a children's self-report measure of temperament and personality was completed in a convenience sample of children 9 to 13 years of age.

## METHOD

*Measures*

The Junior Temperament and Character Inventory is a self-report measure of temperament and emerging personality characteristics, developed for use with children between 9 and 13 years of age as an adaptation of the Temperament and Character Inventory. The original adult version of the scale, the Temperament and Character Inventory, was developed by Cloninger and colleagues and is based on the biosocial model of adult personality (Cloninger, *et al.*, 1994). This model was developed on the premise that individual differences in temperament can be described along the four basic dimensions of Harm Avoidance, Novelty Seeking, Reward Dependence, and Persistence. These dimensions, which show relative independence and stability within adult populations, are thought to be the result of both genetic and environmental influences. In addition, three character dimensions have been described: Self-directedness, Cooperativeness, and Self-transcendence. The integrity of the biosocial model and these seven dimensions have now been supported in adult populations by genetic, neuropsychological, and neuropharmacological studies (Cloninger, 1988). These basic dimensions have also been shown to be normally distributed in representative samples and to be moderately heritable in twin studies (Heath, Cloninger, & Martin, 1994; Stallings, Hewitt, Cloninger, Heath, & Eaves, 1996). The measure has excellent internal consistency, reliability, and validity in multiple large-scale clinical and cross-cultural studies (Svrakic, Przybeck, & Cloninger, 1991; Bulik, Sullivan, Joyce, & Carter, 1995; Bayon, Hill, Svrakic, Przybeck, & Cloninger, 1996; Nylander, Schlette, Brandstrom, Nilsson, Forsgren, Forsgren, & Adolfs-son, 1996; Chatterjee, Sunitha, Velayudhan, & Khanna, 1997; Tanaka, Kijima, & Kitamura, 1997; Tome, Cloninger, Watson, & Issac, 1997).

The Temperament and Character Inventory has been used successfully in numerous investigations involving older adolescent subjects (e.g., Nixon & Parsons, 1989; Brent, Zelanak, Bukstein, & Brown, 1990; Brent, Johnson, Bartle, Bridge, Rather, Matta, Connolly, & Constantine, 1993). Therefore, the adaptation of the measure for use with children 9 to 13 years of age was the logical next step in methodological development. Items were modified to capture the same underlying temperamental or personality feature using behavioral examples experientially appropriate for children 9 to 13 years of age. This task was undertaken by individuals with expertise in child development and child psychiatry (JL and KM) with the assistance of an original author of the Temperament and Character Inventory (DS). This resulted in a children's version with fewer items.

We chose an age range which includes both the elementary school age and early adolescent periods of development. In a number of cases, there

were items that could not logically be applied to children of this age so they were eliminated. Both parents' and children's versions of the scale were developed. Linguistic simplification of the items was also necessary for the children's self-report version so that they could be easily read and understood by children as young as 9 years of age.

#### *Sample and Procedure*

To test the psychometric features of the paper-and-pencil version of the inventory we assessed 322 children from a community convenience sample 9–13 years of age ( $M$  age = 12.0 yr.,  $SD$  = 1.3) and patrons of a local shopping center. In addition to the 105-item inventory, children were also asked questions about special education and other aspects of their current academic achievement and performance in school. Children were also given the Reading subscale of the Wide Range Achievement Test, a standardized test of academic achievement for children. The Reading subscale assesses the child's performance on a word-reading task. The use of this subscale and the normative values available were deemed necessary to assess the child's basic ability to read and understand the Junior Temperament and Character Inventory.

Table 1 shows the age distribution of the sample of 322 children, 145 boys and 177 girls. Forty-six percent were 13 years of age, 22% were 12 years of age, 17% were 11 years of age, 8% were 10 years of age, and 7% were 9 years of age.

TABLE 1  
AGE DISTRIBUTION OF SAMPLE ( $N=322$ )

Age, yr.	$f$	%	$\Sigma f$	$\Sigma\%$
9	23	7.1	23	7.1
10	27	8.4	50	15.5
11	53	16.5	103	32.0
12	70	21.7	173	53.7
13	149	46.3	322	100.0

#### *Analyses*

To investigate whether the Junior Temperament and Character Inventory had psychometric features similar to those of the Temperament and Character Inventory, we assessed response characteristics and structure in a number of ways. Although the sample was not representative of the general population and therefore not representative of children in the general community, means and standard deviations were calculated. An estimate of Cronbach alpha for each scale and Pearson correlations between scores on scales were obtained. In addition, the correlations between scores on the Junior Temperament and Character Inventory scales and the objective measure of

reading performance as well as other aspects of children's self-reported academic performance were examined. Variations in the responses as a function of sex and age were studied. Finally, we examined the factor structure of the Junior Temperament and Character Inventory. To test the factorial integrity of the seven dimensions a confirmatory factor analysis was performed using the hypothesis that the items in each of the seven Junior Temperament and Character Inventory dimensions constituted single factors. Two further confirmatory factor analyses were also computed, one for the items of the four temperament dimensions, specifying four orthogonal factors, and one for the items of the three character dimensions, specifying three orthogonal factors. Version 6.12 of the SAS statistical software (SAS Institute, 1989, 1992) was used for all analyses.

## RESULTS AND DISCUSSION

### *Psychometric Features*

This is the first study to investigate the psychometric features of the Junior Temperament and Character Inventory. Table 2 contains the means, standard deviations, and Cronbach alphas for subscales of the Junior Temperament and Character Inventory. The mean scores ranged from 1.17 to 15.90. Standard deviations ranged from 1.17 to 4.52. Cronbach alphas ranged from .44 to .77; six of eight scales had alphas greater than or equal to .50.

TABLE 2  
MEANS, STANDARD DEVIATIONS, AND CRONBACH ALPHAS FOR SCALES OF  
THE JUNIOR TEMPERAMENT AND CHARACTER INVENTORY ( $N = 322$ )

Scale	No. Items	$M$	$SD$	Cronbach $\alpha$
Novelty Seeking	18	7.11	3.64	.77
Harm Avoidance	22	7.79	4.52	.83
Reward Dependence	9	4.42	1.87	.62
Persistence	6	3.85	1.51	.50
Self-directedness	20	14.32	3.55	.75
Cooperativeness	20	15.90	3.55	.78
Fantasy	5	1.90	1.44	.56
Spirituality	5	1.17	1.17	.44

Means and standard deviations are consistent with these properties of the adult scale (Table 2). Table 3 contains the Pearson correlation coefficients between scores on scales of the Junior Temperament and Character Inventory. For exploratory purposes, significance at the .01 and .05 level are also noted.

With the exception of the subscales of Reward Dependence and Self-transcendence 2 and 3, the Cronbach alphas are in an acceptable range for

TABLE 3  
PEARSON CORRELATION COEFFICIENTS AMONG SCALES OF THE JUNIOR  
TEMPERAMENT AND CHARACTER INVENTORY ( $N = 322$ )

Scale	1	2	3	4	5	6	7	8
1. Novelty Seeking		-.04	.19 <sup>a</sup>	-.44 <sup>a</sup>	-.33 <sup>a</sup>	-.47 <sup>a</sup>	.19	-.20 <sup>a</sup>
2. Harm Avoidance			.16 <sup>b</sup>	-.17 <sup>b</sup>	-.45 <sup>a</sup>	-.24 <sup>a</sup>	.10	.01
3. Reward Dependence				.17 <sup>b</sup>	.28 <sup>a</sup>	.32 <sup>a</sup>	-.01	.14 <sup>c</sup>
4. Reward Dependence 2					.40 <sup>a</sup>	.37 <sup>a</sup>	-.22 <sup>a</sup>	.13 <sup>c</sup>
5. Self-directedness						.51 <sup>a</sup>	-.16 <sup>b</sup>	.10
6. Cooperativeness							-.12 <sup>c</sup>	.31 <sup>a</sup>
7. Self-transcendence 1								.00
8. Self-transcendence 23								

<sup>a</sup> $p \leq .001$ . <sup>b</sup> $p = .01$ . <sup>c</sup> $p = .05$ .

research. The lower alphas for these two scales could reflect the fewer items in those scales. These findings over-all support the internal reliability of the Junior Temperament and Character Inventory.

Self-transcendence may not be well developed in childhood. The Junior Temperament and Character Inventory includes items for fantasy or day-dreaming and also items about spiritual beliefs. Scores on these scales are not correlated for these children. Self-transcendence in adults involves imaginativeness and spirituality, which are correlated traits in adult populations. It is uncertain which of the constructs during childhood is developmentally related to adults' Self-transcendence so both are retained and distinguished as independent subscales (2 and 3) pending further research.

The correlation matrix indicated that the majority of the scales are independent of each other (Table 3). Five correlations below .40 (shown in bold face in Table 3) show over-all that the Junior Temperament and Character Inventory scales have about the same level of independence as those of the Temperament and Character Inventory; however, significant correlations between .15 and .40 were observed for many scales. This could suggest, consistent with literature on personality development, that these character traits are not as well differentiated and therefore not statistically independent during childhood as they are in adulthood.

#### *Relations Among Subscales*

Another finding from the Junior Temperament and Character Inventory that differs from the adult version is the lack of a significant negative relationship between scores on Novelty Seeking and Harm Avoidance. For adults these two scales have a significant negative correlation, while for children the negative correlation is not significant. This might be explained by the traditional parental pressures for harm avoidance, i.e., social conditioning, which could mask the expression of their innate tendencies during childhood or their verbal self-report of these characteristics.

Table 4 displays a number of significant correlations among scale scores and age, sex, self-reported mental health treatment, and independent measures of self-reported academic performance. As expected, scores on Harm Avoidance and Novelty Seeking are negatively correlated with age. In epidemiological samples of adults, changes in scores on the Temperament and Character Inventory subscales have also been shown to occur with age. A decrease in scores on Novelty Seeking with increasing age has been well established in adult populations (Cloninger, Przybeck, & Svrakic, 1991; Cloninger, *et al.*, 1994). Based on the known variation with age, we would expect to see differences in at least one or more of these dimensions in a sample of 9- to 13-yr.-old children since this is a period of rapid emotional and developmental change. The findings of a positive correlation between scores on Novelty Seeking and age and a negative correlation between scores on Harm Avoidance and age are consistent with the literature on child development which suggests that, as the child individuates from the family, there is a greater tendency for exploration and risk-taking behavior.

In addition, orthogonal confirmatory factor analyses for the temperament scales and for the character scales were also done. The confirmatory analysis for the temperament scales showed a GFI=0.75 ( $\chi^2=2,529.61$ ,  $p=.0001$ ). The confirmatory factor analysis for the character scales showed a goodness of fit index of 0.76 ( $\chi_{1175}^2=2,298.70$ ,  $p=.0001$ ).

The factor analysis in which the seven subscales were hypothesized to be independent had goodness of fit indices comparable to those found for the Temperament and Character Inventory (Bagby, Parker, & Joffe, 1992). These data provide initial support for the application of Cloninger's general model of temperament and developing personality with children. Using the orthogonal models, however, the goodness of fit indices for the temperament scales are marginally acceptable. The significant chi square indicates that the four factors are highly correlated and not independent. The multifactorial models for the character scales were less satisfactory. These data might suggest that the multifactorial model *per se* is not yet applicable at this early point in development. Reasons may be several. Theoretical work suggests that the structure of personality in early adolescence is not yet fully developed which would give rise to a less stable character factor structure. Based on this, more elaborate modeling does not seem appropriate here. Alternatively, the relatively small sample for the number of variables in each model and the inherent weakness of self-reports measures, especially with children, may also contribute to the weakness of the model in this investigation.

### *Sex Differences*

In addition to age effects, sex effects were also evident. Girls rated



TABLE 4  
 PEARSON CORRELATIONS FOR SCALES OF THE JUNIOR TEMPERAMENT AND CHARACTER INVENTORY  
 AND MEASURES OF PERFORMANCE, AGE, AND SEX ( $N = 322$ )

Measure	Novelty Seeking	Harm Avoidance	Reward Dependence	Persistence	Self- directedness	Coopera- tiveness	Self-transcendence	
							1	23
Age, yr.	.23 <sup>a</sup>	-.23 <sup>a</sup>	.10	-.08	.10	-.00	.15 <sup>b</sup>	.06
WRAT Reading	.12	-.17 <sup>b</sup>	.03	-.02	.25 <sup>a</sup>	.12 <sup>c</sup>	.08	.10
Time to complete test, min.	-.05	.03	-.00	.04	.05	.08	.07	.03
Ever repeat grade?	-.04	.04	-.05	.00	-.15 <sup>b</sup>	-.07	-.03	-.02
Estimate of grade average	-.24 <sup>a</sup>	.02	.12 <sup>c</sup>	.21 <sup>a</sup>	.28 <sup>a</sup>	.22 <sup>a</sup>	-.08	.05
Grade in next year	.25 <sup>a</sup>	-.25 <sup>a</sup>	.12 <sup>c</sup>	-.05	.13 <sup>c</sup>	.04	.18 <sup>a</sup>	.08
Self-described reading	-.21 <sup>a</sup>	-.17 <sup>b</sup>	.18 <sup>a</sup>	.23 <sup>a</sup>	.34 <sup>a</sup>	.23 <sup>a</sup>	.00	.07
Sex	-.16 <sup>b</sup>	.03	.31 <sup>a</sup>	.09	.15 <sup>b</sup>	.28 <sup>a</sup>	-.03	.07
Ever in special education class?	.11	.07	-.10	-.06	-.20 <sup>a</sup>	-.13 <sup>c</sup>	.03	-.09
Ever had mental health treatment?	.18 <sup>a</sup>	-.01	-.10	-.19 <sup>a</sup>	-.02	-.11 <sup>c</sup>	.10	.00

<sup>a</sup> $p \leq .001$ . <sup>b</sup> $p \leq .01$ . <sup>c</sup> $p \leq .05$ .

themselves significantly lower on Novelty Seeking and higher on Reward Dependence, Cooperativeness, and Self-directedness than boys. The largest sex differences were observed for Reward Dependence and Cooperativeness just as in adults (Cloninger, *et al.*, 1994). Girls also reported higher grade point averages and described themselves as better readers, although there were no significant sex differences in performance on the Wide Range Achievement Test. We did not obtain data on grade point averages from school records. The weak positive correlation between scores on the Cooperativeness and Reward Dependence subscales and femaleness is also consistent with the analyses in which sex is an independent variable; variation on these two subscales was found by sex. These findings may suggest either significant sex differences in personality development during this period of development or alternatively significant differences in the ways girls and boys conceptualize and describe their own characteristics. Investigations using objective measures of these personality traits are needed to clarify this question.

#### *Academic Performance*

Differences in scores on several subscales were also found as a function of a number of self-reported measures, and one objective measure of academic performance. Those children who reported having ever having "flunked" a grade also had significantly lower ratings on Self-directedness. Children who reported ever being in special education had lower scores on Self-directedness and Cooperativeness.

The validity of these self-reports of "flunking" and use of special education is consistent with correlations between ratings on both of these items and objective performance on the Reading subtest of the Wide Range Achievement Test. Groups who reported having flunked and groups who reported receiving special education services each scored significantly lower on this reading test. Accordingly, lack of traits such as self-directedness and cooperativeness are known to be associated with the greater risk for school failure and identification for special education services.

#### *Mental Health Treatment*

Along similar lines, children who reported receiving some form of mental health treatment also described themselves as novelty seekers, less dependent on rewards, and noncooperative. These characteristics, high novelty seeking, low reward dependence, and low cooperativeness are factors to be associated with referral for mental health treatment for children. These findings taken together provide preliminary evidence for the validity of specific scales of the Junior Temperament and Character Inventory for 9- to 13-yr.-old children.

#### *Conclusion*

This study provides preliminary validation of the Junior Temperament

and Character Inventory for 9- to 13-yr.-old child informants, which suggests that this group can validly report on their own temperament and personality characteristics. There is a need, however, for larger scale studies of the measure with more representative and ethnically diverse samples. In addition, studies of concurrent and predictive validity are also needed. Preliminary demonstrations of the validity of this children's self-report measure are promising in light of the inherent problems with the use of parents as informants about children's characteristics. Perhaps most importantly, the potential of using children as informants about this issue using a relatively straightforward survey methodology could facilitate investigations of the development of personality during childhood. The Junior Temperament and Character Inventory shows promise as a reliable and valid self-report measure for children 9 to 13 years of age. Further studies are needed to investigate the feasibility, utility, stability, and other validities of the measure.

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