

Personality Structure as Derived From Parental Ratings of Free Descriptions of Children: The Inventory of Child Individual Differences

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We dedicate this research to the memory of Jack Digman who inspired the exploration of child personality.

This research was supported in part by a National Institute of Mental Health Grants 39899, 50302 to Charles Halverson and MH53272 to James Victor.

We would like to thank many individuals and their research collaborators for help over the years, but we are especially appreciative of Geldolph Kohnstamm who was a pioneer in this research endeavor. Included among others who assisted with this project are LaKeisha Bland, Eric Elphick, Jennifer Gonyea, Holly Higgins, Roy P. Martin, Ying Lu, Leanna Thomas, Karen Shetterley, Anne-Marie Slotboom, Lisa White, Yuching Zhang and Ying Zhou. Finally, we are most grateful to the parents, teachers and children who participated in our studies.

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Journal of Personality 71:6, December 2003.

Blackwell Publishing 2003

ABSTRACT Based on over 50,000 parental descriptors of children gathered in eight different countries, we used a combination of focus group sorting of descriptors in each country and factor analyses of instruments developed in four of the countries (United States, China, Greece, and the Netherlands) to describe children ages 3 to 12 years to select items for an instrument that would work well across countries to assess personality. Through many factor analyses of indigenous items in each country, a core set of 141 items was used in three of the countries, with over 3000 parents responding to our instruments in China, Greece, and the United States. Much cross-comparative research analysis has resulted in 15 robust midlevel scales that describe the structures of parental descriptors that are common to the three countries. The data on the English (U.S.) sample are presented in detail. Links to temperament and behavior problems are presented and discussed.

In the adult literature on personality there is an emerging consensus regarding the main dimensions of personality. This consensus has had many salutary effects and has led to advances in personality research at the adult level by providing structure, clarity, and direction to diverse research programs. Research at the adult level has attested to the comprehensiveness of the Five-Factor Model (FFM). The FFM has shown impressive integrative power linking many diverse systems under the "Big Five" umbrella. For example, see the FFM integration of Jung's theory of types as operationalized by the Myers-Briggs Type Indicator (McCrae & Costa, 1989; Myers & McCaulley, 1985), Murray's (1938) taxonomy of needs (Costa & McCrae, 1988), the Personality Research Form (Jackson, 1984; Costa), Eysenck's (1947) three factor system, the MMPI, the California Q-set (Block, 1961), Wiggins' (1995) Interpersonal Adjective Scales, and Holland's (1985) influential theory of occupational choice, among others. The usefulness of the FFM in the psychopathology area has also been impressively documented in an edited volume on personality disorders (Costa & Widiger, 2002). The usefulness of the FFM for applied psychology has been demonstrated and the authors of that review concluded:

In order for any field of science to advance, it is necessary to have an accepted classification scheme for accumulating and categorizing empirical findings. We believe the robustness of the 5-factor model provides a meaningful framework for formulating and testing hypotheses relating to individual differences in personality to a wide range of criteria in . . . psychology (Barrick & Mount, 1991, p. 23).

No such consensus, with its probable benefits' exists for the child development literature. There is no integrating structure of basic broadband dimensions to provide structure, clarity, and a meaningful framework for formulating and testing hypotheses. Developmental researchers need a reference set of coordinates to understand how what we measure relates to a major construct scheme. The Big Five has been analogized as a set of continents on a map that assist the personality navigator in knowing his/her position. Child development research is more like a 14th century explorer who sets out with no coordinates so that what was "discovered" cannot be placed in any coordinate system and progress is therefore difficult to perceive (Digman, personal communication, 1996). The present research is directed toward remedying this inchoate situation in child development.

We elaborate the main broadband dimensions of childhood to provide the coordinates for direction and understanding of research on individual differences in children. With these coordinates, we begin to see how well a small number of dimensions can account for much of the proliferating construct space in childhood. Further, research on developmental process would be greatly facilitated and energized when investigators could start to map the child coordinates onto adolescent and adult FFM coordinates, and examine how stability and change in the common dimensions are moderated by such things as peer, family, and social contexts (Saucier & Goldberg, 2001).

Lack of Empirical Convergence Regarding the Basic Dimensions of Temperament and Personality in Childhood

Parents often give personality descriptions of their children. The descriptions are usually obtained using standardized procedures such as questionnaires, Q-sorts or checklists. These questionnaires can either be directed toward behavior problems (e.g., the CBCL; Achenbach & Edelbrock, 1981), at typical social and emotional characteristics (e.g., Carey & McDevitt, 1989; Chess & Thomas, 1984; Windle, 1989; Windle & Lerner, 1986), or at personality differences measured from questionnaires like the Eysenck Personality Questionnaire (e.g., Eysenck & Eysenck, 1985; Eysenck & Eysenck, 1975). Consensus on the broadband dimensional structure underlying these descriptions exists only for behavior problems,

namely, the distinction between “externalizing” and “internalizing” problems (Achenbach, Howell, Quay, & Connors, 1991). For the many instruments measuring temperament and personality in typically developing children, little empirical convergence across constructs now exists. (For recent reviews of measures and constructs of temperament in childhood see Rothbart & Bates, 1998; Shiner, 1998.) In a review of temperament constructs, Strelau (1991) reported that there are over 30 psychometric measures of early temperament, sampling over 40 different individual difference constructs. He referred to this as “uncontrolled growth” in temperament research. Unlike many areas of psychological research, no single instrument or set of constructs has dominated the measurement of individual differences in children. Instead, there has been a distressing tendency for many researchers to develop their own ad hoc, idiosyncratic instruments without adequately considering psychometric properties. This is a major weakness in child temperament/personality research.

When one examines the literature it is apparent that much of child measurement research is still rather small scale, with investigators working in relative isolation from each other. Generations of this kind of research have led to a weakness in child assessment: There are too many measures measuring too many constructs. Any review of child measurement (e.g., Martin, Wisenbaker, & Huttunen, 1994; Rothbart & Bates, 1998) will quickly reveal there are many child measures, most with limited reliability and barely adequate psychometric properties. The few measures that might possess decent psychometrics have usually been used in only a study or two. Many investigators seemed prone to develop new measures when they needed one to measure their favorite construct, or worse, adopt ones with unknown psychometric properties. Closely allied to the problem of too many measures (and really a result of it) is the problem of too many constructs being assessed by all these child instruments. The problem of too many constructs reflects the fact that, until recently, there has not been any possibility of broad consensus on what the most important constructs in assessing child personality are. A careful look at most constructs defined by the various assessment devices, reveals that many constructs with the same name may not be measuring the same underlying variable, and there is always the possibility that constructs with very different labels may be capturing the same underlying variance (what

researchers refer to as the “jingle-jangle” problem). With the multitude of measures partially identifying many constructs and very little in the way of replicated findings, it is difficult for most researchers to identify potentially useful measures of individual differences in children.

Is There an Emerging Conceptual Consensus About the Major Dimensions of Personality/Temperament in Childhood?

An analysis of the discussions of “personality” in current introductory texts of developmental psychology has revealed almost no interest in “personality” structure beyond the obligatory and often cursory summary of temperament based on the nine-dimensional structure proposed by Thomas and Chess (1977). Chess and Thomas’s dimensional scheme has been the basis for many operationalizations in many different questionnaires, but when items are factored, the resulting factor structure fails to confirm the existence of the nine dimensions. These analyses begin with a top-down, theoretically driven set of instruments and provide interesting possibilities of convergence. Temperament researchers have made progress in both instrument construction and construct validation. Hundreds of validation studies of perhaps 25 to 30 constructs have appeared in the literature, and several integrative conceptual summaries are available (e.g., Rothbart & Ahadi, 1994; Buss & Plomin, 1975; 1984; Ciba Foundation Symposium #89, 1982; Garrison & Earls, 1987; Kohnstamm, Bates, & Rothbart, 1989; Rothbart & Bates, 1998). Concern about a replicated set of basic dimensions; however, has only recently begun to appear in the literature (Goldberg, 2001; Hart, Hoffmann, Edelstein, & Keller, 1997; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Martin, Wisenbaker & Huttunen, 1994; Shiner, 1998).

The relative recency of this concern is attributable to two factors: First, temperament research has only recently matured to the point that basic questions about the importance of the phenomena have been put to rest, and second, issues of structure may be more complicated in childhood due to rapid developmental changes. Structural questions began to arise in the temperament literature as instrument builders turned to factor-analytic instrument-development methods. Many of these instrument builders began with one of the original instruments, and factor-analyzed the items in an attempt

to verify the nine dimensional structure (e.g., Presley & Martin, 1994), or augmented the items in minor ways to more fully assess the structure (e.g., Lerner, Palermo, Spiro, & Nesselrode, 1982). As this kind of research has accumulated, it has become clear that some of the Thomas and Chess dimensions have held up under factor analysis, while others have not (Ball, Pelco, Havill, & Reed-Victor, 2001; Presley & Martin, 1994).

Martin and his colleagues (1994) reviewed 12 large-sample studies, and from this review based only on factor labels, there was considerable uniformity across ages and subject nationality for parental and self-ratings. Yet, they found very little evidence for the Thomas and Chess nine-factor structure, although some of the original nine dimensions appear to be strongly represented. They found remarkable convergence for five constructs derived across age, informant, and instruments when factored at the item level. The constructs were activity level, negative emotionality, task persistence, adaptability/agreeableness, and inhibition (approach/withdrawal). Two additional factors have emerged in several studies using Q-sets as well (See Robins, John, & Caspi, 1994; Van Lieshout & Haselager, 1994).

Note that the above studies all used either the original Thomas and Chess (1977) items or adaptations and translations of the original items. It is not known whether a) some important personality dimensions were not obtained because Thomas and Chess were not interested in them, or b) dimensions were obtained because they wrote many items to measure what they believed to be important. This discrepancy between “top-down” theory-driven tests (like virtually all tests describing personality in children) and “bottom-up,” language-frequency-based tests reflect the “etic-emic” distinctions used by cross-cultural researchers (Church, 2001; Church & Katigback, 1989; John, 1990). Cross-national work may be compromised and relatively uninformative because the investigator supplies the constructs to be rated. Many prefer the “emic” (cultural-specific-informant-based) approach to instrument construction. When we depend on a scheme like Thomas and Chess’, we will get out of analyses what we put into them—even if they are not the original nine “factors”—because parents will rate what is given to them—even if they never use such terms in describing their own children. One key question is: Does the test constructor base the instrument on what the theorist thinks

important (etic) or on what informants such as parents and teachers use as frequent descriptors (emic)?

There are many theorists in child personality who postulate a smaller number of factors. For example, the EAS theory (Buss, 1991; Buss & Plomin, 1984), the temperament theory of Rothbart (1981; Rothbart, Ahadi, Hershey, & Fisher, 2001; Rothbart & Derryberry, 1981), and the personality theory of the Eysencks (1985) all postulate a small number of basic dimensions. All of these theorists have limited their factors to those showing bases in either individual differences in physiological responding or genetics, as shown by behavior genetic methodology. Among the three theories mentioned above (and there are many more, for example, the Blocks' theory of ego resilience and control, 1980), there exists insufficient agreement on dimensional structure. From one perspective, these theories postulate only one fundamental factor: Emotional Stability (Neuroticism, Negative Reactivity). Important adult dimensions like Eysenck's Psychoticism or Tough-mindedness (1975) have no childhood counterpart in either Buss and Plomin's (1984) theory or in Rothbart and Derryberry's (1981). Further, Buss and Plomin's Activity and Sociability (1984) have not been accepted by adult theorists such as the Eysencks as independent factors. Instead, they are thought to be two facets of the broadband factor of Extraversion.

From this brief overview, it can be seen that some notions about the main dimensions of personality in childhood may be emerging as there is an array of partially overlapping constructs described by different investigators. Further, there has been almost no empirical effort directed toward organizing these domains of child personality and linking them to adult personality structure. What is needed is a rigorous analysis of the structure of individual differences in childhood that can then be linked to the now growing consensus of adult personality.

Are There Precursors to the Big Five in Childhood?

Empirical studies of the FFM have been done mostly on descriptions of adult individual differences by adult perceivers. "Beyond the obvious problem of empirical generality, there are conceptual problems associated with these developmentally restricted samples. The evidence supporting the FFM is pervasive but *developmentally shallow*" (Graziano, 1994, p. 336). (Indeed, the

special issue of the *Journal of Personality* on Big Five research contains *no* studies of a developmental nature.) The value of the FFM would be enhanced if it could be shown that Big Five dimensions have developmental antecedents. These antecedents may be linked to genetic differences (e.g., Loehlin, 1992; Matheny, 1989), temperament (e.g., Buss & Plomin, 1984), or socialization (e.g., Halverson, & Wampler, 1997). If the Big Five dimensions are generally important, then it is possible that their adaptive influence could also be seen relatively early in life and, therefore, figure prominently in the natural language of parental descriptors. Until a short while ago, Digman's (1963, 1990; Digman & Inouye, 1986) work was the only research examining the relevance of the Big Five model for early and late adolescence (but see Caspi & Silva, 1995; Goldberg, 2001; John et al., 1994; Graziano & Ward, 1992). In an attempt to bridge the gap between temperament and personality researchers, Kohnstamm and Halverson assembled scholars from both fields. One of the themes that emerged was the need for the lexical analysis of childhood temperament and personality.

With children, it is clear that using a dictionary-based approach to get an exhaustive collection of all relevant descriptors would be an awkward, roundabout way to develop the lexical structure of individual differences in childhood. Other collections of terms could be made, notably from all the questionnaires, Q-sorts, and other instruments used to assess individual differences in childhood. Still, such psychology- and psychiatry-based collections will likely have less ecological validity than collections based on a large number of natural, free descriptions of children worded in the folk language that people, who know them well, use to describe them. Both parents and teachers could provide descriptions of children across a variety of settings. Preliminary studies that collected such free descriptions of children have used Dutch parents (Goedhart, Treffers, & Kohnstamm, 1994), Belgian teachers (Mervielde, 1994), and U.S. mothers, fathers, and teachers (Havill, Allen, Halverson, & Kohnstamm, 1994) as informants.

In related research, we have developed three psychometrically sound instruments, based on parental free descriptions of 3, 6, and 9–12 year olds (Havill & Halverson, 1997). We are now in a position to begin to clarify the usefulness of the broadband constructs we delineated: Agreeableness/Manageability, Openness/Intellect, Extraversion, Neuroticism, and Conscientiousness. Data clearly are

needed on the reliability of these childhood factors, including their stability over time, samples, countries, race, class, ethnicity, etc., as well as their convergence across multiple observers and occasions of observed behavior. We need evidence of the pervasiveness of these constructs by linking them to other measures of individual differences like temperament scales, measures of social competence, and maladaptive behavior.

Closely related to this goal is the examination of the structure of child individual differences. We will clarify and bolster what we and others (e.g., Rothbart & Ahadi, 1994) perceive to be the major broadband traits of personality/temperament in childhood as well as the robustness of midlevel scales comprising those broadband domains. By measuring multiple traits with multiple instruments on the same children, we can make progress in examining the redundancy, overlap, and fuzzy boundaries among the constructs now in the literature.

Truly basic dimensions of childhood personality ought to be universal—found in boys and girls in all ethnic groups and in different cultures. This clearly is an empirical question, but data are beginning to accumulate for the possible universality of the adult Big Five (Costa et al., 2000; Costa & McCrae, 1992; McCrae & Costa, 1997; McCrae et al., 1999). We are hopeful that we can begin to assess similar universality for our child constructs and begin the process of linking them to adult personality and to studies of adaptive psychological functioning.

METHOD

Instrument Development Procedures

Parental natural language. Investigators in seven countries collected parental free-language descriptions of their children. Over 3000 parents were interviewed (ranging from 246 parents in Germany to over 600 in the United States). These descriptions were reliably coded using a system developed in collaboration with the Dutch research team (See Havill et al., 1994 for details). The English Coding Manual has been translated and back-translated by bilingual speakers to produce equivalent coding categories across languages. Cross-national findings, including age and gender differences, have been summarized in a book edited by Kohnstamm, Halverson, Mervielde, and Havill (1998). In this earlier work, we found striking confirmation for the usefulness of the FFM for

coding parental descriptions of children from 2 to 14 years, regardless of country or language. In every country the majority of descriptors (short phrases for the most part) were coded in the Big Five categories. Of 59,000 phrases, over 80% fit into the Big Five. Overall proportions across all countries were: Extraversion, 28.4; Agreeableness, 20.6; Conscientiousness, 9.6; Neuroticism, 8.6; and Openness, 14.7. We found that parents in all samples construed the basic structure of child personality in much the same way.

Instrument construction. In the early phases of our research, each collaborating team constructed instruments to measure the personality characteristics coded from the taxonomy compiled from parental descriptions for the three different age groups of children (3, 6, 9–12 years). In each country, parental free descriptions for children at each age were written on index cards. Focus groups of four people (naïve to the Big Five system as well as to our codings) sorted items within a dimension (e.g., Extraversion) into homogeneous clusters. The focus groups were also asked to select two to three phrases that they felt were the most prototypical of the items contained in a given cluster. Based on many clusterings of the free descriptions, subsets of items were assembled at each age with items from each cluster collated into preliminary instruments of about 100 to 150 items at each age. The items on the instruments were verbatim descriptions provided by parents. For the U.S. data, factor analyses of parental ratings and teacher ratings, resulted in age-specific new measures of children's individual differences, that is, the ICID (Inventory of Children's Individual Differences).

Final item selection for the ICID. Since each country produced three or four age-specific questionnaires, the research teams believed that the process resulted in an unwieldy and unworkable set of measures (e.g., 3 ages \times 8 countries = 24 questionnaires). It was an empirical question whether we could produce one questionnaire that capitalized on the overlap and redundancy of items across age and country.

To select items for our new cross-age, cross-national instrument, we translated and back-translated items found on all of the Chinese, Dutch, and Greek instruments. We added these items to the pool of items on our American questionnaires, along with prototypical items identified in the African American parental lexicon provided by Hampton University. A team consisting of White, African American, and Chinese researchers, blind to the origin of the item, then sorted these items. Prototypical items were selected for each cluster. If a prototypical item was represented in the lexicon of the majority of samples, and present at each age group described, it was retained for the first version of the ICID. These items

were then reviewed by Greek and Dutch collaborators. Minor amendments were made to the current ICID.

This procedure resulted in a 144-item questionnaire that contained items that matched the distribution of the Big Five phrases in the parental lexicon (26% of the items were coded as describing Extraversion, 26% describing Agreeableness, 15% describing Conscientiousness, 11% describing Neuroticism, and 17% describing Openness/Intellect). For example, there were 38 items retained describing Extraversion and out of 38, 25 were coded as high in extraversion and 13 as low (introversion). Most items (26) had representation in at least 3 of the 4 countries and across all ages from 3 to 12 years of age (32 were represented in descriptions of 3–6 year old children and 36 represented descriptions of the 7–12 year old children). Such distributions were obtained for the other domains (details available from the authors).

Development of the midlevel scales for each domain. The new 144-item ICID was translated and back translated by bilingual persons in each country. The final version was in a Likert-scale format and was given to parents of 506 children in China (mothers and fathers), parents of 1089 children in Greece (mothers and fathers), and parents of 962 children in the United States, as part of a larger project. All ages from 3 to 13 were approximately equally represented in each sample (ages 3–6 years, $N = 894$, ages 7–10 years, $N = 852$, and 11–13 years, $N = 811$).

To obtain midlevel “culturally decentered” scales (Saucier & Goldberg, in press), both oblique and orthogonal principle axis factor analyses were done within each of three countries (United States, China, and Greece) and were refined by replications on random halves of each sample. In each country, a factor structure resembling the Big Five structure was obtained (see Havill, Baker, Halverson, Paulopoulos, & Wen, under review). To obtain midlevel scales within each country, each of the domains (e.g. Extraversion, Agreeableness, etc.) was further factored with maximum likelihood factor analysis with orthogonal rotations that was also replicated on random halves with each sample.

The resulting midlevel clusters were then examined across countries for each domain, and scales were formed that contained nearly identical items in the indigenously derived midlevel scales. The final iterations resulted in 15 robust midlevel scales that summarized a cross-national, internally consistent set of parental descriptors in these areas. The remainder of this report focuses on the characteristics of these 15 midlevel scales and the domain structure they generate for the U.S. sample only. Some data on convergences with other childhood measures will also be discussed.

U.S. Participants

Sample 1. There were 962 parental ratings of children. They came mostly from mothers (81%), and they rated 442 males and 520 females whose ages were fairly equally distributed over age (3–5 years, $N = 349$, 6–9 years, $N = 317$, and 11–13, $N = 246$). The sample was 38% European American and 57% African American, with small numbers of other ethnic groups. The sample was mostly middle class, with 59% completing high school or technical school and 38% completing college.

Procedure

Questionnaires were collected from a variety of sources in the Midwest, Virginia, and Georgia that represented 29 states. Most data came from students who collected data from parents for class credit.

Sample 2. Participants from the Georgia Longitudinal Study (GLS), a 5-year study of (initially) preschool children and their families were recruited to participate in a follow-up study. During the first year of the study, 136 families were recruited. These families all had at least one child between the ages of 3 and 6 (the target child) years. The target child had to be in some kind of organized childcare from which a non-related adult could evaluate him/her. In January 2000, 11 years after the end of the original GLS, families were contacted and asked to participate in a one-time follow-up. Of the 186 original families, 110 agreed to participate. At the time of the original recruiting into the study, average child age was 4.59 years. Average age of these children at the follow-up was 17.89 years.

Instruments. Personality in adolescence/young adulthood was measured by the ICID and the NEO-FFI (Costa & McCrae, 1992). Mothers and fathers rated their children on both instruments. Target children provided self-ratings.

RESULTS

ICID Midlevel Scale and Domain Psychometric Characteristics

Table 1 presents internal consistency estimates based on coefficients alpha for the ICID scales obtained from all available ratings in the three countries (China, Greece, and United States) and for a sample of parents who rated their adult children (aged 20–23 years) with the ICID. These alphas were consistently high in each country and across all ages indicating a high degree of coherence of the 15 scales for all ages and countries. Mother–father agreement and parental

Table 1
Internal Consistencies and Average Inter-Item Correlations of the
ICID Scales

Scale	No. items	Internal Consistency (coefficient α)					Average Inter-Item Correlations
		3–5 ^a	6–8 ^b	9–11 ^c	12–14 ^d	Adult ^e	
Sociability	7	.88	.85	.86	.84	.92	.46
Shy	7	.75	.72	.72	.74	.85	.36
Activity Level	6	.76	.76	.79	.84	.86	.46
Positive Emotions	6	.86	.84	.84	.83	.90	.53
Antagonism	9	.83	.83	.83	.84	.93	.45
Strong Willed	8	.77	.73	.78	.78	.79	.33
Negative Affect	6	.80	.76	.74	.74	.90	.43
Considerate	7	.86	.86	.87	.86	.93	.53
Compliant	7	.81	.82	.79	.81	.89	.44
Organized	7	.78	.83	.84	.86	.89	.34
Achievement Orientation	6	.71	.78	.74	.80	.90	.45
Distractible	7	.76	.78	.77	.79	.91	.41
Fearful/Insecure	7	.75	.73	.78	.79	.88	.33
Intellect	11	.88	.90	.90	.90	.94	.49
Openness	10	.83	.79	.84	.80	.86	.48

Note. Ages 3–12 years, alpha averaged over three countries, Adult = U.S. data only;

^a $N = 349$; ^b $N = 274$; ^c $N = 282$; ^d $N = 339$; ^e $N = 108$.

agreement with young adult self-ratings are reported in Table 2. For the 15 scales, the mother–father agreement was consistently high for all 15 scales. Lower levels of agreement were obtained for mother–adult child and father–adult child agreement, with poor agreement for father–adult child on some scales. The self-report form of the ICID generally resulted in lower agreement with parental raters. Table 3 presents inter-rater reliability for the domain-level scales and one-month, test-retest stabilities, all of which were consistently high.

The content of each of the midlevel scales is summarized in Appendix A with sample items included. Parental language about individual differences in children, summarized in the scales, is remarkably comprehensive in scope, covering most of the content

Table 2
Inter-Rater Agreement for ICID Scales

ICID Scales ^a		Mother– Father	Mother– Adult Child	Father– Adult Child
1. Extraversion				
E ₁	Positive Emotions	.62	.35	.35
E ₂	Sociability	.59	.55	.38
E ₃	Considerate	.67	.28	.30
E ₄	Activity Level	.70	.65	.56
E ₅	Openness	.50	.40	.25
2. Agreeableness				
A ₁	Antagonism	.70	.49	.29
A ₂	Strong Willed	.57	.27	.21
3. Conscientiousness				
C ₁	Organized	.74	.59	.13
C ₂	Achievement Orientation	.71	.40	.46
C ₃	Distractible	.70	.52	.45
4. Neuroticism				
N ₁	Fearful/Insecure	.61	.38	.26
N ₂	Negative Affect	.59	.51	.28
N ₃	Shy	.53	.46	.42
5. Intellect				
O ₁	Intellect	.72	.59	.52

^aN = 220.

found in studies of children (See Appendix B for a comparison of ICID scales to recent instruments and their midlevel scales).

Factor Structure of the ICID in U.S. Sample

In our ongoing research (Baker & Victor, 2001), we sought to determine the structure of personality through childhood to early adolescence, by procedures beyond simple exploratory factor analyses and principal component analyses while acknowledging the restrictions of using confirmatory factor analyses procedures (Church & Burke, 1994; Floyd & Widaman, 1995; McCrae, Zonderman, Costa, Bond, Paunonen, 1996). Browne, Cudeck, Tateneni, and Mels (1999) developed a statistical software program, Comprehensive Exploratory Factor Analyses (CEFA), to go beyond

Table 3
Domain Inter-Rater Reliabilities and 1-Month Stabilities for the ICID

<i>Domain</i>	<i>Reliability</i> 2-Rater ^a	<i>Stability</i> (age in years)		
		3 ^b	6 ^c	9 ^d
Extraversion	.94	.90	.87	.93
Agreeableness	.90	.89	.93	.94
Conscientiousness	.97	.90	.92	.90
Neuroticism	.85	.84	.76	.73
Intellect	.92	.83	.92	.95

^a*N* = 220; ^b*N* = 117 (mothers); ^c*N* = 134 (mothers); ^d*N* = 88 (mothers).

exploratory factor analyses. Browne et al. (1999) developed CEFA to provide fit indexes, the Root Mean Square Error of Approximation (RMSEA) as point estimation and the Expected Cross Validation Index (ECVI; Browne & Cudeck, 1993), and a method of estimating asymptotic standard errors of rotated factor loading and factor intercorrelations. Using the estimated standard errors, we can estimate statistical significance of the factor loadings. Data analyses also provide a value of the absolute maximum residual (Browne, 2001).

The CEFA was used to perform an oblique, target rotation of the raw data fit both a four and five factor solution. For the four factor solution, the RMSEA was .10 (90% confidence interval [CI], .089 to .111), with an ECVI of .874 (90% CI, .773 to .990), a chi-square of 313.034 (degrees of freedom 51) and an absolute maximum residual of .0688. For the five factor solution, the RMSEA was .086 (90% CI, .074 to .098), with an ECVI of .684 (90% CI, .608 to .775), a chi-square of 193.049 (degrees of freedom 40) and an absolute maximum residual of .0533. All factor loadings were statistically significant and the intercorrelations between factors were as expected. Based upon these indications, the five factor solution is a better fit to the data.

Next, the factor pattern and loadings from the CEFA analysis were used to specify the pattern and loadings for the confirmatory factor analysis (CFA), which was conducted using EQS (Bentler, 1992). Using the first half of the samples, initial analyses revealed significant residual covariances between Sociable and Shy and between Organized and Compliant that were not accounted for by

the factor structure. A better fit overall resulted by removing Compliant from the model. Finally, modification indices showed that the fairly simple structure implied by the earlier exploratory analyses did not fit the data well. As a result, secondary loadings were specified where theoretically meaningful, resulting in the final model fit to the first half of the data. This model fit the data well: NFI = .93, CFI = .94, RMR = .02, and RMSEA = .10. As a final step, the model developed on the first half of the sample was tested on the second half of the sample, resulting in the model described in Table 4. This model also fit the data well: NFI = .94, CFI = .95, RMR = .02, and RMSEA = .09.

Extraversion was defined by 5 mid-level scales: Sociability, Activity Level, Positive Emotions, Considerate and Openness. Children high on Extraversion are active, energetic, positive, and outgoing. Agreeableness was recovered from the data and was characterized by two mid-level scales: Antagonism (reversed) and Strong Willed (reversed). Conscientiousness was easily described by three mid-level scales that dealt with being Organized, Achievement Oriented, and Distractible (reversed). Neuroticism was defined by Fearfulness/Insecurity, the expression of Negative Affect and Shyness. The fifth factor, Intellect, described children who were bright and inquisitive.

To assess whether the factor analytic solutions had some generality we examined correlations with two other instruments measuring the Big Five: Costa and McCrae's NEO Five Factor Index (NEO-FFI) and the factor structure generated by Digman and Shmelyov (1996) from Russian teachers. For the NEO-FFI, we had both parent ratings on the NEO-FFI ($N = 210$) and young adult children self-ratings on the same instrument. We correlated the factor scores for the ICID with both the parent NEO-FFI scores and the self-report NEO-FFI scores. As can be seen in Table 5, the factor analytic solutions clearly matched the NEO-FFI scores. Similarly, parents of young children (3 to 12 years) also rated their children on the 60-item Digman scales (Digman & Shmelyov, 1996). Factor score correlation show considerable convergence with these domain scores. The similarity in the five column means clearly shows that for the U.S. samples, the Big Five factor structure was easily recovered and replicated in these data. These 14 scale scores are robust, internally consistent across age and samples and together they produce a clearly marked Big Five structure.

Table 4
Total Sample Confirmatory Factor Analysis

		N	E	O	A	C
	Neuroticism					
N ₁	Fearful/Insecure	87				
N ₂	Negative emotionality	76			– 54	
N ₃	Shy	54	– 20			
	Extraversion					
E ₁	Positive emotionality		89		46	
E ₂	Sociable		87			
E ₃	Considerate		81		64	
E ₄	Activity level		67			
E ₅	Openness		51	38		
	Openness					
O ₁	Intellect			87		
	Agreeableness					
A ₁	Antagonism				– 73	
A ₂	Strong willed	54	49		– 69	
	Conscientiousness					
C ₁	Organized					80
C ₂	Achievement orientation			40		53
C ₃	Distractible	38				– 57

Note. N = 1035; GFI = .94. Decimals omitted.

Links to Other Domains

As part of a larger, cross-national project (see Havill & Halverson, in preparation), we also collected parent ratings on two well-known temperament scales: the Temperament Assessment Battery for Children-Revised (TABC-R, Martin & Bridger, 1999) and the scales measuring effortful control from the Children’s Behavior Questionnaire (CBQ, Rothbart, Ahadi, Hershey & Fisher, 2001), as well as parent ratings on the Behavior Problems Checklist (BP, Quay, 1987). These three measures were included to assess further the convergent and discriminant validity of the new ICID scales when compared with temperament and behavior problems. The convergence among these measures can be seen in Table 6. It is clear that temperamental impulsivity (from the TABC-R) and the converse effortful control (indexed by five scales from the CBQ)

Table 5
Factor Convergence of ICID Scales

		<i>Parent</i>		<i>Adult FFI</i>		<i>Child DSS</i>
		Child ^a	Adult ^b	Self ^c	Parent ^b	Parent ^d
1. Extraversion				66	80	
E ₁	Positive Emotions	70	53	53	60	54
E ₂	Sociability	89	88	66	80	62
E ₃	Considerate	82	86	53	79	60
E ₄	Activity Level	31	78	47	67	45
E ₅	Openness	91	85	46	67	48
2. Agreeableness				79	84	
A ₁	Antagonism	− 82	− 82	− 68	− 79	− 67
A ₂	Strong Willed	− 62	− 59	− 48	− 56	− 40
3. Conscientiousness				82	87	
C ₁	Organized	75	90	56	88	60
C ₂	Achievement Oriented	62	81	65	80	60
C ₃	Distractible	− 73	− 77	− 63	− 72	− 53
4. Neuroticism				56	74	
N ₁	Fearful/Insecure	73	73	68	81	63
N ₂	Negative Affect	47	68	48	71	62
N ₃	Shy	79	86	65	78	55
5. Intellect				46	53	
O ₁	Intellect	38	70	38	50	57

Note. Decimals omitted. Parent ratings of child and adult are factor loadings; others are correlations with factor scores. FFI = Five Factor Index (NEO); DSS = Factors from Digman and Shmelyov (1996).

^a*N* = 980; ^b*N* = 210; ^c*N* = 107.

were consistently and strongly related to four of the ICID domains as indexed by the midlevel marker scales. Further, temperamental inhibition (TAB) and positive affect (CBQ) were strongly and consistently related to the one dimension not linked to impulsivity control: Extraversion. It appears that for these parental language scales, there is some overlap with two temperamental dimensions: Inhibition and effortful control/impulsivity (see Martin & Lu, in preparation, for detailed analyses). This conclusion is bolstered by the correlates with parent-rated behavior problems. Conduct problems (CD) were consistently related to the marker scales in the four dimensions linked to impulsivity/control. The relations are

Table 6
Convergence of ICID Scales with Measures of Temperament and Behavior Problems

	TAB IN	TAB IM	CBQ AF	CBQ IC	CBQ PS	CBQ S&L	CBQ LIP	BP CD	BP PP	BP TOT
1. Extraversion	-60	-27	16	24	27	49	28			
Positive Emotions	-37	-33	24	34	31	41	39	-28	-24	-30
Sociability	-64	-20	16	23	28	39	51	-01	-34	-25
Considerate	-24	-40	35	47	38	37	44	-39	-15	-36
Activity Level	-41	01	02	02	12	29	09	02	25	-21
Openness	-46	-31	30	28	38	48	41	-16	-29	35
2. Agreeableness	-23	-62	43	58	32	33	42			
Antagonism	16	61	-41	-51	-25	-28	-35	56	14	47
Strong Willed	-45	49	-40	-45	-18	-20	-18	48	13	45
3. Conscientiousness	-11	-58	66	61	42	27	43			
Organized	01	-48	53	49	18	39	35	-48	-14	42
Achievement Oriented	-13	-48	56	57	28	48	40	-36	-16	-53
Distractible	14	62	-62	-51	-23	-24	-36	34	26	32
4. Neuroticism	33	70	-49	-47	-24	-31	-31			
Fearful/Insecure	49	49	-25	-24	-16	-34	-17	-24	22	39
Negative Affect	23	67	-35	-42	-15	-23	-24	-15	22	39
Shy	72	32	-10	-16	-16	-43	-15	-06	36	17
5. Intellect	-26	-57	55	51	46	47	39	51	-25	40

Note. $N = 377$. Decimals omitted. $r \geq .09$; $p = .05$. *TAB* = Temperament Assessment Battery; *CBQ* = Child Behavior Questionnaire; *BP* = Quay-Peterson Behavior Problem Checklist. *IN* = Inhibition; *IM* = Impulsivity; *AF* = Attention Focusing; *IC* = Inhibitory Control; *LIP* = Low Intensity Pleasure; *PS* = Perceptual Sensitivity; *S&L* = Smiling and Laughter; *CD* = Conduct Problems; *PP* = Personality Problems; *Tot* = Behavioral Problems Total score.

consistent with the interpretation of conduct problem scales as indices of externalizing behavior. Similarly, personality problems (PP) have been thought of as markers for internalizing, and they have been consistently linked with shyness and low levels of scales marking Extraversion.

DISCUSSION

The comparative analyses of common midlevel scales derived from three distinctive cultures (China, Greece and the United States) and across ages, from early preschool to young adulthood, have resulted in a comprehensive and robust set of 14 marker variables. These marker scales provide compelling evidence that there is a basic common set of personality traits that combine into the familiar Big Five model of personality. Together with other recent evidence (Goldberg, 2001; Slotboom & Elphick, 1997; Robins, John & Caspi, 1994), the results from our project show that the same set of marker scales can be obtained from parental ratings of children, ranging from 3 years of age to early adulthood. The generality of these marker scales was remarkable. For comparative purposes, we have summarized other studies, using teacher and parent ratings, in Appendix B. There were close correspondences among 4 sets of marker variables: Goldberg's midlevel markers derived from teacher ratings, markers derived from Flemish informants (Mervielde et al., 1995), Dutch parental ratings (Slotboom & Elphick, 1997) and the ICID midlevel scales.

Empirically, we have found 14 marker traits that can be reliably and consistently measured as early as 3 years of age and each of these traits can be measured into adulthood. These findings provide a firm basis to assert that young children have personality traits (beyond the often-studied temperament dimensions) that are markers for the general Big Five model. It is now possible (and necessary) to inquire into the stability of personality traits from childhood into adulthood using a comprehensive measurement system. Developmentally, we want to know if these traits combine differently as children mature from early childhood into adulthood. By using a common-marker set at each age, we can track developmental trajectories in longitudinal studies of large, representative samples differing in ethnicity, language, social class, and culture. We may be able to learn much about personality development by exploring how these marker traits comprise the broad factors, and how the clustering into broad

domains of the Big Five is similar or different across ages and languages. We concur with Saucier and Goldberg (2001) that the links across ages and culture will be better assessed using scales that aggregate variables (rather than using single items).

In addition to identifying developmental trajectories, this common marker set may clarify a potentially changing nomological net around personality development. Just as there have been salutary effects of the mapping of constructs of the Big Five model in adulthood, developmentalists may be better able to understand how personality traits are related to other measures of individual differences as well as measures of adaptive outcomes. For example, the current interest in the constructs of ego-resilience, and ego-overcontrol and ego-undercontrol (Asendorpf & VanAken, 1999; Robins et al., 1994) defined by Q-set items (see Block, 1961) may be clarified and simplified by examining how the constructs fit into the vector-defined space of the Big Five model and the defining midlevel markers. For example, Robins et al., (1994) reported broad-based convergences of the Big Five model with these Q-set-defined constructs (e.g., ego-resiliency was defined by high levels of Agreeableness and Conscientiousness and low levels of Neuroticism). Studies that focus on more specific midlevel scales may reveal which facets of these domain-level constructs may be linked with Ego Resiliency over age and whether there is any substantial increment in the amount of variance predicted by these midlevel traits when compared with broadband dimensions.

The broad domain scores of the ICID have predicted self-concept and school performance (Baker, 2001; Demetriou & Kazi, 2001; Graziano & Ward, 1992) social and behavioral ratings in preschool (Havill, White & Halverson, 2000) and resiliency in late childhood (Davey, Eaker & Walters, 2003). The usefulness of the ICID is further enhanced as it has been successfully used as a self-report instrument for adolescents both in the U.S. and in Greece (Davey et al.; Demetriou & Kazi, 2001). Using the more specific scales defining the Big Five in childhood may improve the understanding of underlying processes.

Research on the links between temperament and personality development may similarly benefit by using the relatively small set of marker traits that are the same from early childhood to adulthood (Strelau, 2001). We have shown here that temperament scales may be importantly related to personality individual differences in

childhood. Note that while the 14 midlevel scales are phenotypes based on parental language, because they appear early (age 2–3 years) and can be reliably measured, they can serve as predictors of possibly relevant pathways to adult personality differences. For example, we presume that children who are organized and focused at age 3 may be more likely to develop into conscientious adults than those that are low in attention and industriousness. With this new instrument, we are now in the position to study the predictive validity of both temperament and personality dimensions on adaptive and maladaptive outcomes.

We have little data on how temperament variance is linked to personality variance over development (mostly because we have lacked a dimensional structure of child personality). We want to know if traits become increasingly differentiated from infancy to adolescence. By using the same items at each age, we will be able to track development. Behavioral manifestations of personality are likely to change due to children's emerging competencies. The development of more sophisticated self-regulatory capacities (Kochanska, Tjebkes, & Forman, 1998; Rothbart, Ahadi & Evans, 2000; Van Lieshout, 2000) allow the child to carry out planned and organized behaviors, including the delay of gratification and resistance to temptation. Hence, we would expect—and do see—an increase in Conscientiousness scores in middle childhood. As children become more able to generate strategies for handling social conflicts and other emotionally arousing experiences, they may show both intraindividual and interindividual differences in their expression of self-control.

Like Goldberg (2001), we believe that knowing the structure of child personality will allow researchers to clarify and explore the links between child personality and measures of adult personality and adaptive outcomes. This new instrument, based on lexical studies, demonstrates that people who know children well find certain dimensions useful in conceptualizing individual differences in their personalities, and that these dimensions are robust across childhood.

Finally, one of the benefits of a comprehensive taxonomy like the present one is that it allows investigators to locate more clearly gaps in the literature. The taxonomy of the midlevel scales we have presented is clearly a work in progress. These lexically based scales will be elaborated, trimmed, and supplemented over time as we

better understand the nomological nets that surround these personality dimensions across development and cultures.

APPENDIX A

Inventory of Child Individual Differences Scale Summaries and Representative Items

Achievement Orientation: Children who are persistent and focused on goal attainment, who follow tasks through to completion. “Self disciplined”; “has a drive to do better.”

Activity Level: The level of energy output indicated by vigorous locomotion and being constantly on the move. “Energetic”; “always busy doing something.”

Antagonism: The amount of confrontational behavior indicated by being discourteous, rude, aggressive; directly expressing anger in interpersonal situations. “Aggressive toward others”; “uncooperative.”

Compliance: Indicates cooperative behavior in response to interpersonal authority; “well mannered”; “obedient”; “dependable and trustworthy.”

Considerate: Is actively concerned about what happens to others, readily helps and nurtures others; “caring”; “sensitive to others’ feelings”; socially close, empathic.

Distractible: Behavior that is described as showing poor concentration and being low on sustained directed attention. These are children “who get bored easily,” “are easily distracted,” and “give up easily.”

Fearful/Insecure: Children who are easily upset and tend to be apprehensive, distressed, and quick to panic. “Child is insecure,” “lacks confidence,” and “is afraid of a lot of things.”

Intelligent–Quick to Learn: This scale measures children who are quick to understand what is said or is going on, who are intelligent and learning oriented; “has good thinking abilities”; “is eager to learn”; “is quick to learn.”

Negative Affect: Negative emotions experienced in interpersonal situations. Children are “irritable,” “moody,” “get angry easily,” and “quick tempered.”

Openness: This is a scale that measures the tendency to explore, find out about things and ask a lot of questions. “Has a lot of imagination”; “curious”; “interested in new things.”

Organized: Describes children who are organized, orderly and tidy. They “do things carefully and with thought” and can concentrate well; “a perfectionist.”

Positive Emotions: Describes children who are sweet, loving, and who get along well with others. These children are described as “a joy to be with,” “happy,” and “cheerful.”

Shy: Scale describes children who are socially reticent and “slow to warm up to new people or new situations.” They tend to be “withdrawn,” “quiet,” and often “prefer to be alone.”

Sociable/Outgoing: This scale describes children who like to be with other people and actively seek their company. They “have a lot of friends.” They are popular with people and “make friends easily.”

Strong-Willed: These are bossy, self-assertive children who “want things their own way,” “like to take charge,” and “manipulate to get their own way.”

APPENDIX B

Comparisons Among Scales

	ICID	Belgian HiPic ^a	Dutch BLIK ^b	Goldberg (Digman) ^c	Shiner Literature Review ^d
1.	Achievement Orientation	Achievement Motivation	Perseverance	Perseverance	Persistence/ Attention
2.	Activity Level	Energy	Energy	Activity Level	Activity Level
3.	Antagonism	None	Aggressiveness	Antagonism	Aggressive
4.	Compliance	Compliance	Compliance	Perseverance	Prosocial
5.	Considerate	Altruism	Altruism	Mannerliness	Prosocial
6.	Distractible	Concentration	Impulsivity	Hyperactive/ Impulsivity	Negative Emotionality
7.	Fearful/Insecure	Anxiety	Emotional Stability (R)	Insecurity	Negative Emotionality
8.	Intelligence/ Quick to Learn	Intellect	Intellect	None	None

(Continued)

APPENDIX B (cont.)

ICID	Belgian HiPic ^a	Dutch BLIK ^b	Goldberg (Digman) ^c	Shiner Literature Review ^d
9. Negative Affect	Irritability	Angry Hostility	Antagonism	Negative Emotionality
10. Openness to Experience	Curiosity	Curiosity	Imagination	Mastery
11. Organized	Orderliness	Carefulness	Carefulness	Motivation Persistence/ Attention
12. Positive Emotions	Optimism	Positive Emotionality	Resiliency	None
13. Shy	Shyness	Approach Withdrawal	Sociability	Shyness
14. Sociable-Outgoing	Shyness (R)	Sociability	Sociability	Sociability
15. Strong Willed	Dominance	Dominance	Self-Assertion	Aggressive

^aMervielde & De Fruyt (1999); ^bSlotboom & Elphick (1997); ^cGoldberg (2001); ^dShiner (1998).

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