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Identifying Early Childhood Personality Dimensions Using the California Child Q-Set and Prospective Associations With Behavioral and Psychosocial Development

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Abstract

The present study used an empirical, "bottom-up" approach to delineate the structure of the California Child Q-Set (CCQ), a comprehensive set of personality descriptors, in a sample of 373 preschool-aged children. This approach yielded two broad trait dimensions, Adaptive Socialization (emotional stability, compliance, intelligence) and Anxious Inhibition (emotional/behavioral introversion). Results demonstrate the value of using empirical derivation to investigate the structure of personality in young children, speak to the importance of early-evident personality traits for adaptive development, and are consistent with a growing body of evidence indicating that personality structure in young children is similar, but not identical to, that in adults, suggesting a model of broad personality dimensions in childhood that evolve into narrower traits in adulthood.

Keywords

Personality structure; personality development; early childhood; California Child Q-Set; cluster analysis

1. Introduction

Differences among children are evident as early as the first few days of life. Individual differences in personality predispose children to approach or avoid particular situations, experiences, or people; dictate children's own emotional responses, as well as reactions by others; and structure children's cognitions, attitudes, and beliefs about themselves, others, and the world (Rueda & Rothbart, 2009). Thus, child personality traits not only serve as

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potential protective or risk factors for later functioning, they also play a key role in developmental processes. As demonstrated by longitudinal studies around the world, personality traits even in very young children predict a multitude of important outcomes, including physical and mental health, educational and occupational success, quality of interpersonal relationships, and antisocial behavior (Caspi, 2000; Ozer & Benet-Martinez, 2006; Shiner & Caspi, 2003). In the present study, we took an empirical approach to identifying key personality traits in early childhood by examining the underlying structure of the California Child Q-Set (CCQ; J. Block & J. H. Block, 1980), a comprehensive measure of individual differences in children, in a large sample of preschool-aged children.

Individual differences in personality in childhood are assessed using indicators of the child's emotional, cognitive, behavioral, and social characteristics, typically obtained from ratings made by parents, teachers, or other informants, or using observational assessment instruments. Child personality constructs may be conceptualized in downward translations from adult models of personality such as ego control and resiliency (J. Block, 1971) or the Big Five personality traits (McCrae & John, 1992), upward extensions from theoretical models of childhood temperament (Thomas & Chess, 1977), or derived using an empirical, "bottom-up" approach that explores the covariance structure among behavioral descriptors in child samples (Rothbart, Ahadi, Hershey, & Fisher, 2001; Tackett et al., 2012). The vast majority of recent investigations has taken the former approach, and has yielded a number of important findings regarding the structure of personality in childhood and adolescence.

There is evidence that adult personality constructs are evident among children and adolescents (see Shiner & Caspi, 2003; Tackett et al., 2012). For example, a number of studies have demonstrated the validity of parent and teacher ratings on measures of Big Five traits geared toward middle childhood- and adolescent-aged children (Barbaranelli, Caprara, Rabasca, & Pastorelli, 2003; Lamb et al., 2002), or have recovered some or all of the Big Five traits in child and adolescent samples using structural analyses of items reflecting Big Five traits (Goldberg, 2001; Halverson et al., 2003; John et al., 1994; Measelle, John, Ablow, P. A. Cowan, & C. P. Cowan, 2005; Mervielde, Buyst, & De Fruyt, 1995; Mervielde & De Fruyt, 2000) and comprehensive measures of child characteristics (Digman & Shmelyov, 1996; van Lieshout & Haselager, 1994). However, there also appear to be important deviations in personality structure among adults and children, particularly preschool-aged and younger children (see Shiner & Caspi, 2003; Tackett et al., 2012). For example, several structural analyses of items reflecting Big Five traits have yielded more (John et al., 1994) or fewer (Mervielde et al., 1995; Mervielde & De Fruyt, 2000) than five factors, and structural analyses of personality constructs assessed using more comprehensive indicators of childhood individual differences (De Pauw, Mervielde, & Van Leeuwen, 2009) or methods other than parent or teacher report, such as standardized laboratory paradigms or peer nominations (Dyson, Olino, Durbin, Goldsmith, & Klein, 2012; Mervielde & De Fruyt, 2000), have yielded personality constructs that show overlap with but are not the same as the Big Five traits. Moreover, there is emerging evidence that, as in adulthood (see Markon, 2009), personality constructs in childhood can be organized in a hierarchical fashion (Goldberg, 2001; Tackett et al., 2012), with broad higher-order factors encompassing more fine-grained lower-order factors. Finally, internal consistency coefficients for Big Five scales tend to be lower in samples of preschool-aged children than in samples of older children and adults (Lamb et al., 2002; Measelle et al., 2005), suggesting that Big Five traits are less coherent among very young children. Taken together, results of these studies suggest that aspects of the adult Big Five traits are evident among young children, but may be represented by less finely differentiated "blends" of Big Five traits that become increasingly distinct with development.

The CCQ is a 100-item Q-sort instrument, adapted from the California Adult Q-Set (CAQ; J. Block, 1978), that allows a knowledgeable rater to rate a particular child using a wide range of emotional, cognitive, behavioral, and social characteristics (J. Block, 2008). The broad range of characteristics captured by the CCQ make it a unique measure that is amenable to diverse conceptualizations of child personality constructs. One commonly used method applies Q- or inverse factor analysis, so that people rather than variables are factor analyzed; this approach consistently identifies three personality types first described by J. Block (1971) and labeled resilient (self-confident, emotionally stable, energetic), overcontrolled (introverted, sensitive, tense), and undercontrolled (stubborn, disobedient, impulsive) (Asendorpf & van Aken, 1999; Hart, Hofmann, Edelstein, & Keller, 1997; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996; Weir & Gjerde, 2002). A second method relies on expert ratings of CCQ items to derive prototype or dimensional scales that reflect a theoretically meaningful trait construct (Eisenberg et al., 1997; John, Caspi, Robins, Moffitt, Stouthamer-Loeber, 1994; Kwok, Hughes, & Luo, 2007; Shedler & Block, 1990). A third, less commonly used method is to take an empirical, bottom-up approach to identifying personality traits underlying the CCQ items. Existing research with the CCQ using the first two methods has almost exclusively involved the application of adult personality constructs to samples of children. However, the comprehensive nature of the CCQ makes it an excellent instrument for deriving child personality constructs from the ground up, that is, by examining the covariance among a large number of individual difference characteristics to uncover the underlying personality structure. This approach is a promising alternative to downward extensions of adult personality constructs into childhood because an empirical approach allows the data to “speak for themselves,” yielding personality constructs that are agnostic as to a priori theoretical conceptualizations from the adult literature.

The underlying structure of the CCQ and CAQ has been examined using principal components and exploratory factor analysis[1] in a handful of studies, with varied results. Studies in samples of adults have more consistently identified the Big Five traits than have studies in samples of children. In their adult samples, McCrae, Costa, and Busch (1986) reported five factors that corresponded to the Big Five traits, and Lanning (1994) reported five to eight meaningful factors, with the first five factors reflecting the Big Five traits, and three additional factors he labeled Attractiveness, Insight, and Ambition. John et al. (1994) reported seven factors in their sample of 10-year-old children that corresponded to the Big Five traits and two additional factors they labeled Irritability and Positive Activity. However, using only the 48 CCQ items rationally derived as reflecting the Big Five personality constructs, Lamb et al. (2002) failed to replicate this seven-factor solution in their sample of 15-year-old children. Van Lieshout and Haselager (1994) reported seven factors in their sample of 3- to 16-year-old children that corresponded to the Big Five traits and two additional factors they labeled Motor Activity and Dependency. Notably, when they examined the correspondence of this seven-factor structure among different age ranges within their sample, van Lieshout and Haselager (1994) found substantial differences in the items that loaded on the seven personality dimensions, with results for the youngest children (ages 3 to 7) showing the lowest congruence with those for older children and adolescents. Taken together, results of these structural analyses of the CCQ suggest that the Big Five traits (along with additional, nonreplicated factors) can be recovered in samples of middle childhood-aged children, adolescents, and adults. However, the five-factor structure is less apparent among preschool-aged children, suggesting that the structure of the CCQ may differ developmentally.

[1]For ease of presentation, we refer to dimensions derived using either principal components or exploratory factor analyses as factors.

In the present study, we employed an empirical, bottom-up approach to identifying childhood personality constructs in a sample of 3- to 5-year-old children. Although van Lieshout and Haselager (1994) considered their seven-factor structure of the CCQ in the preschool-aged children in their sample, they did not explicitly conduct exploratory structural analysis of the CCQ at this age. Thus, the present study is the first to our knowledge to examine the underlying structure of the CCQ in early childhood. Although previous studies have used principal components or exploratory factor analysis to examine the underlying structure of the CCQ, we instead selected cluster analysis of the CCQ items as our primary analytic approach. Cluster analysis and exploratory factor analysis of items are comparable in several ways. They are both exploratory methods that can be used to determine the structural relationship among items by identifying underlying dimensions based upon the covariance among a set of items. However, aspects of cluster analysis make it optimal for exploratory analysis of the CCQ items. Hierarchical cluster analysis (Revelle, 1979), for example, proceeds by combining items and resulting subclusters on the basis of predetermined criteria (e.g., increased internal consistency and unidimensionality estimates), so that the final solution maximizes the unidimensionality of clusters. Cluster analysis more clearly delineates the hierarchical relationships among highly correlated variables relative to exploratory factor analysis, and allows for easy inspection of hierarchical cluster-subcluster relationships. The use of predetermined criteria that dictate whether items/subclusters are combined may prevent “overfactoring” (Revelle, 1979), a potential concern given inconsistencies in the number of factors identified in previous exploratory factor analyses of the CCQ (ranging from 3 to 15). Cluster analysis of items has been successfully used in a number of structural analyses of psychopathology and personality traits in adulthood, especially in the exploratory stages (e.g., Hicks, Schalet, Malone, Iacono, McGue, 2011; Krueger, Markon, Patrick, Benning, & Kramer, 2007; Markon, 2010; Schalet, Durbin, & Revelle, 2011), but, to our knowledge, cluster analysis of items has not yet been used in samples of children. Because the use of cluster analysis of items is relatively unconmmon in the field of personality research, and to allow continuity with existing analyses of the underlying structure of the CCQ, we compared the results of our cluster analysis of the CCQ items with results of more traditional exploratory factor analysis.

As the utility of measures of child personality hinges upon their ability to predict developmental outcomes, it is critical that their convergent and predictive validity be evaluated. After identifying child personality dimensions in the CCQ items, we examined concurrent and prospective associations between these empirically derived CCQ scales and demographic, individual-level, and family variables assessed from early childhood to late adolescence using multiple methods and reporters. Behavioral and psychosocial outcome variables were assessed repeatedly and included measures of perceived competence, peer relationships, prosocial and antisocial peer behavior, and internalizing and externalizing problems.

2 Methods

2.1 Sample and Procedures

Participants were members of the ongoing Michigan Longitudinal Study (MLS; Zucker, Fitzgerald, Refior, Puttler, Pallas, & Ellis, 2000), a prospective study that follows a population-based community sample of families with alcoholic parents and matched families with nonalcoholic parents. Study procedures and participant recruitment have been described extensively elsewhere (Zucker et al., 2000). Briefly, within a geographic net of a four-countywide area in mid-Michigan, families with an alcoholic father were identified through court-arrest records (drunk-driving charges with a high blood alcohol level) and community canvassing, and matched families with nonalcoholic parents were identified through community canvassing in the same neighborhoods as the alcoholic families.

Inclusion criteria included a father residing with a biological son aged 3 to 5 and the child's biological mother, with no evidence of fetal alcohol syndrome in the child. Although the alcohol status of mothers in alcoholic families was allowed to vary, mothers in matched families were all nonalcoholic. These recruitment procedures resulted in an initial cohort of 338 children. An additional 258 children from these families—male and female siblings of the initial target child who were between ages 3 and 11—were subsequently recruited, for a total sample of 596 children. Entering siblings participated in the first age-appropriate wave. Because siblings entered the study at later time points with a broader age range upon entry, not all children participated in all waves. In the present study, we report on the 373 children who initially participated in their first assessment when they were between 3 and 5 years old (18% girls; 97% Caucasian; 69% from alcoholic families). The inclusion of children at high risk for substance use problems by virtue of parental alcoholism status increased variance within the sample, while the inclusion of children of nonalcoholic families preserved the overall representativeness of the sample.

Full family assessments (including mothers, fathers, their children, and teachers, depending on the wave) were conducted by examiners at 3-year intervals as a function of the child's age, at 3 to 5 years (wave 1), 6 to 8 years (wave 2), 9 to 11 years (wave 3), 12 to 14 years (wave 4), and 15 to 17 years (wave 5). Not all measures were administered at all waves by design (e.g., measures appropriate for assessing functioning during adolescence were introduced in later waves). Descriptive statistics are presented in Table 1, including the number of available assessments for each reporter and measure at each wave. A total of 323 (87%) children, 348 (93%) mothers, and 232 (62%) teachers provided at least two waves of data on child functioning. Children who did not have at least two waves of child, mother, or teacher data did not differ significantly from the larger sample in regards to child sex or family alcohol status (all ps > .05).

2.2 Assessment

Each family participated in several hours of assessment spread over multiple sessions; child assessments typically required 7 hours. Examiners administered multiple instruments including questionnaires, interviews, and interactive tasks. Assessments were typically conducted in the families' homes.

2.2.1 CCQ—Examiners (master's-level clinical psychology graduate students, social workers) rated each child's personality and behavioral characteristics using the CCQ (J. Block & J. H. Block, 1980) at wave 1. The CCQ consists of 100 brief statements printed on cards, which portray a variety of emotional, cognitive, behavioral, and social characteristics. Raters sort the 100 cards into 9 discrete categories ranging from most to least descriptive of the child following a forced normal distribution. Examiners completed the CCQ after conducting the child assessment, at which point they were very familiar with the child; they sorted CCQ items using all available information, including their personal clinical observations. Examiners received training in using the CCQ and were required to demonstrate acceptable reliability levels on the CCQ before rating children. Interrater reliability for the CCQ was acceptable (rs ≥ .78).

2.2.2 Cognitive Functioning—Children were administered the Stanford-Binet Intelligence Scale Form L-M (Terman & Merrill, 1973) at wave 1. The Stanford-Binet assesses general cognitive functioning, yielding an overall IQ score. The Stanford-Binet Form L-M was normed in a representative sample of 2,100 children ranging in age from 2 years to late adulthood, and demonstrates good internal consistency and validity (Sattler, 1992).

2.2.3 Perceived Competence—Children reported on their perceived competence using the Self-Perception Profile for Children (SPPC; Harter, 1982, 1985) at waves 2 and 3, and the Self-Perception Profile for Adolescents (SPPA; Harter, 1988) at waves 4 and 5. The SPPC and SPPA assess children's sense of their own abilities and social stature in comparison with other children in multiple domains. We examined four scales from the SPPC and SPPA: Scholastic Competence (academic ability and achievement), Behavioral Conduct (good behavior, manners, staying out of trouble), Global Self-Worth (perceived competence across all domains), and Social Competence (friendship, popularity). Both the SPPC and the SPPA scales exhibit adequate-to-good internal consistency, test-retest reliability, construct validity, and low correlations with measures of social desirability (Harter, 1982; Wichstrom, 1995). Cronbach's alphas for the SPPC and SPPA scales ranged from .73 to .84 in the present sample, and 3-month test-retest reliability ranged from .70 to .87.

2.2.4 Relationships With Peers and Peer Behavior—Children reported on the quality of their relationships with peers using the Peer Relationships scale of the Self-Image Questionnaire for Young Adolescents (Petersen, Schulenburg, Abramowitz, Offer, & Jarcho, 1984) at waves 4 and 5. The Peer Relationships subscale has demonstrated good internal consistency and validity (Peterson et al., 1984). Children reported on their peers' prosocial (involvement in school activities and academics) and antisocial behaviors (substance use and delinquent behaviors) at waves 4 and 5 using a scale developed specifically for the present study comprised of items drawn from Social Control Theory (Hirschi, 1969), Problem Behavior Theory (Jessor, Costa, Jessor, & Donovan, 1983; Jessor & Jessor, 1977), and the Antisocial Behavior Checklist (Zucker & Noll, 1980). Cronbach's alphas for the Peer Relationships scale ranged from .81 to .85 in the present sample.

2.2.5 Internalizing and Externalizing Problems—Mothers reported on their children's emotional, behavioral, and social functioning using the Child Behavior Checklist (Achenbach, 1991a) at waves 1 to 5 and teachers reported on children's functioning using the Teacher Report Form (Achenbach, 1991b) at waves 2 to 5. Each measure yields two broadband scales of Internalizing and Externalizing problems. The Achenbach instruments have been extensively examined and demonstrate adequate to good internal consistency, test-retest reliability, and construct validity (Achenbach & Rescorla, 2001). Cronbach's alphas for the Internalizing and Externalizing scales ranged from .93 to .96 in the present sample.

2.3 Data Analysis

We began our examination of the underlying structure of the CCQ data by first applying exploratory techniques to determine the optimal number of clusters/factors to extract. We considered results of the scree plot (Cattell, 1966), very simple structure criterion (Revelle & Rocklin, 1979), the minimum average partial (Velicer, 1976), and parallel analysis (Horn, 1965). We then conducted exploratory cluster analysis of the CCQ items to examine their underlying structure with the goal of creating CCQ scales. We applied hierarchical cluster analyses to the CCQ data using the ICLUST algorithm (Revelle, 1979). The ICLUST algorithm proceeds by first combining the two highest correlating items. The highest correlating pair of remaining items (including the new two-item cluster) form the next cluster; items and clusters are combined until internal consistency (Cronbach's alpha) and unidimensionality (Revelle's beta) of the resulting higher-order cluster no longer increase. Revelle's beta is defined as the minimum split-half correlation of a given set of items; as such, it is more sensitive than alpha to "lumps" of items (group factors) and a better indicator of a test's general factor saturation (Revelle, 1979; Zinbarg, Revelle, Yovel, & Li, 2005). Revelle's beta is therefore an estimate of the proportion of variance attributable to a

single factor common to all items (see also Revelle & Zinbarg, 2009). We also conducted exploratory factor analysis of the CCQ items using ordinary least squares factor analysis followed by oblimin rotation. To index the similarity between the cluster and factor analysis solutions, we calculated cluster-factor congruence coefficients of the loading matrices. Finally, we calculated children's CCQ scale scores by summing the items that comprised each of the final clusters. All exploratory analyses were conducted using the psych package (Revelle, 2013) available in R (R Core Development Team, 2013).

We took several steps to evaluate the validity of the resulting variable-centered CCQ scales. First, we examined the relationship between the CCQ scales and person-centered CCQ personality types. We derived the three non-overlapping personality types described in prior research by following the procedures described in Robins et al. (1996) (see also Asendorpf & van Aken, 1999; Hart et al., 1997). Briefly, we conducted a Q-factor analysis by transposing the data matrix and conducting a principle-components analysis with varimax rotation on participating children (as opposed to items), which yielded factor loadings for each child on the resulting three factors. We then classified children into three mutually exclusive groups on the basis of their factor loadings on the three factors, and a discriminant function analysis that optimally discriminated between the three groups for those children who were not classifiable in the initial Q-factor analysis (see Robins et al., 1996). Consistent with previous research, these procedures resulted in the classification of 359 children (93% of the sample) into three groups: resilient (n = 230; 64%), overcontrolled (n = 52; 15%), and undercontrolled (n = 77; 21%).

Finally, we examined prospective associations between the CCQ scales and multiple indicators of child behavioral and psychosocial functioning from early childhood to late adolescence in a series of multilevel models (MLM) conducted using HLM 6.04 (Raudenbush, Bryk, Cheong, & Congdon, 2004). We selected MLM because child functioning variables were assessed repeatedly (i.e., time-varying indicators were nested within each child), and to account for the fact that some participating children were siblings (i.e., siblings were nested within families). Data in the present study were unbalanced both by design (i.e., not all measures were administered at all waves) and due to missing data, circumstances for which MLM is particularly well-suited (Singer & Willett, 2003).

MLM analyses proceeded in a series of steps. First, we fit unconditional growth models for the child functioning dependent variables to estimate initial levels and change in functioning over time. Unconditional growth models were estimated using Equation 1 to 5:

$$Y_{ij}=\pi_{0i}+\pi_{1i}(\mathrm{Age}_{ij}-\overline{\mathrm{Age}}_{\mathrm{w}})+\varepsilon_{ij} \quad (1)$$

$$\pi_{0i}=\beta_{00}+\zeta_{0i} \quad (2)$$

$$\pi_{1i}=\beta_{10}+\zeta_{1i} \quad (3)$$

$$\beta_{00}=\gamma_{000}+\zeta_{00i} \quad (4)$$

$$\beta_{10}=\gamma_{100i}+\zeta_{10i} \quad (5)$$

Equation 1 refers to the level-1 model. It stipulates that the value of a behavioral or psychosocial functioning outcome (Y_{ij}) for child i at age j is modeled as a function of an

intercept (initial level of functioning; π_{0i}), a slope (linear rate of change in functioning over time; π_{1i}), and a residual term (ε_{ij}). Age_{ij} represents the child's age in years at each assessment. Chronological age was used as the unit of time rather than assessment wave to account for variation in the age at which each assessment was administered to each child and the interval between assessments. Child age was centered by subtracting $\overline{\text{Age}}_{\text{w}}$, the mean age of the sample at the wave the child functioning outcome variable was initially assessed. Because some child functioning measures were introduced at later waves, age at the initial assessment and number of assessment waves varied across dependent variables. Equations 2 and 3 refer to the level-2 model, and include the mean for the intercept (β_{00}) and slope (β_{10}) at the level of the individual child, and residual terms that account for variation between individual children around the sample intercept (ζ_{0i}) and slope (ζ_{1i}). Equation 4 and Equation 5 refer to the level-3 model, and include the mean for the intercept (γ_{000}) and slope (γ_{100i}) at the level of the family, and residual terms that account for variation between families around the sample intercept (ζ_{00i}) and slope (ζ_{10i}). In order to determine whether there was significant individual variation in children's initial levels of and change over time in functioning variables that could be accounted for in subsequent conditional models, variance components for the level-2 intercept and slope were allowed to vary randomly across children in each unconditional model; variance components for the level-1 and level-3 intercepts were also allowed to vary randomly, while variance components for all other parameters were fixed.

Next, we fit a series of conditional models that sought to account for variation in the intercepts and slopes of child functioning outcome variables by adding time-invariant between-child predictors at level-2. These models were estimated using Equation 6 and Equation 7:

$$\pi_{0i}=\beta_{00}+\beta_{01}(\text{Sex}_i)+\beta_{02}(\text{CCQ}_i-\overline{\text{CCQ}})+\zeta_{0i}. \quad (6)$$

$$\pi_{1i}=\beta_{10}+\beta_{11}(\text{Sex}_i)+\beta_{12}(\text{CCQ}_i-\overline{\text{CCQ}})+\zeta_{1i}. \quad (7)$$

Equation 6 refers to the initial level of functioning and Equation 7 refers to change in functioning over time. In these equations, a dummy variable representing child sex (Sex_i; 0 = female, 1 = male) was added at the level-2 intercept and slope to account for initial differences (β_{01}) and change over time (β_{11}) as a function of child sex[2]. Each child's grand-mean centered CCQ scale score at wave 1 $(\text{CCQ}_i-\overline{\text{CCQ}})$ was added to the level-2 model to predict variation in the intercept (β_{02}) and slope (β_{12}) in the child functioning outcome variable. Effects on model intercepts mean that CCQ scale scores account for variation in the child's initial level of the functioning variable; effects on model slopes mean the CCQ scale scores account for variation in the rate of change in the functioning variable. In each conditional model, the variance component for the level-1, level-2, and level-3 intercepts were allowed to vary randomly across children; variance components for all other parameters were fixed.

[2]We also conducted a series of conditional models that included family alcohol status at the level-2 intercept and slope to account for individual differences and change over time in functioning variables. As would be expected, family alcohol status was associated with initial levels and change over time of several functioning variables. However, results for the CCQ scales were comparable to those for models not including family alcohol status, indicating that effects for CCQ scales were not accounted for by family alcohol status.

3 Results

3.1 Derivation of the CCQ Scales

We began our examination of the underlying structure of the CCQ data by first applying exploratory techniques to determine the optimal number of clusters/factors to extract. There was little consensus across methods, with the number of underlying dimensions ranging from two (very simple structure criterion; Revelle & Rocklin, 1979), three (Cattell scree plot; Cattell, 1966), eight (minimum average partial; Velicer, 1976), and eleven (parallel analysis; Horn, 1965). Given this lack of consensus, as well as findings from previous empirical analyses of the CCQ and CAQ (John et al., 1994; Lanning, 1994; McCrae et al., 1986; van Lieshout & Haselager, 1994), we hypothesized that the structure of the CCQ is likely to consist of a few large clusters and several small independent clusters of items of narrow content.

To determine the content of the clusters, we ran hierarchical clustering on the 100 CCQ items using the ICLUST algorithm with default clustering criteria (i.e., subclusters are combined if the superordinate cluster's alpha is greater than the larger subcluster's alpha and the superordinate cluster's beta is greater than the smaller subcluster's beta, with the alpha criterion applied to clusters of 3 and greater and the beta criterion applied to clusters of 4 and greater). This produced an initial six-cluster structure comprised of two large clusters and four smaller clusters. Following guidelines described in Cooksey and Soutar (2005), we inspected the graphical output and identified three poor-fitting CCQ items (i.e., adding the item to the cluster resulted in a ≥ .30 drop in beta): "Seeks physical contact with others," "Behaves in a feminine/masculine style and manner," and "Has an active fantasy life." Dropping these three items and re-running ICLUST on the 97 CCQ items produced a three-cluster structure with poor beta estimates (≤ .40) or narrow content (6 items). This suggested that the default clustering criteria were not "strict" enough. To maximize beta estimates (i.e., unidimensionality) in our final solution, we set the clustering criteria so that subclusters were combined if the superordinate cluster's beta was greater than the larger subcluster's beta, and applied the beta criterion to clusters of 3 and greater. This produced a seven-cluster structure. The first two clusters were the largest and most robust: the first was comprised of 43 items (α= .96, β = .80) and the second 30 items (α= .91, β = .68). The remaining clusters were comprised of only 2 to 10 items reflecting narrow content and/or had low beta estimates, indicating a lack of unidimensionality.

To compare and verify the results of the cluster analysis, we also conducted factor analysis of the CCQ items and calculated factor-cluster congruence coefficients. To allow for direct comparison with the final cluster solution, we analyzed the 97-item set. The two-factor solution showed high congruence with the first two clusters of the cluster solution (.96 and .97 for the first and second clusters/factors, respectively). Examination of item loadings across the cluster analysis and factor analysis solutions indicated the same item-to-factor assignment (i.e., highest item loading ≥ .30) for 65 of the 73 total items. On the basis of these analyses, we retained the first two clusters (comprising a total of 73 items) of the cluster analysis as reflecting the most parsimonious structure of the underlying personality dimensions embedded in the CCQ items[3].

[3]We also conducted separate cluster analyses in the alcoholic and nonalcoholic subsamples following the same procedures described above. The two clusters identified in the full sample were clearly evident in both the alcoholic and nonalcoholic subsamples. The two clusters derived in the alcoholic and nonalcoholic subsamples showed reasonably high congruence with those derived in the full sample (.99 and .98, and .90 and .94, respectively), and with one another (.85 and .96), indicating the generalizability of the two-cluster solution.

Table 2 shows the loadings (corrected item-cluster correlations) for the items on the two final clusters. Inspection of the item content of these two clusters suggested that they reflected a cohesive set of personality traits. We labeled the first cluster Adaptive Socialization and the second cluster Anxious Introversion. The Adaptive Socialization cluster was defined by CCQ items that reflected emotional stability and compliance, as well as cognition and intelligence (e.g., “Reflective, thinks and deliberates before acting,” “High intellectual capacity,” “Verbally fluent”). Anxious Introversion was defined by CCQ items that describe emotional and behavioral introversion (e.g., “Inhibited and constricted,” “Withdraws and disengages under stress”). Adaptive Socialization was moderately negatively correlated with Anxious Introversion ($r = -.38$). Given the moderate correlation among the clusters, we examined the cross-loadings of CCQ items on the two clusters. The more “emotional” Adaptive Socialization items (e.g., “Overreacts to frustration, easily irritated/angered[-],” “Warm and responsive”) also had relatively high loadings—but in the opposite direction—on Anxious Introversion. In contrast, the more ―behavioral” Adaptive Socialization items (e.g., “Obedient and compliant,” “Helpful and cooperative”) had small cross-loadings with Anxious Introversion.

3.2 Cross-Sectional Associations Between CCQ Scales and Other Personality Indicators

There were significant differences on the CCQ scales among children classified as resilient, overcontrolled, and undercontrolled (effect sizes were medium-to-large in magnitude; see Table 3). Post hoc pairwise comparisons corrected for multiple tests ($p < .001$) indicated that resilient children were rated as significantly higher on Adaptive Socialization than were overcontrolled and undercontrolled children, and overcontrolled children were rated as significantly higher than were undercontrolled children. Overcontrolled children were rated as significantly higher on Anxious Introversion than were resilient and undercontrolled children, and undercontrolled children were rated as significantly higher than were resilient children. Thus, the empirically derived CCQ scales were related in a meaningful manner to the well-validated CCQ personality types.

The empirically derived CCQ scales also showed meaningful relationships with the rationally derived Big Five CCQ scales developed by John et al. (1994) (see Table 4). Regression analyses indicated that a substantial amount of variance in the empirically derived CCQ scales was accounted for by the Big Five CCQ scales: $R^2 = .97$ for Adaptive Socialization and .91 for Anxious Introversion. In the regression models, Adaptive Socialization was strongly associated with higher Conscientiousness and Agreeableness, and modestly associated with higher Openness and lower Neuroticism, but was unrelated to Extraversion. Anxious Introversion was strongly associated with lower Extraversion, moderately associated with higher Neuroticism, modestly associated with lower Conscientiousness and higher Openness, and was unrelated to Agreeableness.

3.3 Concurrent Validity of the CCQ Scales

Independent *t* tests indicated that girls were rated as significantly higher on Adaptive Socialization ($d = .52$) than were boys, and significantly lower on Anxious Introversion ($d = -.39$). Children from alcoholic families were rated as significantly lower on Adaptive Socialization than were those from nonalcoholic families ($d = -.40$); there was no significant difference for Anxious Introversion. Full scale IQ scores were associated with higher Adaptive Socialization ($r = .47$) and lower Anxious Introversion ($r = -.34$).

3.4 Predictive Validity of the CCQ Scales

Next, we conducted MLM analyses to examine the predictive validity of the CCQ scales (Tables 5, 6, and 7). We first conducted a series of unconditional growth models. As indicated by the coefficients for the slopes, on average, children’s self-perceived

competence decreased from childhood (ages 6 to 8) to late adolescence (ages 15 to 17) in all domains except social competence, which increased over time. Children also reported decreasing prosocial and increasing antisocial peer behavior during early (ages 12 to 14) to late adolescence (ages 15 to 17). Finally, mothers reported decreasing child externalizing problems from early childhood (ages 3 to 5) to late adolescence (ages 15 to 17), and teachers reported decreasing child internalizing problems from childhood (ages 6 to 8) to late adolescence (ages 15 to 17). Because individual children may differ in their initial levels and rate of change, we modeled between-child variation by allowing the variance components for the intercept and slope to vary in the unconditional growth models (variance components for the slope were fixed for variables assessed only at two time points). As shown in Tables 5, 6, and 7, there was generally significant variation between children in the intercept and slopes for the child functioning variables.

As shown in Tables 5 and 6, the CCQ ratings made in early childhood (ages 3 to 5) predicted children's social functioning in later childhood and adolescence. There were relatively few significant differences between boys and girls in initial levels and rate of change for social functioning: girls evidenced greater declines in perceived academic competence from childhood (ages 6 to 8) to late adolescence (ages 15 to 17), but reported higher prosocial peer behavior in early adolescence (ages 12 to 14). After accounting for sex differences, Adaptive Socialization ratings predicted higher behavioral conduct, global self-worth, and social competence in childhood, and better peer relationship quality in early adolescence. Adaptive Socialization ratings were also associated with greater increases in prosocial peer behavior and greater declines in antisocial peer behavior. Anxious Introversion ratings predicted lower social competence in childhood, and less prosocial peer behavior in early adolescence.

Finally, the CCQ scales predicted children's internalizing and externalizing problems as reported by mothers and teachers (Table 7). There were several differences for boys and girls in their initial levels of internalizing and externalizing problems. Mothers reported higher internalizing and externalizing problems in early childhood in boys than in girls, and teachers reported higher externalizing problems in childhood in boys. After accounting for sex differences, Adaptive Socialization ratings predicted lower mother- and teacher-reported externalizing problems in childhood, and Anxious Introversion ratings predicted lower mother-reported externalizing problems and higher teacher-reported internalizing problems in childhood. Adaptive Socialization was also associated with greater declines in mother-reported internalizing problems from early childhood to late adolescence, whereas Anxious Introversion was associated with greater increases from early childhood to late adolescence.

4 Discussion

We evaluated the structure and developmental correlates of personality in early childhood by examining the underlying dimensions of the CCQ in a sample of young children (ages 3 to 5) using an empirical, bottom-up approach. We identified two broad personality dimensions that we labeled Adaptive Socialization and Anxious Introversion. These empirically derived CCQ traits demonstrated concurrent and prospective relationships with important developmental indicators during childhood and adolescence—in general, higher ratings on Adaptive Socialization were associated with more adaptive functioning in social, behavioral, and mental health domains, whereas higher ratings on Anxious Introversion were associated with less adaptive functioning in these domains. For the most part, the early childhood CCQ traits were associated with mean-level differences in functioning that were already evident at the initial assessment of each functioning variable, suggesting that individual differences in personality have early-emergent, lasting implications.

The empirically derived CCQ traits were meaningfully related to the well-replicated and validated resilient, overcontrolled, and undercontrolled personality types derived in person-centered analyses of the CCQ (Asendorpf & van Aken, 1999; Hart et al., 1997; Robins et al., 1996; Weir & Gjerde, 2002), as well as the Big Five model of personality assessed using rationally derived scales of CCQ items (John et al., 1994). Children rated as higher on Adaptive Socialization were more likely to be classified as resilient, while children higher on Anxious Introversion were more likely to be classified as overcontrolled. Adaptive Socialization was uniquely associated with higher Big Five Conscientiousness and Agreeableness, while Anxious Introversion was uniquely associated with higher Neuroticism and lower Extraversion. These findings are consistent with previous research on dimensional and typological personality antecedents of functioning (Caspi, 2000; Donnellan & Robins, 2010; Ozer & Benet-Martinez, 2006). Conscientiousness, Agreeableness, and low Neuroticism are each associated with adaptive functioning in adolescence and adulthood (Ozer & Benet-Martinez, 2006); that the CCQ scales derived in the present study in a sample of early-childhood aged children are likewise associated with subsequent functioning speaks to cohesion in, though not necessarily equivalence of, personality correlates across the lifespan. It is somewhat surprising that girls were rated as lower on Anxious Introversion than were boys, given that a recent meta-analysis of sex differences in childhood personality traits reported girls to be modestly higher than boys on indicators of fearfulness and shyness, and moderately higher on introversion (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006); future research with the CCQ in early childhood-aged samples of boys and girls will help to explicate this finding.

The Adaptive Socialization dimension emerged as a particularly important personality construct for developmental outcomes, with children higher on this dimension during early childhood evidencing better behavior, greater sense of self-worth, more positive peer relationships, and fewer mental health problems in childhood and adolescence. The Adaptive Socialization dimension is similar to the committed compliance construct described by Kochanska and colleagues in their preschool-aged samples (Kochanska & Aksan, 1995; Kochanska, Coy, & Murray, 2001; see also De Pauw & Mervielde, 2010). Committed compliance is characterized by the child's willing and wholehearted cooperation with the parent, and has been assessed using observational ratings of the parent-child dyad during structured interaction tasks; it is considered an early indicator of self-regulatory behavior and moral development. In the present study, we found that the dimension we labeled Adaptive Socialization, comprised of covarying indicators of behavioral compliance, emotional stability, likability, and intellectual capacity, were evident in clinician ratings after spending several hours with the child. Taken together, these findings suggest that early indicators of child socialization are manifested across interaction contexts and partners, and speak to the importance of this construct for subsequent developmental outcomes.

4.1 Structure of Personality in Early Childhood

Although our results are consistent with previous analyses of the CCQ and CAQ in terms of identifying meaningful personality constructs, there are notable distinctions from previous research, as well as similarities with more recent investigations of personality in early childhood. Many studies of child personality have used downward extensions of adult personality models, and studies using the CCQ and CAQ in samples of older children and adults report recovering factors analogous to the Big Five traits (John et al., 1994; Lamb et al., 2002; Lanning, 1994; McCrae et al., 1986; van Lieshout & Haselager, 1994). In contrast, we used an empirical approach that allowed the data to "speak for themselves." Our selection of hierarchical cluster analysis captured the covariance among the CCQ items without imposing an a priori theoretical structure. Moreover, we did not force an orthogonal structure that maximizes differentiation between factors. Shiner (1998) noted in her review

of childhood personality that adult models of personality were not developed to assess the age-typical behaviors and traits evidenced at younger ages. In contrast, the CCQ item pool was developed to assess a wide range of emotional and behavioral characteristics typical in childhood. Our analyses indicate that the underlying structure of the CCQ in early childhood is best represented by two dimensions that encompass— but are not identical to—the Big Five traits. That our structural analysis of the CCQ in early childhood yielded a personality structure other than the Big Five is consistent with results found for other measures of early childhood personality that are not limited to Big Five indicators (De Pauw et al., 2009; Dyson et al., 2009), and it is likely that these differences reflect both the content of the personality indicators and veridical developmental differences in personality structure. The CCQ encompasses Big Five constructs (as evidenced by the recovery of Big Five traits in the CCQ in samples of children and adolescents; John et al., 1994; van Lieshout & Haselager, 1994), as well as other important childhood personality constructs. This suggests that the CCQ dimensions identified in the present study have relevance to existing models of personality while also holding considerable potential to extend current understanding of personality structure and development. Taken together with the burgeoning body of evidence reviewed here, the results of the present study suggest that personality in young children can be conceptualized in terms of Big Five or similar adult traits, but that personality structure in young children is not identical to that in adults.

There have been increasing calls for a lifespan framework of personality in which broad personality dimensions in early childhood evolve into narrower and more clearly differentiated traits in adulthood (Caspi, Roberts, & Shiner, 2005; Shiner, 1998; Tackett et al., 2012). Results of the present study dovetail with those reported in a recent investigation of parent-reported personality traits from early to middle childhood (Tackett et al., 2012) in indicating that indicators of Agreeableness and Conscientiousness covary tightly among young children, becoming increasingly more differentiated at later ages. Such differentiation reflects greater cognitive ability, emotional experiences, and increasingly complex social environments and developmental tasks that must be successfully navigated to maintain adequate psychosocial functioning. Additional longitudinal analyses that track the unfolding processes by which broad dimensions, such as those found in the present study and others (Tackett et al., 2012) differentiate into narrower traits that converge with adult personality constructs will be especially helpful in understanding personality development, as well as the dynamic interplay of personality traits with developmental progression.

Methodological decisions in regards to personality assessment will also have important implications. Adult traits are overwhelmingly assessed via self-report questionnaires, whereas child traits are predominantly assessed using informant reports (parents and teachers) or observational methods. Cross-method agreement tends to be low, particularly among younger children (Durbin, Hayden, Klein, & Olino, 2007; Majdandžić & van den Boom, 2007). Unlike previous analyses of the CCQ that relied on parental ratings (John et al., 1994; Lamb et al., 2002; van Lieshout & Haselager, 1994), we used clinician ratings. Examiners were well-trained, obtained extensive information about the child from parental and child interviews and behavioral tasks, and had interacted with the child for approximately 7 hours. Their ratings, however, may primarily relate to characteristics most salient in the assessment context—whether the child was likable, well-behaved, and obedient (Adaptive Socialization), or inhibited, fearful, and shy versus sociable (Anxious Introversion). Results of the present study map onto observer ratings of older children—Hicks, Iacono, and McGue (in press) found that their socialization (similar to the Adaptive Socialization dimension identified in the present study) and boldness (similar to a reversed Anxious Introversion dimension) constructs were the strongest dimensions to emerge from teacher ratings of personality and behavior in a sample of 11-year-old twins. Consistent with the results of the present study, Hicks et al. (in press) found that socialization and boldness

were both heritable and exhibited theoretically coherent patterns of concurrent and prospective associations with measures of mental health and environmental risk. Additional research that examines the structure of personality rated by multiple informants will help to further disentangle developmental effects from methodological effects.

4.2 Future Directions

The present study has a number of strengths, including the empirical derivation of personality dimensions during early childhood, repeated assessment of multiple functioning variables using multiple methods and reporters in a relatively large sample of children, and the use of growth modeling analyses to examine initial levels and rates of change in children's functioning over time. However, there are also important limitations that suggest several directions for future research. The CCQ personality dimensions were assessed only once during early childhood. Additional research is needed that examines the stability of personality traits, including CCQ dimensions, across developmental stages, particularly among samples of very young children, as well as prospective associations with functioning at later ages. In terms of sample characteristics, all of the children in the present study were living with both biological parents at wave 1 (though not necessarily at later ages), almost all participants were Caucasian, and the majority of children were male; moreover, two-thirds of the children were selected to be at high risk for substance use problems due to parental alcohol dependence and related disorders. The inclusion of children at both high and low risk is a strength of the present study as this increases variability in relevant constructs, but the sampling decisions of the present study may limit generalizability.

Continued longitudinal research that identifies key personality constructs in young children and their correlates across developmental stages will further understanding of the dynamic and evolving implications of personality for adaptive and maladaptive developmental outcomes, inform theoretical models of personality development, and contribute to the development and implementation of prevention and intervention efforts for children at risk for maladaptive outcomes associated with predisposing individual difference characteristics.

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Highlights

- Cluster analysis identifies two personality dimensions in preschool-age children.
- Dimensions overlap with, but are not identical to, Big Five traits.
- Dimensions show convergent and prospective associations with important outcomes.

Table 1

Descriptive Data for Child Functioning Variables at Each Assessment Wave

	Wave 1 (Age 3 – 5)		Wave 2 (Age 6 – 8)		Wave 3 (Age 9 – 11)_		Wave 4 (Age 12 – 14)		Wave 5 (Age 15 – 17)	
	n	**Mean (*SD*)**	***n***	**Mean (*SD*)**	***n***	**Mean (*SD*)**	***n***	**Mean *(SD)***	***n***	**Mean (*SD*)**
Academic Competence (C)	-	-	266	3.09 (.68)	286	3.07 (.69)	291	2.84 (.47)	284	2.76 (.46)
Behavioral Conduct (C)	-	-	266	3.13 (.71)	286	3.12 (.65)	291	2.93 (.48)	284	2.89 (.44)
Global Self-Worth (C)	-	-	266	3.48 (.53)	286	3.42 (.51)	291	3.30 (.58)	284	3.23 (.56)
Social Competence (C)	-	-	266	2.89 (.72)	286	3.08 (.67)	291	3.28 (.62)	284	3.27 (.57)
Peer Relationships (C)	-	-	-	-	-	-	227	4.72 (.81)	268	4.61 (.80)
Prosocial Peer Behavior (C)	-	-	-	-	-	-	229	3.80 (.52)	270	3.59 (.54)
Antisocial Peer Behavior (C)	-	-	-	-	-	-	228	1.21 (.47)	270	1.77 (.77)
Internalizing Problems (M)	356	5.26 (4.87)	272	6.25 (5.28)	286	5.64 (5.35)	290	5.92 (5.47)	262	5.45 (5.57)
Externalizing Problems (M)	356	12.03 (7.14)	272	10.24 (6.55)	286	9.18 (6.94)	290	8.76 (7.09)	262	7.85 (8.12)
Internalizing Problems (T)	-	-	233	5.62 (6.13)	228	5.63 (7.27)	237	5.14 (6.62)	185	3.50 (5.16)
Externalizing Problems (T)	-	-	233	6.37 (8.81)	228	5.85 (9.66)	237	6.18 (9.44)	185	4.77 (8.62)

Note. C = child-reported. M = mother-reported. T = teacher reported. Average child age at wave 1 = 4.46 years, wave 2 = 7.55 years, wave 3 = 10.44 years, wave 4 = 13.52 years, wave 5 = 16.60 years. - Measure not administered.

Table 2

Cluster Loadings for the Final Two CCQ Clusters (Ages 3 – 5)

	Item	I. Adaptive Socialization	II. Anxious Introversion
30	Arouses liking/acceptance in adults	**.82**	−.37
62	Obedient and compliant	**.78**	−.09
13	Stretches limits; sees what s/he can get away with	**−.76**	.03
66	Attentive, able to concentrate	**.74**	−.24
14	Eager to please	**.74**	−.21
95	Overreacts to frustration; easily irritated/angered	**−.71**	.27
74	Becomes strongly involved in activities	**.69**	−.42
3	Warm and responsive	**.68**	−.52
41	Persistent, does not give up easily	**.67**	−.28
6	Helpful and cooperative	**.67**	−.15
91	Inappropriate in emotive behavior	**−.67**	.42
40	Curious and exploring; open to new experiences	**.65**	−.57
54	Rapid shifts in mood; emotionally labile	**−.65**	.09
20	Tries to take advantage of others	**−.65**	.02
46	Goes to pieces under stress	**−.64**	.35
42	Interesting, arresting	**.64**	−.38
76	Trusted, dependable	**.63**	−.13
90	Stubborn	**−.63**	.02
12	Immature behavior when under stress	**−.62**	.32
94	Sulky or whiny	**−.62**	.38
89	Competent, skillful	**.62**	−.36
55	Afraid of being deprived	**−.60**	.27
64	Calm and relaxed, easy-going	**.60**	−.12
85	Aggressive (physically or verbally)	**−.60**	−.03
93	Behaves dominant with others	**−.59**	−.14
99	Reflective; thinks and deliberates before acting	**.58**	.07
25	Uses and responds to reason	**.57**	−.20
34	Restless and fidgety	**−.56**	−.07
47	Has high standards of performance for self	**.55**	−.21
65	Unable to delay gratification	**−.55**	−.01
67	Planful, thinks ahead	**.54**	−.03
39	Rigidly repetitive or immobilized under stress	**−.54**	.31
68	High intellectual capacity	**.52**	−.29
60	Anxious when the environment is unpredictable	**−.51**	.50
10	Has transient interpersonal relationships; fickle	**−.50**	.30
9	Develops genuine and close relationships	**.48**	−.29
57	Dramatizes or exaggerates mishaps	**−.46**	.19
96	Creative in perception, thought, work, or play	**.46**	−.27
69	Verbally fluent	**.44**	−.32

	Item	I. Adaptive Socialization	II. Anxious Introversion
43	Can recoup or recover after stressful experiences	**.42**	−.30
59	Neat and orderly in dress and behavior	**.39**	.10
44	Yields in conflicts or disagreements	**.39**	.19
22	Tries to manipulate others by ingratiation	**−.37**	.04
35	Inhibited and constricted	−.24	**.80**
23	Fearful and anxious	−.49	**.77**
28	Vital, energetic, lively	.19	**−.71**
8	Keeps thoughts, feelings, products to self	−.28	**.69**
98	Shy and reserved	−.17	**.68**
84	Talkative	.23	**−.63**
24	Broods, ruminates, worries	−.25	**.63**
75	Cheerful	.56	**−.62**
79	Suspicious and distrustful	−.51	**.62**
52	Physically cautious	−.07	**.56**
78	Easily offended; sensitive to ridicule or criticism	−.30	**.56**
45	Withdraws and disengages under stress	−.47	**.54**
77	Feels unworthy; thinks of self as bad	−.42	**.54**
58	Emotionally expressive	.11	**−.53**
26	Physically active	−.16	**−.52**
82	Self assertive	−.25	**−.50**
53	Indecisive and vacillating	−.26	**.49**
16	Pleased with and proud of accomplishments	.39	**−.47**
63	Rapid personal tempo; reacts and moves quickly	−.26	**−.46**
1	Prefers nonverbal methods of communication	−.44	**.45**
86	Likes to be by self; enjoys solitary activities	−.11	**.43**
36	Resourceful in initiating activities	.20	**−.42**
19	Open and straightforward	.38	**−.42**
70	Daydreams; gets lost in reverie	−.26	**.38**
100	Easily victimized by other children	−.22	**.37**
33	Cries easily	−.31	**.37**
37	Likes to compete; compares self against others	.16	**−.36**
73	Responds to humor	.31	**−.36**
21	Tries to be the center of attention	−.21	**−.32**
83	Seeks to be independent and autonomous	−.10	**−.29**
2	Considerate and thoughtful of other children	.34	.05
4	Gets along well with other children	.34	−.04
32	Gives, lends, shares	.38	.00
56	Jealous and envious of others	−.43	.14
80	Teases others	−.28	−.08
5	Admired and sought out by other children	.26	−.14
29	Protective of others	.26	−.06

	Item	I. Adaptive Socialization	II. Anxious Introversion
11	Attempts to transfer blame to others	−.37	.15
61	Judgemental of the behavior of others	−.15	.11
38	Unusual thought processes	−.15	.14
27	Visibly deviant in appearance, size, or condition	−.36	.27
92	Physically attractive, good-looking	.35	−.24
49	Shows specific mannerisms or behavioral rituals	−.34	.25
50	Bodily symptoms from tension and conflict	−.21	.25
15	Shows concern for moral issues	.32	−.13
31	Recognizes the feelings of others; empathic	.40	−.14
81	Can acknowledge unpleasant experiences, feelings	.14	−.13
72	Readiness to feel guilty; puts blame on self	.14	.08
71	Looks to adults for help and direction	−.02	.28
48	Seeks reassurance about worth or adequacy	−.12	.25
88	Self-reliant, confident; trusts own judgement	.29	−.44
18	Expresses negative feelings toward peers directly	−.20	−.18
51	Agile and well coordinated	.15	−.21
87	Imitates characteristics of admired others	−.10	−.08
7	Seeks physical contact with others	−.04	−.01
17	Behaves in a feminine/masculine style and manner	.10	−.15
97	Has an active fantasy life	−.08	−.10
	Mean (SD)	5.70 (1.21)	4.18 (1.00)

Note. Structure matrix of cluster loadings. Loadings represent item-cluster correlations corrected for item overlap and alpha reliability. Loadings in **bold** reflect assignments to the respective cluster. Item descriptions are abbreviated.

Table 3

Descriptive Data for and Concurrent Validity of the CCQ Scales

			Adaptive Socialization	Anxious Introversion
		n	**Mean (*SD*)**	**Mean (*SD*)**
CCQ personality types	Resilient	230	6.37 (.64)[ab]	3.75 (.71)[ab]
	Overcontrolled	52	5.36 (.89)[ac]	5.54 (.80)[ac]
	Undercontrolled	77	3.91 (.74)[bc]	4.45 (.91)[bc]
	Between-group difference		$F(2, 356) = 361.37^{***}$	$F(2, 356) = 122.52^{***}$
	Effect size		$\eta^2 = .67$	$\eta^2 = .41$
Child sex	Female	68	6.14 (.81)	3.86 (1.03)
	Male	305	5.60 (1.26)	4.25 (.98)
	Between-group difference		$t(371) = 3.42^{***}$	$t(371) = -2.94^{**}$
	Effect size		$d = .52$	$d = -.39$
Family alcohol status	Alcoholic	256	5.55 (1.26)	4.21 (1.03)
	Nonalcoholic	117	6.01 (1.12)	4.10 (.92)
	Between-group difference		$t(371) = 3.47^{***}$	$t(371) = -1.05$
	Effect size		$d = -.40$	$d = .12$

Note. Significant differences between the CCQ personality types are marked with the same superscript.

** $p < .01$.

*** $p < .001$.

Table 4

Zero-Order Correlation and Beta Coefficients for the Empirically Derived and Big Five CCQ Scales

		Empirically-Derived			
		Adaptive Socialization		Anxious Introversion	
		r	β	*r*	β
Big Five CCQ Scales	Extraversion	.20***	−.01	−.92***	−.79***
	Neuroticism	−.65***	−.08***	.71***	.30***
	Conscientiousness	.90***	.39***	−.25***	−.08**
	Agreeableness	.90***	.51***	−.24***	.03
	Openness	.74***	.16***	−.49***	.08***

Note. Zero-order correlations among the Big Five CCQ scales $r_{E.N}$ = −.55***; $r_{E.C}$ = .09; $r_{E.A}$ = .14**; $r_{E.O}$ = .42***; $r_{N.C}$ = −.61***; $r_{N.A}$ = −.48***; $r_{N.O}$ = −.68***; $r_{C.A}$ = .71***; $r_{C.O}$ = .68***; $r_{A.O}$ = .54***.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5

Unconditional Growth Models and CCQ Models Predicting Child-Reported Perceived Competence From Wave 2 to Wave 5 Using CCQ Scales

	Academic Competence		Behavioral Conduct		Global Self-Worth		Social Competence	
	Intercept (age 6 – 8)	Slope (change)	Intercept (age 6 – 8)	Slope (change)	Intercept (age 6 – 8)	Slope (change)	Intercept (age 6 – 8)	Slope (change)
	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)
Unconditional growth models								
Fixed Effects								
Level-1	3.11 (.04)***	−.04 (.01)***	3.14 (.04)***	−.03 (.00)***	3.48 (.03)***	−.03 (.00)***	2.94 (.04)***	.04 (.00)***
Variance Components								
Level-1	.207		.219		.186		.263	
Level-2	.192***	.002***	.216***	.002***	.063***	.002***	.119***	.000
Level-3	.059***		.020*		.036***		.067***	
Conditional models								
Child sex	.15 (.08)	−.02 (.01)*	−.12 (.09)	−.01 (.01)	−.04 (.06)	.00 (.01)	.08 (.08)	−.01 (.01)
Adaptive Socialization	.06 (.04)	.00 (.01)	.07 (.03)*	−.00 (.00)	.08 (.03)**	−.00 (.00)	.09 (.03)**	−.00 (.00)
Anxious Introversion	−.04 (.04)	−.01 (.01)	−.04 (.04)	.01 (.01)	−.05 (.03)	.01 (.01)	−.08 (.03)*	.00 (.00)

Note. Unconditional growth models include only an intercept term and child age (at the initial assessment of the measure) at the slope at level-1. Conditional models include child sex (0 = female, 1 = male) and CCQ scale scores at level-2. Coef = coefficient.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 6

Unconditional Growth Models and CCQ Models Predicting Child-Reported Peer Relationships and Peer Behavior From Wave 4 to Wave 5 Using CCQ Scales

	Peer Relationships		Prosocial Peer Behavior		Antisocial Peer Behavior	
	Intercept (age 12 – 14)	**Slope (change)**	**Intercept (age 12 – 14)**	**Slope (change)**	**Intercept (age 12 – 14)**	**Slope (change)**
	Coef (*SE*)	**Coef (*SE*)**	**Coef (*SE*)**	**Coef (*SE*)**	**Coef (*SE*)**	**Coef (*SE*)**
Unconditional growth models						
Fixed Effects						
Level-1	4.70 (.05)***	−.02 (.02)	3.30 (.04)***	−.08 (.01)***	1.26 (.03)***	.17 (.01)***
Variance Components						
Level-1	.288		.135		.204	
Level-2	.287***	-	.066***	-	.000	-
Level-3	.073*		.148***		.210***	
Conditional models						
Child sex	−.03 (.12)	−.04 (.03)	−.26 (.07)***	−.00 (.03)	−.01 (.06)	.04 (.02)
Adaptive Socialization	.13 (.05)*	.00 (.02)	.04 (.03)	.03 (.01)**	−.00 (.02)	−.03 (.01)*
Anxious Introversion	−.09 (.05)	.02 (.02)	−.11 (.03)***	−.00 (.01)	.02 (.02)	.03 (.01)*

Note. Unconditional growth models include only an intercept term and child age (at the initial assessment of the measure) at the slope at level-1. - Variance components for the slope were fixed because variables were assessed at only two time points. Conditional models include child sex (0 = female, 1 = male) and CCQ scale scores at level-2 (in separate models). Coef = coefficient.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 7

Unconditional Growth Models and CCQ Models Predicting Mother- and Teacher-Reported Child Internalizing and Externalizing Problems From Waves 1 and 2 to Wave 5 Using CCQ Scales

	Mother-Reported				Teacher-Reported			
	Internalizing		Externalizing		Internalizing		Externalizing	
	Intercept (age 3 – 5)	Slope (change)	Intercept (age 3 – 5)	Slope (change)	Intercept (age 6 – 8)	Slope (change)	Intercept (age 6 – 8)	Slope (change)
	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)	Coef (*SE*)
Unconditional growth models								
Fixed Effects								
Level-1	5.76 (.26)***	.01 (.03)	12.14 (.37)***	−.33 (.04)***	5.99 (.34)***	−.20 (.06)***	6.95 (.57)***	−.13 (.08)
Variance Components								
Level-1	12.993		16.344		32.069		49.148	
Level-2	1.974***	.100***	16.054***	.232***	10.050***	.006	13.963	.288**
Level-3	10.354***		20.004***		.019		33.410***	
Conditional models								
Child sex	1.10 (.46)*	−.08 (.07)	2.88 (.75)***	−.09 (.08)	.78 (.82)	−.11 (.13)	2.62 (1.07)*	−.04 (.17)
Adaptive Socialization	.24 (.20)	−.08 (.03)**	−.77 (.27)**	−.05 (.03)	−.46 (.34)	−.07 (.06)	−1.64 (.49)***	.04 (.07)
Anxious Introversion	−.05 (.24)	.07 (.03)*	−.72 (.33)*	.07 (.05)	.97 (.39)*	−.04 (.08)	−.65 (.51)	.04 (.08)

Note. Unconditional growth models include only an intercept term and child age (at the initial assessment of the measure) at the slope at level-1. Conditional models include child sex (0 = female, 1 = male) and CCQ scale scores at level-2 (in separate models). Coef = coefficient.

* $p < .05$.

** $p < .01$.

*** $p < .001$.