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Personality in the Age of Industry: Structure, Heritability, and Correlates of Personality in Middle Childhood from the Perspective of Parents, Teachers, and Children

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Abstract

Middle childhood is a crucial juncture in the lifespan where children work towards achieving a sense of competence foundational for future development. However, middle childhood has historically been underrepresented in the personality literature. The current study provides a comprehensive examination of personality in middle childhood using a large ($N = 2510$), longitudinal sample of 10- to 12-year-old twins. The structure, heritability, and correlates of personality in this period were investigated using personality ratings of parents, teachers, and children. Results showed that personality in middle childhood has a coherent structure, is heritable, and is relevant for developmentally salient outcomes such as externalizing behavior, substance use, and academic engagement. Results emphasize the importance of investigating personality in middle childhood across multiple informants.

Keywords

Personality; Middle Childhood; Multiple Informants; Personality Structure; Personality Heritability; Personality Outcomes

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The origins of personality are found in childhood temperament, or, the “individual differences in reactivity and self-regulation” that appear as early as infancy (Rothbart, 2011; Shiner & De Young, 2013). Although most research on temperament focuses on infancy through early childhood (3 to 7 years old), there is also a substantial body of literature on temperament and personality in adolescence (13 to 17 years old). However, the intervening period of 8 to 12 years old, sometimes referred to as *middle childhood*, has received considerably less attention. Consequently, much of our understanding of this period is based on the upward or downward extension of findings from early childhood and adolescence, respectively (Teglass, 1998).

Middle childhood, however, is a distinct and formative period in which critical cognitive, behavioral, and social-emotional changes are taking place that likely influence—and are influenced by—the development of personality. During this stage youngsters face academic and social challenges that are more demanding than those of earlier periods, and for which success is less certain. For example, children are exposed to more explicit and comparative feedback about their performance in intellectual, athletic, and other skill domains (Wigfield et al., 2006). They spend less time with their families and more time with peers, which allows for new opportunities and challenges in forging and maintaining friendships, as well as establishing a place in the social hierarchy (Collins, Madsen, & Susman-Stillman, 2002; Kerns, 2008; Rubin, Bukowski, Parker, 2006). Mixed-gender play becomes more common (Poulin & Pedersen, 2007; Shrum, Cheek, & Hunter, 1988), parental expectations for independence and responsibility increase (Collins et al., 2002), and children begin to invest in personal goals and life tasks consistent with their own interests and values (Fahey & Shelley, 1981; Harter, 2006; Rochat, 2013).

As a result of these changes, youngsters in middle childhood have more opportunities to discover how their abilities and desires are similar to or different from others', encounter praise or complaints about their behavior, and feel ownership over their accomplishments and failures. As described by Erikson (1980), this period is a decisive one in childhood that sets a course towards industry, competence, and self-confidence or failure, lack of maturation, and inferiority.

In parallel to the greater sophistication of the environments encountered by children during this period, personality in middle childhood is more complex in its manifestation and structure than in infancy and early childhood, though it is not yet completely analogous to what is observed in adolescents and adults (Shiner, 2006). Furthermore, consistent with increasing levels of explicit feedback, and greater self-reflection and verbal abilities, most children of this age are able to provide self-reports regarding their own personalities (Shiner & De Young, 2013). Therefore, middle childhood represents the point at which we first gain access into how youngsters conceptualize their own personality. At this age, however, children are still not as capable raters as adults (Soto, John, Gosling, & Potter, 2008); consequently, self-reports may still need to be complimented by the ratings of others, specifically, adults with close connections to youngsters who may hold different perspectives on children's dispositional styles than the children themselves. On one hand, individuals such as parents and teachers can only provide an outsider's impression of a child's personality, but on the other, significant adults such as parents and teachers are more

experienced, knowledgeable, and capable raters. Given this, gathering and reconciling information from both children and adult informants is important for gaining a more complete understanding of personality within the developmental context of middle childhood.

Our goal was to explore the essential elements of personality in middle childhood so as to provide a detailed picture of the nature of trait dimensions, as well as their origins and influences on other functional domains. We drew upon the reports of youngsters as well as their teachers and parents to take advantage of the unique knowledge and perspectives brought by each of these important individuals, and to explore how varying perspectives provide complementary information for understanding personality during this period.

Informants of Personality

A critical issue in the study of personality is how to most accurately and thoroughly assess individual differences in personality. Self-report is the most frequently used approach for measuring adult personality, but is generally inappropriate for younger children given their cognitive limitations (Shiner & De Young, 2013). Personality in childhood is thus most commonly assessed via informant-report (Gartstein, Bridgett, & Low, 2012; Goldsmith & Gagne, 2012), which draws upon the knowledge and experience of those presumed to be ‘expert’ observers of child characteristics. Parents—the most common informant—spend and have spent considerable time with their children, and observe their behavior across a wide variety of situations (Rothbart & Goldsmith, 1985). Teachers are less commonly employed as informants than parents, but have extensive experience interacting with many different children, resulting in better norms for rating individual differences in personality (Teglasi, 1998). Also, teachers have unique access to contexts that are strong elicitors of individual differences in various personality traits (e.g., highly structured classroom activities, performance evaluations, peer interaction).

The developmental achievements of middle childhood suggest that compared to younger children, those in this age range may be more able to serve as reliable reporters of their own personality. By middle childhood children think more in trait terms (Alvarez, Ruble, & Bolger, 2001), and have developed other linguistic and meta-cognitive abilities that support the ability to provide self-reports (Shiner & De Young, 2013; Soto et al., 2008). Children are knowledgeable of their behavior across all situations, and are privy to a private inner world that may be obscure to parents and teachers. Indeed, one advantage of self-reports is they provide better information on “internalized” traits (e.g., neuroticism) not easily observed by others (Funder, 1995).

Despite widespread use and utility, informant and self-report approaches have faced criticism (Gartstein et al., 2012). One reason is that agreement across informants tends to be modest (Achenbach, McConaughy, & Howell, 1987; Laidra et al., 2006; Verhulst & Akkerhuis, 1989; Worobey, 1987). Disagreement can arise because each informant is subject to different influences (De Los Reyes & Kazdin, 2005). For example, mood and anxiety symptoms in parents are associated with over-reporting maladaptive behavior in children (Durbin & Wilson, 2012; Fergusson, Lynskey, & Horwood, 1993; Muller, Achtergarde, &

Furniss, 2011). Furthermore, teachers sometimes exhibit a generalized evaluative rating style for children who have more behavioral problems (i.e., a “negative halo effect”; Abikoff, Courtney, Pelham, & Koplewicz, 1993; Stevens, Quittner, & Abikoff, 1998). Self-reports of children on the other hand show more acquiescence bias than adults, and are less reliable (Soto et al., 2008).

Although rater disagreement has spurred several methodological critiques, it may not be completely disadvantageous. Disagreement can be informative in that it provides an opportunity to learn about the ways in which different informants conceptualize a child's personality. For instance, in their relationships with children, parents and teachers differ in their goals, means of interaction, and degree of intimacy. Thus, the behaviors they are likely to observe and the situations in which they are elicited are different. Therefore, examining the reports of multiple informants provides a more complete representation of personality in middle childhood than would be obtained from any single informant.

Personality Structure

Understanding personality in middle childhood requires that many key issues be considered that have historically been integral for understanding personality in other developmental periods. One of the most basic and important of these issues concerns the structure of individual differences. That is, how is personality typically organized and manifested; how many trait dimensions are needed to provide an adequate summary of the myriad individual differences that are demonstrated in middle childhood? There are several competing theories regarding the structure of temperament in earlier childhood (Goldsmith et al., 1987; Mervielde & De Pauw, 2012). Despite ostensible differences, however, there is considerable overlap across conceptualizations, and structural examinations often reveal that three major factors provide a useful framework to organize the narrower temperamental differences that are investigated (Mervielde & De Pauw, 2012; Rothbart, Ahadi, Hershey, & Fisher, 2001; Shiner, 2006). One of the most prominent models of child temperament is Rothbart's psychobiological model, which posits 3 major factors: Surgency, Negative Affectivity, and Effortful Control (Rothbart, 2011). The first two dimensions capture individual differences in affective experience (positive and negative, respectively), and Effortful Control captures individual differences in self-regulatory ability.

There has been similar debate and semi-consensus in the adult literature. Three and 5 factor models have generally received the most support and attention (Clark & Watson, 2008; Saucier & Simonds, 2006). The Big 3 model includes the theoretically independent traits of Positive Emotionality, Negative Emotionality, and Constraint (Clark & Watson, 2008). Roughly analogous to the temperament traits described above, these dimensions capture individual differences in sociability and positive affect, aggression and distress, and self-control and traditionalism (Clark & Watson, 2008). The Big 5 model includes the traits of Extraversion, Neuroticism, Conscientiousness, Agreeableness, and Openness (Saucier & Simonds, 2006). The first three traits are similar to the Big 3, and the last two capture individual differences in trust and selflessness, and intellect and aesthetics (Saucier & Simonds, 2006). Importantly, although the Big 3 and 5 appear to be competing paradigms, this is not necessarily the case, as the Big 5 factors are largely nested within the Big 3

factors (Markon, Krueger, & Watson, 2005). Thus, preference for one over the other often comes down to the level of abstraction desired.

We adopted a Big 3 perspective in the current study because of this model's robustness and relevance across childhood and adulthood (Clark & Watson, 2008). Moreover, our measures were derived from a theoretical model of the Big 3. As such, our interest was not necessarily in the structure of personality itself, but rather in how the structure varied across informants.

Heritability of Personality

Just as important as delineating the structure of personality in middle childhood is determining its origins. Most theorists posit biological and heritable influences on early emerging temperament traits (Rothbart, 2011), and, in fact, heritability estimates for these traits tend to range from 0.20 to 0.60 (Braungart et al., 1992; Goldsmith et al., 1997; Plomin et al., 1991; Saudino & Wang, 2012). Although focusing on fluctuations in heritability estimates is not necessarily constructive (Johnson, Penke, & Spinath, 2011), systematic variations can be illuminating. Some of the variability may stem from age differences in children (Plomin & Nesselroade, 1990; Saudino & Wang, 2012), with heritability tending to increase with age (Saudino & Wang, 2012). The few studies examining middle childhood did report heritability estimates in a narrower range of 0.50 to 0.70 (Matheny & Dolan, 1980; Spengler, Gottschling, & Spinath, 2012). However, each of these studies relied on only a single type of informant, and heritability estimates can also differ as a function of informant.

Heritability estimates tend to be higher for parental reports relative to teacher and child reports (Goodman & Stevenson, 1989; Kuntsi & Stevenson, 2008; Martin, Scourfield, & McGuffin, 2002; Schmitz et al., 1996; Wood et al., 2008). This may in part be due to parents' propensity to exaggerate differences between non-identical twins and full siblings (i.e., "contrast effects"), which inflates heritability estimates (Ganiban et al., 2008; Krueger, Johnson, & Kling, 2006; Saudino, 2003; Saudino & Eaton, 1991; Saudino et al., 1995). Heritability estimates may also differ as a function of the contexts in which informants' ratings are based (e.g., in the home versus in the laboratory or school; Cherny et al., 1994; Saudino & Zapfe, 2008), and the varying reliability of informants' reports (Johnson et al., 2011). The fact that youth reports are typically less reliable than adult reports (Soto et al., 2008) may partly account for the lower heritability estimates often found for children's self-reports (e.g., Martin et al., 2002).

Personality and Psychosocial Functioning

Knowledge regarding the structure and etiology of personality helps put personality's pervasive relevance to functioning in various life domains into perspective. That is, it helps us understand why personality matters. Indeed, personality research has long been fueled by an interest in how individual differences in disposition shape important life outcomes. Personality traits in adolescence and adulthood are related to a plethora of consequential outcomes across a variety of domains (e.g., career and romantic success; Ozer & Benet-Martinez, 2006). Research on personality in childhood has sought to extend the

developmental scope of this work by examining how early emerging temperamental differences contribute to noteworthy outcomes (e.g., health, mental wellness, and criminality) in adolescence and beyond (Moffitt et al., 2011).

Middle childhood is an especially important life stage to consider in this regard. In middle childhood, one must navigate more complex intellectual and social challenges than early childhood, and forces outside the family begin to exert more influence (Masten et al., 1995; Masten & Coatsworth, 1998). This period is characterized by the transition to more intense formal schooling (i.e., elementary to middle school), a major milestone that heralds the onset of specific developmental tasks (Masten & Coatsworth, 1998). In middle childhood, youngsters need to be able to follow rules, avoid conflict with adults, meet academic standards, make friends and engage in meaningful social relationships, develop a stronger sense of autonomy, and maintain a positive sense of subjective well-being. A lack of competence in these domains can hinder later development. For example, the inability to control impulses and thrive academically can result in later occupational difficulties (Masten et al., 1995; Masten & Tellegen, 2012) and internalizing (anxiety and depression) and externalizing (antisocial behavior and substance abuse) problems (Masten & Curtis, 2000).

To better understand the associations between personality and psychosocial functioning in middle childhood, we examined how personality relates both concurrently and prospectively to aspects of mental and behavioral health, academic success, and social adjustment. In addition to examining the concurrent and prospective associations between personality and these outcomes, we were interested in the unique contributions of the three informants' ratings in predicting these outcomes. As discussed above, inter-rater agreement is seldom high between teachers, parents, and children, making it possible for each informant to contribute incremental information in predicting various outcomes.

Method

Participants

The sample consisted of 2510 (51% female) twins participating in the Minnesota Twin Family Study (MTFS), a longitudinal study investigating the development of substance use disorders (Iacono et al., 1999). Families were recruited into the study the year the twins turned 11 years old. All twin pairs were same sex. Consistent with the demographics of Minnesota for the target birth years, 96% of participants reported European American ancestry. After the intake assessment at age 11 ($M = 11.8$ years, $SD = 0.43$ years), twins were invited to participate in a follow-up assessment at age 14 ($M = 14.9$ years, $SD = 0.55$ years). Follow-up data was available for 91.4% of the sample. To examine any bias, we compared those with and without outcome data at each age on personality traits at age 11. There were no differences for those without outcome data at age 14.

Measures

Personality—Personality at age 11 was assessed via ratings of personality descriptors that indexed the broad dimensions of Positive Emotionality, Negative Emotionality, and Constraint (see Table 1). Ratings were collected from teachers, parents (almost all mothers),

and a subgroup of male children (child self-ratings were eventually cut from the lengthy MTFS assessments and the assessment of female twins lagged that of male twins).

Although each informant provided ratings for the same constructs, the format and item content of the questionnaires varied somewhat across raters. Mothers completed ratings for the 34 personality trait adjectives listed in Table 1 after reading a brief description of a child high or low on the trait. Teachers made ratings for the 10, 3-4 adjective clusters presented in Table 1; they were instructed to compare each participant to his or her classmates. When more than one teacher rating was available, the mean of the teacher ratings was used for analysis (75% of participants had at least 2 teacher ratings). It was Minnesota state policy to place members of twin pairs in separate classrooms whenever possible, which minimizes any bias due to twin contrast or comparison. Children completed ratings for the same 34 trait adjectives as mothers, but were instructed to compare themselves to other children on the specified trait.

Ratings of the individual trait adjectives were used as indicators of 11 facet level components of personality, which were in turn subsumed by the aforementioned three dimensions of Positive Emotionality, Negative Emotionality, and Constraint (see Table 1). Facets were calculated by averaging the individual items in a scale, and factor scores were calculated by averaging together the corresponding facet scale scores.

Prior to the main analyses, the psychometric properties of the parent and child ratings were examined using Samejima's (1969) Graded Response Model for polytomous items. Preliminary item and scale level exploratory factor analyses were also conducted and results were consistent with the structure portrayed in Table 1 (results are available upon request). Parent reports exhibited adequate psychometric properties with most item discrimination values above 0.8 (i.e., standardized factor loadings above 0.4), and most facet level scales demonstrating satisfactory measurement precision across levels of the latent trait (i.e., information values around 4¹). Child self-ratings were adequate overall, but contained some problematic scales and items. Because items with low discrimination values do not contribute meaningfully to the measurement of the target constructs, the weakest items were removed from the analyses² (see Table 1). The self-report facet scales also evidenced less measurement precision relative to parent reports; information values in the self-reported facet scales generally ranged from 2 to 3, indicating lower reliability for child self-ratings at the facet level.

As the teachers' items were already at the facet level, and often represented the average of multiple teachers' ratings, Graded Response Models were not run. However, standard confirmatory factor analytic models showed that with the exception of harm avoidance, items were generally strongly related to on their relevant factor (standardized loadings between .5 and .9). Full results from these psychometric analyses are available upon request.

¹Information values of 4 correspond to a standard error of 0.5, and a 0.75 estimate of reliability.

²Analyses using the full self-report measure were also run. Overall conclusions did not differ, however, effect sizes were often attenuated using the full measure

Childhood disorders—Mothers and each twin were independently interviewed to assess symptoms of attention deficit hyperactivity disorder (ADHD), conduct disorder (CD), oppositional defiant disorder (ODD), major depressive disorder (MDD), and separation anxiety disorder using the Diagnostic Interview for Children and Adolescents-Revised (Welner et al., 1987). *DSM-IV* criteria were used, as this was the diagnostic system that was current when the study began. Symptoms were rated as absent (0), present at subthreshold level (0.5), or present at full threshold (1). Teachers also provided ratings of symptoms for ADHD, CD, ODD, and overall internalizing problems using items adapted from the Conners Teacher Rating Scale (Conners, 1969; Pelham, Milich, Murphy, & Murphy, 1989) and the Rutter Child Scale B (Rutter, 1967), with additional items to assess diagnostic constructs. Mother, teacher, and twin ratings were averaged and two composite scores were calculated, one to assess externalizing (ADHD, CD, and ODD), and the other to assess internalizing (MDD, separation anxiety, teacher ratings of internalizing) problems.

Academic engagement—A composite of each child's academic engagement was calculated using child and mother ratings for the following measures (Johnson, McGue, & Iacono, 2005, 2006): a 7-item ($\alpha = .83$) scale of the child's attitudes about school (good attitude about school, enjoys attending school), cumulative grade point average (GPA), and expectation of educational attainment (e.g., high school, bachelor's degree). The academic engagement composite was calculated by taking the mean z-score for academic attitudes, GPA, and expectations averaged across the child and mother informants ($r = .77$).

Environmental risk—Several measures were used to assess different aspects of the children's environmental context. The domains included were: antisocial and prosocial peer affiliation, quality of the mother-child and father-child relationships, and family-level stressful life events. For more information about each individual variable, see Hicks and colleagues (2014). A composite measure of environmental risk was calculated by taking the mean z-score across measures of the five domains (mean $r = .28$ and $.34$ at ages 11 and 14, respectively).

Adolescent Substance Use—The Substance Abuse Module of the Composite International Diagnostic Interview (Robins, Babor, & Cottler, 1987) was used to assess substance use and symptoms of substance use disorders at age 14. We calculated a composite measure of adolescent substance abuse using 10 measures of alcohol, nicotine, and marijuana use and symptoms of abuse/dependence. The composite included *DSM-IV* symptoms of alcohol, nicotine, and marijuana abuse and dependence; past 12-month frequency of alcohol, nicotine, and marijuana use; quantity measures including average number of drinks per occasion, maximum number of drinks consumed in 24 hours, average number of cigarettes smoked per day, and number of lifetime marijuana uses. A $\log(x+1)$ transformation was applied to all variables to reduce positive skew. The mean z-score across the 10 measures (mean $r = .58$) was used as the substance use problems composite score at age 14. In addition to this composite, we also examined age at substance use initiation.

Data Analytic Strategy

All major analyses were conducted with Mplus version 7.31 (Muthen & Muthen, 1998-2012), and estimated using full information maximum likelihood with robust standard errors (MLR). With the exception of the biometric analyses, models were run as “complex” models, which in combination with the MLR estimator accounts for the nested nature of the data (i.e., twins nested within families), eliminating bias stemming from non-independence.

First, we examined the correlational structure of the personality dimensions across informants. Lower correlations suggest that dimensions are more distinct. In other words, informants make clear delineations between the different dimensions when thinking about and rating personality. Higher correlations suggest that the dimensions of personality are less distinct.

Next, we estimated the heritability of the three dimensions of personality for each rater by fitting standard biometric models to the twin data. In these models, the relative magnitude of the MZ and DZ twin correlations for a given trait are used to decompose the observed variance of that trait into additive genetic (A), shared environmental (C), and non-shared environmental (E) components. Additive genetic variance refers to genetic influences summed across loci. Shared environmental variance is the result of environmental influences that contribute to similarity among family members. Non-shared environmental variance is due to environmental influences that contribute to differences between twins (including measurement error).

Finally, we examined the concurrent and prospective associations between personality and the measures of psychosocial functioning and environmental context. We were particularly interested in the incremental predictive power of each informant. That is, we wanted to estimate how much additional information each informant provided relative to the other informants. This was done by fitting a series of multiple regression models for each outcome. First, parent ratings of the three personality traits were entered as predictors into the model as parents are the most commonly utilized informant³. Second, teacher ratings of the three personality traits were entered as predictors alongside the parent ratings. Third, child self-ratings of the personality traits were entered into the model along with the parent and teacher ratings. This final step was restricted to males, as only some male participants provided self-ratings.

Results

Preliminary Analysis

Table 2 includes descriptive statistics for the personality ratings, and the correlations among the traits between and within the three informants. Agreement across the informants' ratings for the same traits ranged from modest to moderate (r s ranged from .18 to .49). For each combination of informants, Negative Emotionality evidenced the lowest agreement and Positive Emotionality the highest. Parent-teacher agreement was the highest (mean $r = .41$),

³Similar models were run varying the order in which the different informants' ratings were included. Conclusions did not vary based on the order of entry. Full results available upon request.

while parent-child agreement (mean $r = .26$) and teacher-child agreement was lower (mean $r = .28$).

Personality Structure

Intercorrelations between the dimensions of personality for the three raters can be found in Table 2. Parent ratings demonstrated the most factor differentiation (mean $r = .26$), with moderate correlations between Negative Emotionality and Positive Emotionality ($r = -.31$) and Constraint ($r = -.28$), and a small correlation between Positive Emotionality and Constraint ($r = .18$). In contrast, teacher ratings demonstrated the least factor differentiation (mean $r = .41$). Positive Emotionality was moderately correlated with both Negative Emotionality ($r = -.36$) and Constraint ($r = .33$), and Negative Emotionality was strongly correlated with Constraint ($r = -.54$). Finally, child self-ratings exhibited a unique pattern of intercorrelations. Specifically, Negative Emotionality was only weakly correlated with Positive Emotionality ($r = -.11$) and Constraint ($r = -.20$), but there was a large correlation between Constraint and Positive Emotionality ($r = .58$).

Heritability of Personality Traits

Intraclass correlations among MZ and DZ twins can be found in Table 3. ICCs suggest genetic influences on parents' and teachers' ratings, but not necessarily on children's self-ratings. Within-rater, ICCs were similar in magnitude across the three dimensions of personality.

Model generated estimates of the additive genetic, shared environmental, and non-shared environmental variance components are reported in Table 3. Consistent with the ICCs, parent ratings of child personality were largely heritable, with additive genetic variance accounting for roughly 80% of the observed variation in Positive Emotionality, Negative Emotionality, and Constraint. Shared environmental influences on the other hand were estimated to be zero, with the remaining variance in parent reports attributable to non-shared environmental influences. The heritability of teacher ratings was slightly lower, with estimates ranging from .50 to .70. Significant shared environmental influences were only detected for Constraint (.15; 95% CI=.04-.34). The estimates of genetic and environmental influence on parent and teacher ratings were similar across boys and girls.

In contrast to the parent and teacher ratings, heritability estimates for the child self-ratings were low, ranging from .10 to .30. This is indicative of relatively modest genetic contributions to child self-ratings of personality, if any. Moderate shared environmental influences were detected for Positive Emotionality (.27; 95% CI= .01-.44). Most of the variance in child self-ratings was attributable to non-shared environmental influences.

Personality Traits in Middle Childhood and Psychosocial Functioning

Tables 4 through 6 provide correlations between personality ratings and the measures of psychosocial functioning, both at the zero-order level and adjusting for the other personality traits within-rater. These tables also summarize the regression models in which criterion variables were first regressed on parent ratings of personality, followed by teacher ratings, and then child self-ratings. For these analyses, we used an $\alpha = .01$ given the number of tests

run, and the large size of the sample. Across the models based on parents' and teachers' ratings, there were generally no differences across boys and girls (full results available upon request).

Personality and Age 11 Outcomes—Parent ratings of the three personality traits accounted for 26% of the variance in externalizing symptoms. Negative Emotionality ($\beta = .26, p < .001$) and Constraint ($\beta = -.38, p < .001$) were both significant predictors. Entering teacher ratings into the model increased the R^2 to .62, a significant incremental effect over and above parent ratings ($R^2 = .36, p < .001$). In this model, both parent and teacher ratings of Negative Emotionality ($\beta = .17$ for parents; $\beta = .31$ for teachers, p 's $< .001$) and Constraint ($\beta = -.14$ parents; $\beta = -.42$, teachers, p 's $< .001$) were significant predictors. Finally, child self-ratings of the three personality traits were added to the model. This did not result in an increase in R^2 , and none of the self-reported traits were significant predictors.

Parent ratings of personality accounted for 8% of the variance in internalizing symptoms. Positive Emotionality ($\beta = -.11, p = .01$) and Negative Emotionality ($\beta = .24, p < .001$) were significant predictors with small and medium effects, respectively. Adding teacher ratings increased the R^2 to .37, a significant incremental effect over and above parent ratings ($R^2 = .29, p < .001$). In the model with parent and teacher ratings, parent rated Negative Emotionality ($\beta = .15, p < .001$) and Constraint ($\beta = .11, p < .001$) had small but significant effects, and teacher rated Positive Emotionality ($\beta = -.33, p < .001$) and Negative Emotionality ($\beta = .36, p < .001$) had significant medium effects. Adding child self-ratings to the model increased the R^2 to .46, a significant incremental effect over and above parents and teachers ($R^2 = .09, p < .001$). However, no individual self-reported trait was a uniquely significant predictor of internalizing symptoms after adjusting for the parent and teacher ratings.

Parent ratings of personality accounted for 26% of the variance in academic engagement. Parent rated Positive Emotionality ($\beta = -.34, p < .001$) and Constraint ($\beta = .29, p < .001$) had significant medium effects. Adding teacher ratings of personality increased R^2 to .45, a significant incremental effect over and above parent ratings ($R^2 = .19, p < .001$). In this model, parent ratings of Constraint ($\beta = .13, p < .001$) and Positive Emotionality ($\beta = .23, p < .001$) had small to medium sized significant effects, while teacher rated Positive Emotionality ($\beta = .29, p < .001$) and Constraint ($\beta = .34, p < .001$) had significant medium effects. Adding child self-ratings to the model did not increase R^2 , and none of the self-rated personality traits were significant predictors after adjusting for the parent and teacher ratings.

Finally, when predicting the environmental risk composite, parent ratings of personality explained 10% of the variance. Negative Emotionality ($\beta = .21, p < .001$) and Constraint ($\beta = -.16, p < .001$) were significant predictors, with small to medium effects. Adding teacher ratings to the model increased R^2 to .21, a significant incremental effect over and above parent ratings ($R^2 = .11, p < .001$). In this model, parent rated Negative Emotionality ($\beta = .17, p < .001$) had a small significant effect, and teacher rated Positive Emotionality ($\beta = -.13, p < .001$) and Constraint ($\beta = -.25, p < .001$) had significant, small to medium sized

effects. Adding child self-ratings to the model increased the R^2 to .23, which was not a significant incremental effect over and above parents and teachers.

Overall, parents and teachers both provided unique information for predicting all of the concurrent outcomes. Indeed, parent and teacher ratings of the same trait were often both significant predictors of an outcome. Child self-ratings of personality provided unique information for predicting only internalizing symptoms. Considered in isolation though, children's ratings of personality were typically predictive of the outcome variables.

Personality and Age 14 Outcomes—Parent ratings of personality accounted for 17% of the variance in externalizing symptoms, with Negative Emotionality ($\beta = .23, p < .001$) and Constraint ($\beta = -.29, p < .001$) having significant medium effects. Adding teacher ratings to the model increased the R^2 to .30, a significant incremental effect over and above parent ratings ($R^2 = .13, p < .001$). In this model, both informants' ratings of Negative Emotionality ($\beta = .17, p < .001$ for parents; $\beta = .11, p = .007$ for teacher) and Constraint ($\beta = -.12$ parent; $\beta = -.31$, teacher, p 's $< .001$) were significant predictors. Adding child-self ratings to the model increased the R^2 to .33, which was not a significant incremental effect over and above parent and teacher ratings ($R^2 = .03, p = .07$).

Parent ratings of personality accounted for 4% of the variance in internalizing symptoms. Positive Emotionality ($\beta = -.10, p = .01$) and Negative Emotionality ($\beta = .16, p < .001$) had small but significant effects. Adding teacher ratings to the model increased the R^2 to .08, a significant incremental effect ($R^2 = .04, p < .001$). Parent ratings of Negative Emotionality ($\beta = .14, p < .001$), and teacher ratings of Positive Emotionality ($\beta = -.14, p < .001$) and Negative Emotionality ($\beta = .11, p = .004$) all had small but significant effects. Child self-ratings of personality did not increase R^2 , and none of the self-reported personality traits were significant predictors.

Parent ratings of personality accounted for 11% of the variance in academic engagement. Positive Emotionality ($\beta = .15, p < .001$) and Constraint ($\beta = .24, p < .001$) had small and medium significant effects, respectively. When teachers' ratings were added to the model, R^2 increased to .23, a significant incremental effect ($R^2 = .12, p < .001$). Parent rated Constraint ($\beta = .09, p = .01$) had a small but significant effect, and teacher rated Positive Emotionality ($\beta = .21, p < .001$) and Constraint ($\beta = .34, p < .001$) had significant medium effects. Adding child self-ratings did not increase the R^2 , and none of the individual self-rated dimensions was a significant unique predictor.

Finally, parent ratings of personality accounted for 8% of the variance in the environmental risk composite at age 14. Negative Emotionality ($\beta = .15, p < .001$) and Constraint ($\beta = -.17, p < .001$) had small but significant effects. When teacher ratings were added to the model, R^2 increased to .17, a significant incremental effect over and above parent ratings ($R^2 = .09, p < .001$). For the model with parent and teacher ratings, parent rated Negative Emotionality ($\beta = .10, p = .003$) had a small effect, and teacher ratings of Positive Emotionality ($\beta = -.14, p < .001$) and Constraint ($\beta = -.25, p < .001$) had small to medium significant effects. Entering child self-ratings of personality significantly increased R^2 to .20

($R^2 = .03$, $p < .001$). Child rated Negative Emotionality was a small but significant predictor ($\beta = .13$, $p = .007$).

Overall, both parents and teachers contributed unique information to the prospective prediction of all outcome variables. With the exception of environmental risk, children's self-ratings generally did not add to the prediction of the outcomes beyond parents' and teachers' reports. Again, self-reported personality was associated with the outcomes when considered in isolation.

Personality and Adolescent Substance Use—Parent ratings of personality at age 11 accounted for 3% of the variance in the substance use problems composite at age 14, and only Constraint ($\beta = -.18$, $p < .001$) emerged as a significant predictor. Adding teacher ratings to the model increased the R^2 to .10, a significant incremental effect over and above parents ($R^2 = .07$, $p < .001$). When teachers' and parents' ratings were entered into the same model, only teacher rated Constraint was a significant predictor ($\beta = -.28$, $p < .001$). Adding child self-ratings to parent and teacher reports did not increase R^2 , nor were any of the specific self-rated traits significant predictors.

Regarding the age of initiation of substance use, parent ratings of personality were significant predictors of variance in the initiation of alcohol ($R^2 = .06$, $p < .001$) and nicotine ($R^2 = .05$, $p = .004$) use. Across models, only Constraint emerged as a significant predictor ($\beta = .26$ for alcohol; $\beta = .20$ for nicotine; $\beta = .17$ for marijuana; all p 's $< .001$). For each substance, adding teacher ratings resulted in a significant incremental effect over and above parent ratings ($R^2 = .06$ for alcohol and nicotine; $R^2 = .05$ for marijuana; all p 's $< .001$). Considered together, both parent ($\beta = .14$, $p < .001$) and teacher ($\beta = .27$, $p < .001$) ratings of Constraint significantly predicted age at first drink, but only teacher rated Constraint was a significant predictor of nicotine and marijuana use initiation (β 's = .26, p 's $< .001$ for both). Finally, the addition of child self-ratings of personality resulted in a significant incremental effect over and above parent and teacher ratings for the initiation of nicotine use ($R^2 = .04$, $p = .002$), but not for the initiation of alcohol ($R^2 = .01$, $p = .31$) or marijuana ($R^2 = .03$, $p = .07$) use. Self-ratings of Negative Emotionality were trend level predictors of both nicotine ($\beta = -.11$, $p = .014$) and marijuana ($\beta = -.12$, $p = .04$) use initiation.

Overall, each informant contributed a modest amount to the prediction of substance use problems, and the age at which the use of various substances was initiated. In keeping with previous research (e.g., Clark et al., 2015), among those who ever use substances, those rated by parents and teachers as lower in Constraint initiated at earlier ages. For children, however, self-reported Negative Emotionality was the strongest predictor of substance use problems, even after adjusting for parent and teacher ratings of personality.

Discussion

We examined the structure, heritability, and external correlates of personality in middle childhood across multiple informants. Results supported the notion that personality in middle childhood has a coherent structure, and that individual differences during this period are evident across reporters with different perspectives on the dispositional styles of

youngsters. Here, individual differences in personality were characterized by three broad superordinate dimensions that were heritable and predictive of a host of developmentally relevant outcomes.

However, many of the specific details were contingent on the source of personality information. In other words, the story of personality in middle childhood differs a bit based on who is telling it. This is not entirely surprising given the modest level of inter-rater agreement, which implies that each informant provided unique information. Of note, this rater-specific information was not simply measurement error, as the ratings made by each informant provided unique information for understanding the role of personality in different life circumstances and outcomes. Thus, as both a practical and theoretical concern, the validity of personality in this period will be colored by the unique perspectives of those from whom personality ratings are collected. Each rater has strengths and weaknesses, and these must be weighed against the goals and resources of any study interested in personality in middle childhood.

Parents as Informants

Few people spend as much time with children as their parents do. Consequently, parents typically have a deep well of experience to draw upon when rating their children's behavior and personality. This, paired with cost and convenience, has led to parents being the most common informant of personality in early life (Goldsmith & Gagne, 2012). Thus, it is of the utmost importance to understand how parents conceptualize and rate personality, and how these tendencies compare to some of the less frequently used raters. In terms of the structure of personality, parents' ratings demonstrated a pattern of factor differentiation that was consistent with prior research on the Big 3 in adults. The three major personality dimensions (Positive Emotionality, Negative Emotionality, and Constraint) were intercorrelated to a modest degree, indicating that parents draw clear distinctions between the 3 major components of personality when conceptualizing and rating the dispositions of their children.

Parents' ratings of all 3 traits were also highly heritable (~ 80%), and showed no evidence of shared environmental influence. The degree of heritability observed here is somewhat higher than what has typically been reported for adult personality (Johnson, Vernon, & Feiler, 2008) and child temperament (Saudino & Wang, 2012). This could be a result of contrast effects whereby parents exaggerate differences between non-identical twins. Of course, parents' reports do not universally suggest such high heritability (e.g., Burt, 2009), and contrast effects may be a consequence of questionnaires that involve global trait judgments as opposed to items focused on specific behaviors (Saudino & Eaton, 1991).

Finally, parents' ratings of personality predicted all the domains of psychosocial functioning that were examined, accounting for between 3% and 26% of the variance. Parents generally provided more unique information for predicting these outcomes than children, but less than (or an equivalent amount to) teachers. It is also important to point out that parents provided information that was used to assess most of the outcome variables we included. Therefore, to a certain extent, the relations between parents' personality ratings and the outcomes are

likely inflated by shared method (i.e., rater) variance, except for the substance use variables, which were self-reported.

Teachers as Informants

Unlike children and most parents, teachers have a wealth of knowledge and experience regarding what is developmentally typical, and they also observe a number of children in unique settings that make certain traits (e.g., Constraint) quite salient. All this makes teachers potentially very useful as informants of personality. In terms of structure, teachers' ratings of the traits were less differentiated than those of the other informants, consistent with evidence that parents make more fine grained distinctions in their ratings of children than do teachers (Presley & Martin, 1994). Constraint and Negative Emotionality in particular were strongly correlated. In the classroom, children that are both emotionally reactive and impulsive are especially likely to create management concerns for teachers, so teachers may be likely to think of children in terms of the intersection of these traits.

The heritability of teachers' ratings of personality ranged from 50% to 70%, and more closely correspond to what has been reported by other genetically informative studies using samples of younger and older individuals. Although small, there was a significant effect of the shared environment on teachers' ratings of Constraint.

Teachers' ratings of personality were strongly predictive of psychosocial functioning, generally providing as much and often more unique information for prediction as parents' ratings. Teachers' ratings were particularly strong predictors of externalizing symptoms and academic engagement, not surprising given the relevance of these of outcomes to the classroom context. The predictive power of teachers' ratings is especially impressive given the amount of experience a teacher has with a specific child compared to their parents. Moreover, teachers who provided personality ratings at age 11 did not contribute to measures used to assess the outcome variables at age 14 or the substance use variables, so shared method variance could not potentially boost the relations between these outcomes and predictors. Similarly, the personality items on the teachers' rating form did not contain items that overlapped with the content of any of the outcome measures (e.g., there are no items that ask about specific externalizing behaviors, and teachers' are unlikely to observe behaviors relevant to substance use; see Table 1).

Children as Informants

By middle childhood children are able to provide self-reports (Shiner & De Young, 2013), which is useful as self-reports can provide insights into processes that are difficult for others to observe and rate (e.g., anxiety, depression; Funder, 1995). In some ways, the structure of children's self-ratings were similar to what is observed for adult self-reports (Clark & Watson, 1999; Watson & Tellegen, 1985). However, Positive Emotionality and Constraint were highly correlated. These results dovetail with Soto and colleagues' (2008) findings that children do not make clear distinctions between Agreeableness and Conscientiousness. At this age there may still be a tendency to think of personality in more undifferentiated and evaluative terms, as younger children do (Alvarez et al., 2001). As children higher in

Constraint are better equipped to successfully navigate the tasks of middle childhood, they likely receive more positive feedback, and have a more positive self-evaluation.

Child self-ratings of personality were generally not heritable. Negative Emotionality was the only dimension that demonstrated a small but significant amount of heritability (29%). The estimate of the shared environmental variance component for Positive Emotionality (27%) was significant, which is consistent with prior research on younger samples (e.g., Goldsmith, Lemery, Buss, & Campos, 1999). Most of the variance in child self-ratings was attributed to non-shared environmental influences. As this component includes the effect of measurement error, this pattern of results could partly be a consequence of the fact that children's self-ratings are typically less reliable than the ratings of adults (Johnson et al., 2011; Soto et al., 2008).

Although self-ratings provided different results than did parent or teacher ratings regarding the heritability and structure of personality, they still predicted several measures of psychosocial functioning, though mostly not over and above parent and teacher ratings. Still, compared to parent and teacher report, self-ratings of personality were the only ratings to indicate a role for Negative Emotionality in predicting substance use and initiation. Also, it is important to reiterate that it was not the case that self-reports were wholly unrelated to the outcomes examined; when zero-order associations were examined, self-ratings were generally associated with the outcomes, and not always to a lesser extent than the other raters.

Implications

The current results show how the particulars of personality in middle childhood can change depending upon the source of personality information. For example, exclusive use of self-ratings would lead to the conclusion that personality is not heritable, whereas only examining parent ratings would leave us blind as to the role of Negative Emotionality in substance use. Indeed, parents, teachers, and children all provide unique information on personality in middle childhood, so to gain a more complete understanding of individual differences at this stage of development all of these perspectives should be considered. The similarities and differences across raters can be illuminating, both for understanding how personality in middle childhood functions, and how it is experienced by the key players in this developmental context.

The current results also have practical implications. Researchers interested in personality in middle childhood can look to these findings when determining whom to collect personality information from, as different raters have different strengths and weaknesses. As can be seen, parental reports are a fine option, but may not always be best depending on the specific aims of a study. For example, parent ratings were consistently outperformed by teacher ratings in predicting important outcomes in middle childhood and adolescence. Thus, if prediction is of paramount importance, teacher reports are likely the best option, even if their conceptualization of personality is not necessarily as clear as parents. Ideally all perspectives could be taken advantage of, but this will likely not always be practical, and so decisions will have to be made based on the goals of the research and the resources available.

Limitations and Future Directions

The current study is notable for taking a multi-informant, longitudinal approach to examining several aspects of personality in middle childhood. Despite these strengths, there are limitations that must be acknowledged. First, the self-report questionnaire was not the most developmentally appropriate, representing a basic downward extension of the parent and teacher forms. As a result, several poor functioning items had to be cut, and scales generally demonstrated suboptimal reliability. Second, self-ratings were only available for a subset of the male participants. This prevents generalization of the current self-report results to both girls and boys. Although there were generally no sex differences across parent and teacher ratings, it is unclear if that would have also been the case with self-ratings. Additionally, there is the issue that although the focus of this study was on the developmental period between early childhood and adolescence, the sample was composed mostly of 11 year olds (range 10-12 years). As such, the findings here primarily speak to the children toward the end of this developmental stage.

Future work can build on our findings by examining personality in middle childhood in samples more diverse with respect to sex, age, and ethnicity. Furthermore, future work using child self-report questionnaires should strive to include more developmentally appropriate measures to improve the quality of children's ratings of personality. The series of questionnaires developed by Rothbart and colleagues for assessing temperament at various ages (e.g., the Child Behavior Questionnaire; Rothbart et al., 2001) represent excellent examples of questionnaires specifically designed for distinct developmental periods that also demonstrate adequate psychometric properties, such as reliable structure (Rothbart et al., 2001; but see Kotelnikova et al., 2015), and relative invariance across informants and targets (Clark et al., 2016). Subsequent research should also delve more deeply into the rater nuance demonstrated here. In essence, what psychological processes account for the differences across raters observed here? Understanding these processes can increase the finesse with which raters are chosen, and their data interpreted.

Clearly there is still much to discover about how personality in middle childhood functions and is perceived. Overall, we hope this study encourages personality researchers to take more interest in the unique developmental period of middle childhood, a time when individual differences in disposition are integral in navigating developmental tasks and challenges that pave the way for future successes or failures, as well as for trait and identity development in later developmental periods.

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Highlights

- Personality in middle childhood coherent, heritable, and consequential
- Specific details regarding personality at this age somewhat informant contingent
- Children and teachers make less distinctions between certain personality traits
- Self-ratings evidenced little heritability, unlike teacher and parent ratings
- Teacher ratings more predictive of outcomes than self and parent ratings

Table 1

Personality Descriptors, Facets, and Traits

Trait	Facet	Descriptor	
Positive Emotionality			
	Well-Being	Cheerful	
		Interested	
		Optimistic	
	Social Potency	Persuasive	
		Dominance	
		Visible	
	Achievement	Ambitious	
		Hard Driving	
		Persevering	
	Social Closeness	Gregarious	
		People-Oriented	
		Affectionate	
	Negative Emotionality		
		Stress Reactivity	Tense
			Sensitive
Even-Tempered *			
Alienation		Feeling Treated Poorly	
		Feels Exploited	
		Feels Unlucky *	
Aggression		Tough	
		Conciliatory *	
		Aggressive	
Constraint			
	Control	Neatness	
		Freewheeling *	
		Planful	
	Harm Avoidance	Adventurous *	
		Safety-Conscious *	
		Thrill-Seeking *	
	Traditionalism	Valuing a Good Reputation	
		Endorsing Strictness *	
		Respect Authority	
		Moral Consciousness	

Note.

* items removed from self-reports. For teacher reports, the three descriptors for each facet were presented simultaneously in a single item (e.g., “Cheerful, Interested, Optimistic”), effectively resulting in facet-level items. Parents and children rated each descriptor individually.

Table 2
Descriptive Statistics and Correlations Between Personality Traits Across Parent, Teacher, and Child Self Ratings

Scale	1	2	3	4	5	6	7	8	9
Parent Rating									
1. Positive Emotionality									
2. Negative Emotionality	-.31*								
3. Constraint	.18*	-.28*							
Teacher Rating									
4. Positive Emotionality	<u>.49*</u>	-.23	.18						
5. Negative Emotionality	-.14*	<u>.24</u>	-.23	-.36*					
6. Constraint	.10*	-.20	<u>.49</u>	.33*	-.54*				
Child Self-Rating									
7. Positive Emotionality	<u>.34</u>	-.13	.08	<u>.37</u>	-.15	.16			
8. Negative Emotionality	-.07	<u>.18</u>	-.12	-.17	<u>.19</u>	-.17	-.11*		
9. Constraint	.17	-.14	<u>.25</u>	.29	-.15	<u>.27</u>	.58*	-.20*	
<i>M</i>	3.07	1.90	2.82	3.33	1.79	3.53	3.54	2.49	3.65
<i>SD</i>	.41	.44	.45	.77	.73	.71	.53	.66	.65
<i>N</i>	1251	1251	1251	2292	2291	2290	612	611	611

Note. M = Mean; SD = Standard Deviation; N = Number of ratings. Underlined coefficients represent cross-informant agreement. Bolded coefficients represent factor intercorrelations within raters. All correlations .1 or greater are significant at $p < .01$ level.

Table 3

Twin Intraclass Correlations and ACE Model Results

	MZ ICC	DZ ICC	A (95% CI)	C (95% CI)	E (95% CI)
Positive Emotionality					
Parent	.79	.27	.79 (.76-.83)	.00 (.00-.08)	.20 (.18-.24)
Teacher	.69	.37	.71 (.55-.88)	.01 (.00-.16)	.29 (.26-.32)
Child	.33	.25	.09 (.00-.46)	.27 (.01-.44)	.64 (.52-.76)
Negative Emotionality					
Parent	.81	.42	.83 (.79-.85)	.00 (.00-.15)	.17 (.14-.20)
Teacher	.63	.31	.64 (.59-.67)	.00 (.00-.32)	.36 (.32-.41)
Child	.31	.16	.29 (.01-.42)	.02 (.00-.34)	.69 (.58-.83)
Constraint					
Parent	.78	.17	.77 (.74-.81)	.00 (.00-.06)	.23 (.19-.27)
Teacher	.68	.41	.53 (.38-.71)	.15 (.04-.34)	.31 (.28-.35)
Child	.33	.25	.16 (.00-.43)	.16 (.00-.38)	.69 (.56-.81)

Note. MZ = Monozygotic (identical) twins; DZ = Dizygotic (non-identical) twins; ICC = Intraclass Correlation; A = Additive genetic variance; C = Shared environmental variance; E = Non-shared environmental variance. 95% Confidence intervals for parameter estimates in parentheses next to estimates.

Table 4

Personality at Age 11 Predicting Outcomes at Age 11

	Externalizing			Internalizing			Academic Engagement			Environmental Risk		
	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters
Parent Ratings												
Positive Emotionality	-.17*	.01	-.04	-.20*	-.11*	-.07	.44*	.34*	.27*	-.14*	-.05	-.03
Negative Emotionality	.38*	.26*	.12*	.29*	.24*	.07	-.27*	-.07	.04	.27*	.21*	.08
Constraint	-.48*	-.38*	-.17*	-.06	.02	.09	.38*	.29*	.12*	-.23*	-.16*	-.04
R ²		.26*	.26*		.08*	.08		.26*	.26*		.10*	.10*
Teacher Ratings												
Positive Emotionality	-.38*	-.08*	.03	-.44*	-.32*	-.38*	.52*	.42*	.26*	-.31*	-.18*	-.04
Negative Emotionality	.63*	.32*	.36*	.50*	.42*	.42*	-.30*	.04	.10	.32*	.11*	.09
Constraint	-.72*	-.52*	-.38*	-.25*	.08*	.00	.47*	.34*	.31*	-.39*	-.27*	-.29*
R ²		.60*	.62*		.33*	.37*		.37*	.45*		.19*	.21*
Child Self-Ratings												
Positive Emotionality	-.17*	.00	.02	-.13*	-.12	.02	.34*	.25*	.08	-.18*	-.11	-.09
Negative Emotionality	.22*	.17*	.04	.14*	.13*	.05	-.18*	-.12*	-.08	.18*	.15*	.09
Constraint	-.27*	-.22*	-.03	-.33*	-.01	.03	.31*	.14*	.01	-.18*	-.09	.01
R ²		.09*	.62*		.04	.46*		.15*	.45*		.06*	.21*

Note, *r* = zero order correlations between traits and outcomes; β solo rater = betas controlling for other traits within rater; β all raters = betas controlling for other traits within and between raters, that is, the betas from the full model with all informants' ratings included. R² values in β all raters column represent R² value when that informant's ratings were added to the previous informant's rating.

* $p < .01$.

Table 5

Personality at Age 11 Predicting Outcomes at Age 14

	Externalizing			Internalizing			Academic Engagement			Environmental Risk		
	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters
Parent Ratings												
Positive Emotionality	-.14*	.00	.01	-.17*	-.10*	-.09	.23*	.15*	.09	-.15*	-.07	-.03
Negative Emotionality	.31*	.23*	.14*	.21*	.16*	.11	-.17*	-.06	.07	.22*	.15*	.00
Constraint	-.35*	-.29*	-.13*	-.04	.02	.06	.29*	.24*	.04	-.23*	-.17*	-.07
R ²		.17*	.17		.04*	.04		.11*	.11		.08*	.08*
Teacher Ratings												
Positive Emotionality	-.26*	-.09*	-.03	-.21*	-.18*	-.09	.35*	.25*	.20*	-.30*	-.19*	-.13
Negative Emotionality	.37*	.15*	.10	.15*	.09*	.05	-.22*	.05	.11	.27*	.07	.12
Constraint	-.45*	-.34*	-.33*	-.09*	.02	.03	.39*	.33*	.37*	-.36*	-.26*	-.15
R ²		.23*	.30*		.05*	.08		.21*	.23		.17*	.17*
Child Self-Ratings												
Positive Emotionality	-.18*	-.04	.02	-.19*	-.16	-.09	.21*	.09	-.02	-.18*	-.06	.02
Negative Emotionality	.17*	.13*	.05	.14*	.09	.08	-.11*	-.07	-.03	.22*	.18*	.13*
Constraint	-.22*	-.17*	-.07	-.09	.03	.03	.23	.16*	.08	-.25*	-.17*	-.11
R ²		.07*	.33*		.03	.08		.06*	.23		.09*	.20*

Note. *r* = zero order correlations between traits and outcomes; β solo rater = betas controlling for other traits within rater; β all raters = betas controlling for other traits within and between raters, that is, the betas from the full model with all informants' ratings included. R² values in β all raters column represent R² value when that informant's ratings were added to the previous informant's rating.

* $p < .01$.

Table 6

Personality at Age 11 Predicting Age at Substance Use Outcomes

	Alcohol Initiation			Nicotine Initiation			Marijuana Initiation			Substance Use		
	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters	<i>r</i>	β solo rater	β all raters
Parent Ratings												
Positive Emotionality	.03	-.01	.07	.01	-.03	-.01	.06	.01	.14	-.01	.03	-.06
Negative Emotionality	-.05	.02	.07	-.08	-.05	.07	-.06	-.02	.09	.06	.02	-.06
Constraint	.25*	.26*	.14*	.25*	.20*	.14*	.22*	.17*	.08	-.18*	-.18*	-.06
R ²		.06*	.06*		.05*	.05*		.04*	.04*		.03*	.03*
Teacher Ratings												
Positive Emotionality	.11*	.00	-.01	.15*	.03	.09	.17*	.11*	-.05	-.12*	-.02	.06
Negative Emotionality	-.05	.02	-.03	-.21*	-.03	.03	-.15*	.06	-.09	.18*	.04	.05
Constraint	.25*	.35*	.26*	.36*	.32*	.29*	.33*	.30*	.16	-.28*	-.25*	-.22*
R ²		.12*	.12*		.11*	.11*		.11*	.09*		.08*	.10*
Child Self-Ratings												
Positive Emotionality	.02	-.03	-.07	.07	.03	-.03	.03	-.04	-.11	-.08	.01	.08
Negative Emotionality	-.13*	-.13*	-.06	-.15*	-.14*	-.11*	-.16*	-.14	-.12*	.14*	.11*	.06
Constraint	.07	.06	.02	.10	.01	-.01	.13*	.10	.05	-.15*	-.13	-.01
R ²		.02	.13*		.03	.15*		.03	.11*		.03	.10*
<i>M</i>		15.92			14.91				16.34			
<i>SD</i>		2.37			2.77				2.59			

Note. *M* = Mean; *SD* = Standard Deviation; *r* = zero order correlations between traits and outcomes; β solo rater = betas controlling for other traits within rater; β all raters = betas controlling for other traits within and between raters, that is, the betas from the full model with all informants' ratings included. R² values in β all raters column represent R² value when that informant's ratings were added to the previous informant's rating.

* $p < .01$.