Personality in Middle Childhood: A Hierarchical Structure and Longitudinal Connections With Personality in Late Adolescence

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Abstract

Research on the structure of personality in middle childhood, while advancing, is still in the early stages of development. In this study, we employed a group of 1563 twins to elucidate the hierarchical structure of personality in middle childhood and provide connections to established personality traits in adult populations. Our results provide evidence for a higher-order structure of personality in middle childhood that maps on to recent findings in adult populations supporting hierarchical relationships among 2-, 3-, 4-, and 5-factor models of personality. In addition, primary higher-order personality traits rated by parents at age 11 showed substantial predictive validity for analogous traits rated by self at age 17. We discuss our results within the context of developing a convergent hierarchical taxonomy of personality in middle childhood and the importance of multiinformant investigations.

Keywords

childhood personality; five factor model; personality structure; personality development

Over the last several decades, a more thorough understanding and better agreement on the fundamental structure of individual differences in personality has emerged. Researchers have converged on the broad outlines of a coherent structural model for classification of personality traits, an effort that has, in turn, facilitated interpretation of results across studies employing different structural models.

These developments have primarily focused on personality traits measured in adulthood. Efforts toward a better understanding of childhood personality have been growing only in recent years, due in large part to a number of researchers who have devoted their attention to this particular age group (e.g., Caspi, Roberts, & Shiner, 2005; De Fruyt et al., 2006; Shiner & Caspi, 2003). While researchers investigating personality structure and classification have often relied on adult samples, another group of individual differences researchers have emphasized the study of *temperament* characteristics in infancy and toddlerhood. Temperamental traits are often defined as individual differences that are largely biologically-

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based and present from birth (e.g., Derryberry & Rothbart, 1997; Saucier & Simonds, 2006). Despite a large and growing body of work investigating models of temperamental characteristics and a common hypothesis that later personality traits develop *out of* early temperamental traits, a comprehensive empirical understanding of how temperament and personality are related has not been established.

Investigations focusing on infants/toddlers and adolescents/adults have been productive and encouraging for the field of personality psychology, but have left numerous questions regarding the intermediate portion of the lifespan. A key issue in this lesser-studied developmental period in personality psychology is the importance of age-specific models. Given the myriad developmental changes that take place across the life span, it is not safe to assume that the "best" structural model in adults is necessarily the "best" structural model in childhood (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006). Thus, in order to thoroughly understand, classify, and measure childhood personality, including an understanding of how it is related to personality in adulthood, we must pursue focused explorations targeting the population of interest (De Fruyt et al., 2006) as we do here. Specifically, we focus on unpacking the hierarchical structure of personality in this age group, building on recent work in adulthood.

While various structural models of adult personality have been utilized in the literature, the field has largely been moving toward agreement on a five-factor model (FFM; e.g. Digman, 1989; McCrae & Costa, 1999) as a comprehensive taxonomy for organizing diverse personality traits. Furthermore, the field has gained an empirical understanding of how 2-, 3-, 4- and 5-factor models of personality are hierarchically related in the adult literature (DeYoung, 2006; Markon, Krueger, & Watson, 2005) such that these models need not be viewed as mutually exclusive of one another. Many early attempts at measuring personality in childhood used a five-factor approach, and recent empirically-based approaches to scale construction in children have shown a similar five-factor structure. However, structural models in the temperament literature often utilize a 3- or 4-factor framework (Else-Quest et al., 2006) resulting in a lack of consensus on the "best" structural model for these younger age groups– analogous, to some extent, to the lack of consensus that previously existed in the adult literature. Thus, an important remaining question is whether various higher-order factor structures of personality traits in children may be hierarchically related to one another in a similar manner to that established for adults.

As noted previously, efforts to identify the structure of personality traits in childhood have largely concurred with major models of adult personality structure, in particular the Five Factor Model (FFM; Caspi, Roberts, & Shiner, 2005; Caspi & Shiner, 2006). Both empirical and integrated theoretical investigations have supported the existence of five broad trait domains in childhood corresponding to Neuroticism, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience (e.g., Caspi, Roberts, & Shiner, 2005; Caspi & Shiner, 2006; Digman, 1989; Goldberg, 2001; Halverson et al., 2003; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Lamb, Chuang, Wessels, Broberg, & Hwang, 2002; McCrae et al., 2002; Mervielde & De Fruyt, 2002). There has been some debate over whether Openness to Experience has a direct analog in childhood (Goldberg, 2001; Halverson et al., 2003) and whether it might not fully emerge until adolescence (Lamb et al., 2002; Mervielde, De Clercq, De Fruyt, & Van Leeuwen, 2005).

The lack of an agreed upon taxonomy (and the resulting use of numerous measures of childhood temperament and personality) has resulted in problematic communication between researchers of childhood temperament and personality, as well as difficulties in linking this work to research on adult populations (Caspi, Roberts, & Shiner, 2005; De Fruyt et al., 2006). Longitudinal studies investigating connections of childhood personality traits to adult personality traits can provide an important step in linking these primarily age-specific

literatures. Work investigating longitudinal connection of personality types (Caspi et al., 2003) and higher-order traits (Asendorpf & Van Aken, 2003; De Fruyt et al., 2006; McCrae et al., 2002; Shiner, Masten, & Roberts, 2003; see Roberts & DelVecchio, 2000, for a quantitative review) suggests modest, but significant, stability in personality traits across childhood and adolescence. However, as measurement of childhood personality improves, potential stability of personality across development should be better understood. Thus, investigators must continue examining cross-time relationships of early personality and rely on methodologically-rigorous designs, such as those utilizing multiple informants and multiple measures as we do in the present study.

The Present Study

The present study had the primary goal of contributing to our current understanding of the higher-order structure of personality traits in middle childhood. First, exploratory analyses at the higher-order trait level were conducted to determine whether different factorial models of higher-order trait structure would be related in a hierarchical manner, similar to the established evidence in adult populations. Second, we sought to establish evidence for predictive validity of these higher-order traits by relating parent-rated higher-order personality traits at age 11 to self-rated higher-order personality traits at age 17.

Method

Participants

Participants were male and female twins and their primary caregivers who were recruited to participate in the Minnesota Twin Family Study (MTFS), a population-based longitudinal study of twins and their families (see Holdcraft & Iacono, 2004, and Iacono, McGue, & Krueger, 2007, for more information on MTFS participants and their representativeness). MTFS utilizes an overlapping cohort design, with one cohort of twins and their families recruited when the twins were approximately 11 years old and the other cohort recruited when the twins were approximately 17 years old. The present study included twins and their caregivers from the younger cohort.

At the intake assessment, parents completed a measure of their children's personality. Analyses included data for 1408 individual twins at age 11, with approximately equal numbers of boys (*N*=668, 47.4%) and girls (*N*=740, 52.6%). In most cases, ratings of the children's personalities came from the biological mother (*N*=1390, 98.7%), but when mother's report was not available data from the father (*N*=6, 0.4%) or stepmother (*N*=12, 0.9%) was used. Approximately 6 years after the initial assessment, at the second follow-up assessment, twins completed a self-report measure of their personality (*N*=1281). Of the 1408 individuals with personality information at age 11, 282 (20%) had missing information for all self-reported personality items at age 17. Of the 1281 individuals with personality information at age 17, 153 (12%) had missing information for all parent-rated personality items at age 11. The resulting sample used for the longitudinal analyses thus consisted of 1563 individuals, 282 with data at age 11 only, 153 with data at 17 only, and 1128 with data from both assessments.

Measures

Parent ratings of childhood personality—Parents completed the Multidimensional Personality Ratings (MPR; Cukrowicz, Taylor, Schatschneider, & Iacono, 2006) measure assessing personality characteristics of each twin during the intake assessment visit. The measure used consisted of 34 items which were written using a rational, face-valid approach to approximating the eleven lower-order scales of the Multidimensional Personality Questionnaire (MPQ; Tellegen & Waller, 2001). Each item listed a personality characteristic, followed by a description of high scorers and low scorers on that attribute. For example:

Dominance: High scorers are natural leaders, they tend to take charge, make decisions, give directions, and other people defer to them. Low scorers prefer to let someone else run things and would rather be a soldier than a general.

Parents were then asked to rank each of their twins on the characteristic using a 4-point Likert scale (1=definitely low, 2=probably low, 3=probably high, 4=definitely high). The instructions requested the parents to keep only one twin in mind while making the ratings.

Self-reported personality at age 17—At the second follow-up assessment, twins were asked to complete the 198-item version of the *Multidimensional Personality Questionnaire* (MPQ; Tellegen & Waller, 2001), an omnibus measure of personality in late adolescence and adulthood. The MPQ is an empirically-derived measure of personality which was developed through an iterative approach to measuring the range of basic personality constructs in adults. It assesses an individual's standing on 11 lower-order personality traits: Well-Being (WB; overall subjective happiness), Achievement (AC; desire to succeed at things), Social Closeness (SC; feeling socially connected with others), Social Potency (SP; tendency to take on leadership roles), Alienation (AL; feeling socially isolated from others), Stress Reactivity (SR; affective lability), Aggression (AG; hurting others), Traditionalism (TR; abiding by traditional rules and norms), Harm Avoidance (HA; being very cautious and safety-conscious), Control (CO; being orderly and organized), and Absorption (AB; ability to become mentally absorbed in experiences).

Statistical Analyses

Part 1: Middle childhood—The MPR measure was subjected to item-level principal components analysis with varimax rotation using SPSS 13.0, according to the procedure described by Goldberg (2006) for examining the hierarchical factor structure of a given set of variables. Specifically, an iterative procedure was implemented by extracting the first principal component from the MPR items and saving the regression-based factor scores, extracting and rotating (using varimax rotation) two principal components and saving the factor scores, extracting and rotating three principal components and saving factor scores, and so on. While the focus on the present study was at the higher-order level, this process was extended to extract a lower-level structure as well. These additional analyses are available from the first author on request.

Correlations were then estimated for the saved factor scores. While correlations between regression-based factor scores produced with varimax rotation will necessarily be uncorrelated *within* levels, we were interested in the relationships of the scores *between* levels of the personality hierarchy. That is, we wanted to understand how lower levels of the hierarchy emerged from higher levels. The factor score correlations were used to construct a hierarchical structure of personality by placing the first principal component at the top of the structure and using the correlations as path estimates between this component and the two principal components at the next level, and so on at successive levels.

Part 2: Longitudinal connections—To make full use of the combined longitudinal data set, missing data were imputed using the EM algorithm in SPSS. Longitudinal analyses were then conducted using Mplus (Muthén & Muthén, 1998–2006), which allowed us to cluster twins at the family-level to account for the fact that data obtained from one twin is not independent of the cotwin's data by using a maximum likelihood estimator with robust standard errors. Ordinary least squares regression analyses were conducted for each of the 3 higher-order scales at age 17, with the 3 higher-order scales at age 11 that map on to those measured by the MPQ at age 17 entered simultaneously as predictors. The lower order structure that emerged at age 11 paralleled the eleven factor structure of the MPQ (details of analyses

available on request). Thus, the 3 higher-order scales of the MPQ were calculated by summing the relevant lower-order scales in both age groups: Positive Emotionality (PEM) was composed of Achievement, Well-being, Social Closeness, and Social Potency; Negative Emotionality (NEM) was composed of Alienation, Stress Reactivity, and Aggression; Constraint (CON) was composed of Traditionalism, Harm Avoidance, and Control.

Results

Part 1: Middle Childhood

Item-level factor analyses were conducted on the 34 items of the MPR questionnaire for *N*=1408 children (see Figure 1). Results at the higher levels of the hierarchy provide support for some congruence with 3-, 4- and 5-factor models of personality established in adult populations. Specifically, the three-principal components level describes traits resembling Positive Emotionality/Extraversion (e.g., items such as dominance, persuasive, hard-driving and interested), Conscientiousness/Constraint (e.g., freewheeling, planful, respects authority, safety-consciousness), and Negative Emotionality/Neuroticism (e.g., treated poorly, even-tempered, feels exploited, feels unlucky). At the four-principal components level, a fourth trait breaks off that largely resembles an Agreeableness-like dimension (e.g., people-oriented, responsive, affectionate, gregarious). Finally, at the five-principal components level, a fifth trait breaks off reflecting Absorption/Openness to Experience (e.g., absorbed, fantasy-prone, responsive).

Part 2: Connections with personality at 17

All of the higher-order scales at age 17 were significantly predicted by the scale of similar content at age 11, above and beyond other higher-order scales at age 11 (See Table 1 for regression coefficients). Only one additional prediction resulted, such that NEM at age 17 was secondarily predicted by low levels on CON at age 11. These results suggest that parental ratings of childhood higher-order personality traits at age 11 hold specific predictive variance for self-reports of the same traits at age 17. Furthermore, examination of the multiple correlations show that parental reports of childhood personality held the most relevant information for predicting later levels of CON, followed by PEM, with self-reports of NEM at 17 showing the lowest amounts of variance accounted for by earlier parental reports.[1] Pearson correlations are presented for additional information about these relationships across time (see Table 2). The overall pattern is similar to the results from the regression analyses although relationships were somewhat less specific.

Discussion

These results provide preliminary support for a hierarchical structure of higher-order personality traits in middle childhood that joins 3-, 4-, and 5-factor accounts of trait structure within a comprehensive framework. The higher-order hierarchical structure is largely consistent with recent results found using adult samples, such that evidence for each prominent model can be found at different levels of personality space. In addition, these results provide evidence that parent ratings of these higher-order traits in middle childhood show specific and meaningful connections with self-rated higher-order personality traits at age 17.

This study represents an important contribution to the ongoing development of a hierarchical taxonomy of personality in middle childhood. The results replicate recent findings in a review of adult personality research, such that evidence was found for a 3-, 4-, and 5-factor model at

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[1]All regressions were repeated in Mplus to test for significant gender differences and, in all cases, the Bayesian Information Criterion (BIC) fit index supported regressions in which parameter estimates were constant across gender.

higher levels of the hierarchy. Specifically, at the third level of the hierarchy, evidence emerges for traits roughly resembling Extraversion/Positive Emotionality, Conscientiousness/ Constraint, and Neuroticism/Negative Emotionality. At the fourth level, a trait resembling Agreeableness breaks off from the broader Conscientiousness/Constraint factor (consistent with results in early childhood and adult populations; Abe, 2005; Markon, Krueger, & Watson, 2005). At level five, the fifth factor emerges as Absorption. In addition, the 2-factor structure is roughly consistent with the emergence of positive and negative 2-factor structures established in adult populations (e.g., Saucier, 2003). Such evidence contributes to continuity across researchers and improved communication and interpretation of results across studies.

One interesting result at the higher-order level represents a subtle deviation from studies with adults. Similar to other studies conducted with children, the higher-order trait corresponding to Agreeableness appears as more of an "agreeable compliance" factor when utilizing parental and teacher ratings (Goldberg, 2001; Mervielde & De Fruyt, 2002). This is also consistent with the fourth factor identified in studies of temperament in early adolescents that has been labeled "affiliativeness" (Caspi & Shiner, 2006) and akin to the positive manifestation of the "difficult" temperament construct that has historically been presented in the literature (De Fruyt et al., 2006). In future work, it will be important to determine whether this is an artifact of the reporter and how other aspects of the agreeableness domain might be measured in middle childhood.

In addition, this study provided evidence of longitudinal prediction of higher-order personality traits across reporter and across the period of adolescent development. Higher-order childhood personality traits as rated by parents at age 11 significantly predicted the analogous self-rated higher-order traits at age 17. These findings are particularly meaningful given the cross-informant, cross-adolescence, and cross-measure nature of the ratings (including the changes in personality that occur over this period of time; e.g., Roberts & Wood, 2006). Temporal reliability and generalizability across informants are important, even necessary, characteristics of traits that would be included in a taxonomy of childhood personality (Saucier & Simonds, 2006). The results of the present study also have implications for reliance on parental reports of childhood personality, such that parental reports may hold more meaningful information for some traits than others. Specifically, results from this study demonstrated the greater predictive validity for later self-reported CON than for other traits from parents' earlier reports.

While longitudinal studies can provide crucial evidence in establishing which personality traits should be included in a taxonomy of childhood personality and how such traits are related to one another, they are necessarily limited by the measurements available at the time the study began. Given that the field has still not yet developed a widely-accepted, well-validated measure of childhood personality, early measures were breaking new ground. Thus, the primary limitation of the present study is reliance on a measure of childhood personality that is limited in its ability to measure the constructs of interest with maximum validity and reliability. Future research should utilize broader measures of traits of interest and also include lower-order traits that may be relevant for children but are not well-captured in adult personality measures (e.g., attentiveness; Caspi & Shiner, 2005).

From a developmental perspective, such research also has clinical implications– e.g., if one is trying to predict at an early age potential negative outcomes for an individual later in life. The ability to make such predictions may contribute to the development of prevention and intervention programs aimed at reducing the probability of these negative outcomes (Shiner, 2006). Similarly useful information could result from identifying those personality characteristics that make children more resilient to negative outcomes and more likely to have positive outcomes. A better understanding of these characteristics could be used to foster and encourage the development of such traits earlier in life.

Future studies should also make attempts to include personality ratings from multiple informants, including the child, and when possible use multiple methods (e.g., observational data). As our knowledge of childhood personality increases, it will be important to gain some understanding of how different sources perceive individual difference characteristics in children, and what types of complementary variance may be offered by using multiple sources (Saucier & Simonds, 2006). Similarly, it will be helpful in answering the essential question in both developmental and personality psychology: "Who reports best on what?" and in uncovering the combinations of informant-trait that offer the best prediction of important behavioral outcomes, such as psychopathology.
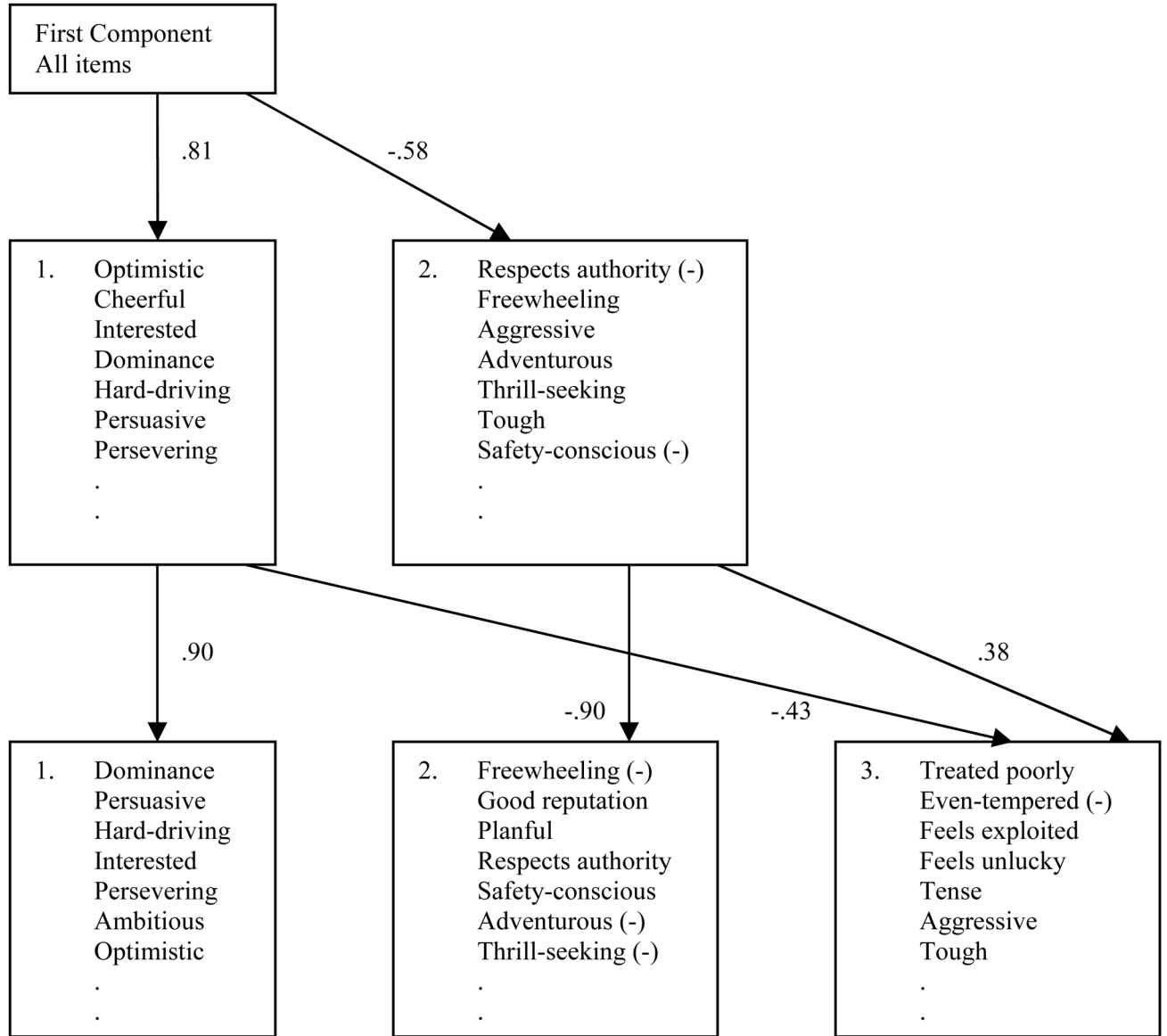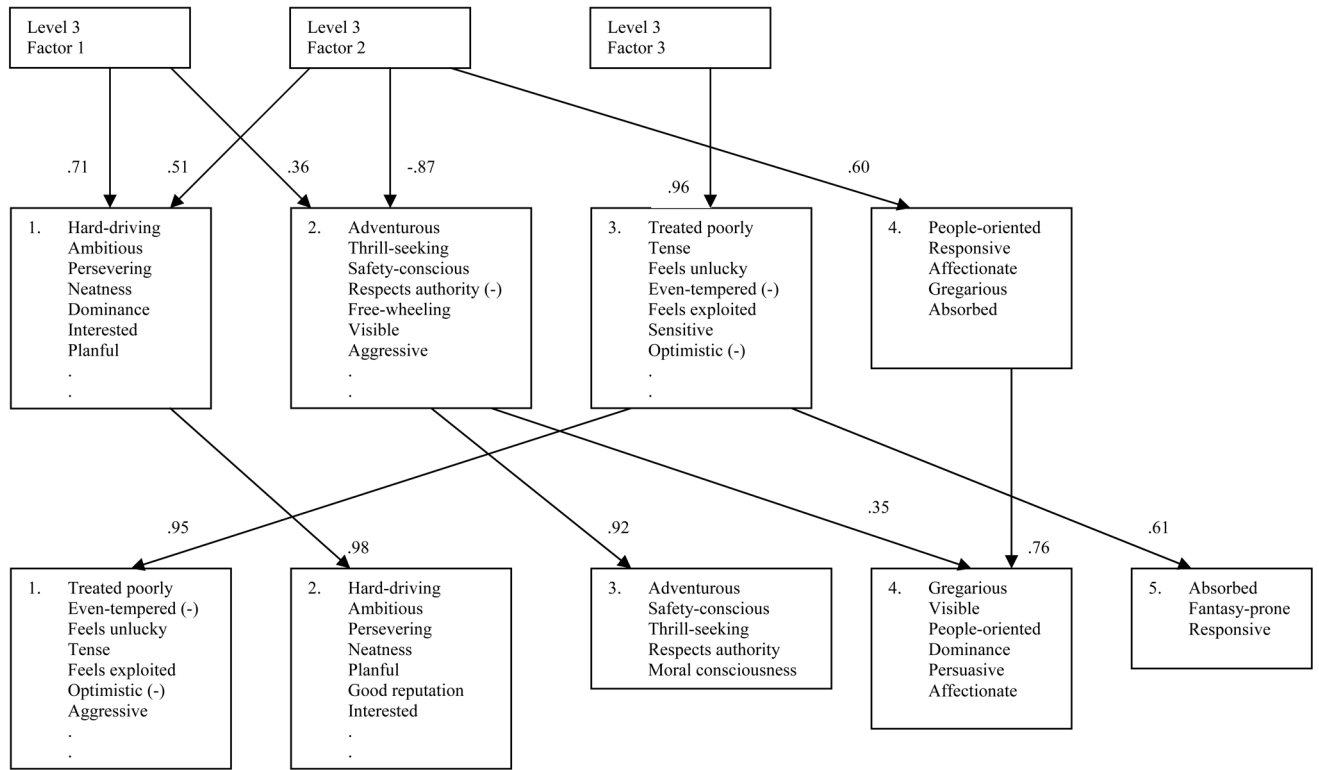
Acknowledgements

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First Component
All items

.81   -.58

1. Optimistic
Cheerful
Interested
Dominance
Hard-driving
Persuasive
Persevering
.
.

2. Respects authority (-)
Freewheeling
Aggressive
Adventurous
Thrill-seeking
Tough
Safety-conscious (-)
.
.

.90   -.90   -.43   .38

1. Dominance
Persuasive
Hard-driving
Interested
Persevering
Ambitious
Optimistic
.
.

2. Freewheeling (-)
Good reputation
Planful
Respects authority
Safety-conscious
Adventurous (-)
Thrill-seeking (-)
.
.

3. Treated poorly
Even-tempered (-)
Feels exploited
Feels unlucky
Tense
Aggressive
Tough
.
.

Level 3
Factor 1

Level 3
Factor 2

Level 3
Factor 3

.71   .51   .36   -.87   .96   .60

1. Hard-driving
    Ambitious
    Persevering
    Neatness
    Dominance
    Interested
    Planful
    .
    .

2. Adventurous
    Thrill-seeking
    Safety-conscious
    Respects authority (-)
    Free-wheeling
    Visible
    Aggressive
    .
    .

3. Treated poorly
    Tense
    Feels unlucky
    Even-tempered (-)
    Feels exploited
    Sensitive
    Optimistic (-)
    .
    .

4. People-oriented
    Responsive
    Affectionate
    Gregarious
    Absorbed

.95   .98   .92   .35   .76   .61

1. Treated poorly
    Even-tempered (-)
    Feels unlucky
    Tense
    Feels exploited
    Optimistic (-)
    Aggressive
    .
    .

2. Hard-driving
    Ambitious
    Persevering
    Neatness
    Planful
    Good reputation
    Interested
    .
    .

3. Adventurous
    Safety-conscious
    Thrill-seeking
    Respects authority
    Moral consciousness

4. Gregarious
    Visible
    People-oriented
    Dominance
    Persuasive
    Affectionate

5. Absorbed
    Fantasy-prone
    Responsive

Figure 1.
Parent-rated items loading highest on components representing the 2nd, 3rd, 4th, and 5th levels of the hieararchy. Path coefficients of ≥.30 are presented; all are significant at p<.01.

Table 1

Unstandardized regression coefficients as indices of association between higher-order personality traits at age 11 and age 17 with 99% confidence intervals.

	PEM – 17 (C.I.)	NEM – 17 (C.I.)	CON – 17 (C.I.)
PEM – 11	0.75[**] (0.57 – 0.92)	−0.10 (−0.30 – 0.09)	0.11 (−0.11 – 0.32)
NEM – 11	0.13 (−0.14 – 0.40)	0.62[**] (0.32 – 0.93)	0.32 (0.00 – 0.64)
CON – 11	−0.22 (−0.46 – 0.01)	−0.29[**] (−0.56 – −0.03)	1.60[**] (1.28 – 1.91)
Multiple correlation	.30	.23	.40

Note. Multiple correlations and beta weights are from ordinary least squares regressions predicting the higher-order traits at 17 from the higher-order traits at 11. Higher-order traits at age 11 were entered simultaneously as predictors. C.I. = 99% confidence intervals are presented in parentheses.

[**]=$p \leq .01$.

Table 2

Pearson correlations as indices of association between higher-order personality traits at age 11 and age 17.

	PEM – 17	NEM – 17	CON – 17
PEM – 11	0.29^{**}	-0.13^{**}	0.12^{**}
NEM – 11	-0.06^{*}	0.21^{**}	-0.06^{*}
CON – 11	0.01	-0.15^{**}	0.39^{**}

*
Note. $=p \leq 0.05$;

**
$=p \leq 0.01$.