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Dimensions of Personality in Teacher Ratings of Chinese Children
(Under the Direction of ROY P. MARTIN)

Teacher ratings are available on a large sample of Chinese children aged 3 to 12 years using the Inventory of Child Individual Differences (ICID, Halverson, Havill, & Deal, 2002). The ICID was developed based on parent and teacher free descriptions of child personality. Data from two other instruments, the Digman and Shmelyov Scale (DSS, Digman & Shmelyov, 1996) and the Temperament Battery for Children-Revised (TABC-R, Martin & Bridger, 1999) were also available on the same sample.

Exploratory factor analysis of the ICID resulted in a four-factor structure. The four ICID factors can be related to the adult Big Five theoretical framework. Exploratory factor analysis of the DSS resulted in a three-factor structure. Each of the ICID factors can also be related to one or more of the DSS factors, and vice versa. These results indicate that free description approach did not overlook any dimension derived based on a more top-down approach. Based on regression analysis using the TABC-R scales as predictors and the ICID factors as criteria, a substantial amount of variance of each of personality dimensions can be explained by temperament traits.

INDEX WORDS: Child personality, Child temperament, Big five, Free description

DIMENSIONS OF PERSONALITY IN TEACHER RATINGS OF CHINESE CHILDREN

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CHAPTER 1

INTRODUCTION

Temperament and personality characteristics play a critical role in Children's development across the life span. Traditionally, temperament studies have focused on individual differences in infancy and childhood, while personality studies have typically involved individual differences in adolescents and adults. Until recently, studies on child personality have been relatively neglected among child development researchers (Digman & Inouye, 1986; Shiner, 1998; Halverson, Kohnstamm, & Martin, 1994). However, more recently, there has been an increased interest in exploring personality structure during childhood. Several factors have contributed to this growing interest, including the lack of clarity regarding the major dimensions of the temperament construct, the growing consensus on personality structure among adult personality researchers, and the emerging empirical evidence supporting the usefulness of the Big Five model for organizing child personality structure.

The study of temperament in childhood was initiated by research on the nine-dimensional structure proposed by Thomas and Chess (1977). These nine dimensions were developed for clinical purposes and were not theoretically derived. In addition, these researchers developed their model based on observations of infants and young children. Therefore, their dimensions might be developmentally inappropriate when studying older children. Furthermore, empirical evidence indicated that only five of the nine factors were consistently replicable over studies (Martin, Wisenbaker, & Huttunen,

1994): activity level, task persistence, social inhibition, negative emotionality, and adaptability. Rythmicity and threshold have also been replicated in several studies.

In contrast with Thomas and Chess's model, contemporary models of temperament are based on recent theoretical and empirical development in the field of temperament. Martin and Bridger (1999) have theorized that Inhibition and Impulsivity underlie all temperament traits. This two-factor model was in part based on research on the neurological basis for important aspects of temperament (e.g., Gray, 1991). Empirical evidence in support of Martin's model comes from the studies using his Temperament Assessment Battery for Children-Revised (TABC-R). Rothbart and colleagues have elaborated a theoretical and empirical model of temperament that relates temperament traits to underlying neurobiological functioning, including the development of self-regulation. She proposed a three-factor model of temperament based on factor analytic studies of her temperament instrument, the Children's Behavior Questionnaire (CBQ, Rothbart, Ahadi, Hershey & Fisher, 2001). The three factors are labeled Extraversion (Surgency), Negative Affectivity, and Effortful Control. Although these newly-developed models appear to show promise for capturing important differences in temperament, their adequacy and usefulness are yet to be tested.

Overall, the current state of temperament literature can be characterized by a wide variety of opinions regarding the basic dimensions of temperament (Halverson, et al., 1994). The existing theories of temperament provide guidance for identifying a core set of temperament traits, but the exact set is still elusive. This lack of consensus on the structure of temperament makes comparison of research findings difficult, and most

researchers have now realized the need to unify temperament study by finding a common language.

In contrast to the lack of agreement regarding the main dimensions of child temperament, there is growing consensus among researchers in the field of adult personality with respect to the traits used to describe adult behaviors. It is now widely accepted that five factors can account for the correlations among the many traits used to describe human behaviors (Goldberg, 1981, 1990; Costa & McCrae, 1985, 1992; Digman, 1989, 1990), which are encompassed in the Big Five theory of personality, or the Five Factor Model (FFM). These five dimensions are usually labeled (I) Extraversion or Surgency, (II) Agreeableness, (III) Conscientiousness, (IV) Emotional Stability or Neuroticism, and (V) Intellect, Culture, or Openness to Experience. Although there is still debate as to the number of dimensions needed to encompass the domain of adult personality descriptions (e.g., Eysenck's three-factor model), empirical evidence shows that the same five factors are replicable across different data sources, different instruments, different groups of subjects, as well as across different languages and cultures.

The FFM of adult personality has not only led to great advances in integrating adult personality research, but also provides a framework and direction for research at the child level. Using trait adjectives based on the adult Big Five literature, Digman and Inouye's (1986) study was the first to replicate the Big Five structure in older children. The Digman et al. (1986) study was replicated by others (e.g., Graziano & Ward, 1992; Victor, 1994; Mervielde, Buyst, & De Fruyt, 1995). Other studies (e.g., John, Caspi, Robins, Moffitt & Stouthamer-Loeber, 1994; Van Lieshout & Haselager, 1994) have

reported research on Big Five in younger age groups using the California Child Q-set (CCQ). Although more than five factors are usually extracted in studies using the CCQ, five of them that were previously mentioned are always recognizable as the adult Big Five characteristics. The conclusion from the available studies is that the adult Big Five factors can be measured in younger age groups.

Although empirical evidence supports the usefulness of the Big Five model as a theoretical framework for exploring personality structure in children, the major dimensions of child personality remains unclear. In addition, it is not clear whether the five factors extracted from child personality studies are the same as the Big Five. Shiner (1998) points out that child personality factors may be different from their adult counterparts. For example, she indicated that Agreeableness observed in children "included descriptors suggesting submissiveness both to other children and to adults; and Openness primarily included aspects of intellect, not Openness" (p. 317). Mervielde et al. (1995) found out that the Big Five Conscientiousness and Openness factors seemed to blend into one common factor for some age groups of children. More research on child personality structure is needed in order to delineate the differences between children and adults.

In summary, there is a continuing search for the major dimensions of individual differences during childhood. Developmental researchers are encouraged by the progress in the adult personality field and the emerging evidence showing the usefulness of the Big Five model for organizing individual differences during childhood. The number of studies exploring child personality is now rapidly growing (Halverson, et al., 1994). However, available studies on child personality have their limitations. One major

limitation is that these studies have used rating scales based on adult personality studies or other measures not specifically designed for assessing child personality characteristics. It is possible that some important characteristics salient to parents and teachers are not captured because they are not included in the measures used. In addition, some dimensions may appear simply because they are already built into those measures.

The lexical approach to studying adult personality has been applied to the field of child personality. Instead of selecting personality adjectives from the dictionaries, child personality researchers have collected parent and teacher free descriptions of children in different countries (Kohnstamm, Halverson, Mervielde & Havill, 1998). This "bottom-up" natural language approach is based on the assumption that parents and teachers spontaneously mention those characteristics that they think are most important or basic. In addition, it is also believed that free descriptions not only depend on children's personality characteristics, but also on what parents and teachers expect to see in children in their specific cultures. Consequently, such descriptions are culturally sensitive. Those descriptors that parents and teachers use most frequently in describing children were then used to construct a child personality instrument: the Inventory of Child Individual Differences (ICID, Halverson, Havill & Deal, 2002). It is believed the ICID captures those personality characteristics that are most salient to parents and teachers.

In the current study, the ICID and two other instruments, the Temperament Assessment Battery for Children-Revised (TABC-R, Martin et al., 1999) and the Digman and Shmelyov Scale (DSS, Digman & Shmelyov, 1996), are used. The TABC-R is an instrument currently in use for assessing temperament characteristics. The DSS was developed based on various sources, including temperament literature and research on

child personality. It includes both temperament variables and personality variables that are considered important individual differences in children. To date, there has been a lack of studies where various measures are available on the same group of children. The data included in this study provide a unique opportunity to study the relations among various temperament and personality constructs.

Further, this study relies on teachers to provide information on these measures. Teachers are as important a source of information as parents, given that teachers see behaviors in an environment that present different demands and expectations from the home environment. There is some evidence that parent and teacher ratings have differential validity (Martin et al., 1994). In addition, teachers have the advantage of continually interacting with and observing groups of same-aged children, while parents have little normative information.

Finally, all these measures were obtained on a large Chinese sample. Studying individual differences in children from a different culture is important in order to attain an understanding of the construct itself as well as an understanding of the relationship between the culture and the construct. It is believed that the data included in this study provide a unique opportunity to study the structure of individual differences, as well as the relations among various temperament and personality constructs, in a culture where relatively little research has been done in this field.

Overview of Current Study

The current study examines the main dimensions of personality in teacher ratings of Chinese children 2 to 13 years of age. Age and gender differences in Chinese children's personality structure will also be investigated. Second, this study investigates

the degree of correspondence between two sets of personality factors developed based on different approaches (the ICID factors and the DSS factors) to determine whether one approach overlooks any dimension derived from the other approach. Finally, this study investigates the relations between temperament traits and personality factors.

CHAPTER 2

LITERATURE REVIEW

Personality

While psychologists define personality in many different ways, the concept of uniqueness seems to be a common theme. Allport (1937) defines personality as the dynamic organization of those psychological systems that determine an individual's unique adjustment to his environment. Thomas and Chess (1989) define personality as a "... composite of enduring psychological attributes which constitute the unique individuality of the person and which are expressed in diverse behaviors in different life situations, both concurrently and over time" (p. 16).

Personality Structure-the Big Five Personality Theory

The trait approach to personality seeks to organize human behaviors by labeling and classifying observable personality characteristics. This approach relies on factor analytical methods to reduce observed personality traits to underlying factors or dimensions. Different researchers have studied different traits, and a great diversity of traits was not organized until relatively recently. It is now widely accepted that five factors can account for the correlations between the many traits used to describe human behavior (Goldberg, 1981, 1990; Costa & McCrae, 1985, 1992; Digman, 1989, 1990). This is known as the Big Five personality theory, or the Five Factor Model (FFM) of personality. These two terms, often used interchangeably, are associated with two research traditions (Goldberg, 1993). The term Big Five is associated with the lexical

research tradition, and the term FFM is associated with the questionnaire research tradition. The following is a brief review of the history of these two research traditions.

History of the Big Five

The lexical research tradition assumes that the world's languages contain all trait terms that are needed to describe important individual differences (Goldberg, 1990). The search for major dimensions of personality began by examining trait terms found in dictionaries. Allport and Odbert (1936) compiled a list of adjectives used to describe human behaviors from the second edition of Webster's Unabridged Dictionary. Their list was later reduced by Cattell (see John, Angleitner & Ostendorf, 1988) to 35 personality variables. Based on factor analytical studies of these 35 variables, Cattell developed his model of personality, which contained 8 second-order factors and 16 primary factors. From this model, he designed his 16PF (16 Personality Factors) Questionnaire (Cattell, Eber, & Tatsuoka, 1980).

Cattell's factor analyses did not lead to five factors. However, his work, as well as Allport and Odbert's early efforts, provided foundation for later studies that led to the present Big Five theory. Fiske (1949) and Tupes and Christal (1961) were acknowledged as pioneers because they discovered that the underlying structure of personality can be represented by five factors.

The discovery of the five factors by Fiske and Tupes and Christal did not initially attract much attention among personality researchers (Digman, 1996). Fiske himself did not follow up his findings, and Tupes and Christal's Air Force technical report was not read by many personality researchers (Goldberg, 1993). Other researchers were reluctant to accept that five factors could account for individual differences in personality and had

attempted to replace the model. For example, although Norman (1963) replicated the 5-factor structure discovered by Tupes and Christal, he did not believe that five factors were adequate to cover the whole personality domain. In searching for a more comprehensive model, Norman (1967) supplemented Allport and Odbert's (1936) original adjective list with terms from the third edition of Webster's Unabridged Dictionary and classified his list of personality terms into 75 categories. Although the five factor structure first appeared in the early 60s, it was widely accepted in the 90s (Digman, 1996). Goldberg (1990) investigated Norman's 75 categories and replicated 5 factors. Digman (1994) also found 5 factors to be too few. He set out to prove his own 10-factor model, but later became convinced that 5 factors were enough.

The five factors in the lexical research tradition are labeled Surgency or Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Culture or Intellect (Goldberg, 1993). Norman (1963) selected 20 variables as his Big Five markers. Goldberg's (1992) also developed a set of 100 unipolar terms as Big Five markers, and claimed that his markers "can now replace those developed over 25 years ago by Norman (1963)" (p. 39). Table 1 presents the set of 100 unipolar adjective markers developed by Goldberg (taken from Goldberg, 1992).

The emerging consensus on the five-factor structure in the lexical research tradition also impacted the other research tradition: the questionnaire research tradition. Costa and McCrae are two of the researchers most frequently associated with the questionnaire research tradition, and their theory development is closely related to the development of their personality assessment instrument. Costa and McCrae first developed a three-factor model based on analyses of Cattell's 16PF and other inventories.

Because of their dissatifaction with existing instruments, they constructed the NEO Inventory, measuring 3 domains of Neuroticism (N), Extraversion (E) and Openness to Experience (O), with 6 facets in each domain (Costa & McCrae, 1978). In response to the emerging consensus on the five-factor structure, Costa and McCrae added Agreeableness (A) and Conscientiousness (C) to their model (Costa & McCrae, 1985), and the NEO Inventory became the NEO Personality Inventory (NEO-PI, Costa, et al., 1985). The NEO-PI measures all five factors, but had only domain scores for A and C. In 1992, subscales or facets for A and C were added, and this change resulted in the Revised NEO Personality Inventory (NEO-PI-R, Costa & McCrae, 1992). Table 2 presents the facets and sample items from the NEO-PI-R (taken from Costa & McCrae, 1992). The research and publications by Costa and McCrae contributed greatly to the modern consensus in the field of adult personality.

In summary, two different research traditions have now reached the same conclusion that five broad dimensions are able to encompass the domain of adult personality descriptions. Empirical evidence showed that the same five factors were consistently found when different data sources (e.g., self-reports and peer ratings), and different instruments (e.g., adjective rating scales and questionnaires) were used (McCrae & Cost, 1987). The Big Five were also recovered (McCrae, Costa & Busch, 1986) in the California Q-Set (CQS, Block, 1961). The fact that the Big Five is replicable in a measure not designed to assess those five factors provides support for the Big Five. In addition, the Big Five have also been obtained in other countries and languages.

Table 1 Goldberg's Big Five Markers

Factor I. Surgency	Factor II. Agreeableness	Factor III. Conscientiousness	Factor IV. Emotional Stability	Factor V. Intellect
Extraverted	Kind	Organized	Unenvious	Intellectual
Talkative	Cooperative	Systematic	Unemotional	Creative
Assertive	Sympathetic	Thorough	Relaxed	Complex
Verbal	Warm	Practical	Imperturbable	Imaginative
Energetic	Trustful	Neat	Unexcitable	Bright
Bold	Considerate	Efficient	Undemanding	Philosophical
Active	Pleasant	Careful	Anxious	Artistic
Daring	Agreeable	Steady	Moody	Deep
Vigorous	Helpful	Conscientious	Temperamental	Innovative
Unrestrained	Generous	Prompt	Envious	Introspective
Introverted	Cold	Disorganized	Emotional	Unintellectual
Shy	Unkind	Careless	Irritable	Unintelligent
Quiet	Unsympathetic	Unsystematic	Fretful	Unimaginative
Reserved	Distrustful	Inefficient	Jealous	Uncreative
Untalkative	Harsh	Undependable	Touchy	Simple
Inhibited	Demanding	Impractical	Nervous	Unsophisticated
Withdrawn	Rude	Negligent	Insecure	Unreflective
Timid	Selfish	Inconsistent	Fearful	Imperceptive
Bashful	Uncooperative	Haphazard	Self-pitying	Uninquisitive
Unadventurous	Uncharitable	Sloppy	High-strung	Shallow

See Goldberg (1992).

Table 2 Costa and McCrae's NEO-PI R Factors and Facets

Factor I. Extraversion	Factor II. Agreeableness	Factor III. Conscientious-ness	Factor IV. Neuroticism	Factor V. Open to Experience
E1: Warmth	A1: Trust	C1: Competence	N1: Anxiety	O1: Fantasy
E2: Gregariousness	A2: Straightforward-ness	C2: Order	N2: Angry Hostility	O2: Aesthetics
E3: Assertiveness	A3: Altruism	C3: Dutifulness	N3: Depression	O3: Feelings
E4: Activity	A4: Compliance	C4: Achievement Striving	N4: Self-Consciousness	O4: Actions
E5: Excitement-Seeking	A5: Modesty	C5: Self-Discipline	N5: Impulsiveness	O5: Ideas
E6: Positive Emotions	A6: Tender-Mindedness	C6: Deliberation	N6: Vulnerability	O6: Values

See Costa & McCrae (1992).

Contending Views

While the Big Five theory has gained much support among personality theorists, there are dissenting views. One of the most influential alternative to the Big Five theory is Eysenck's P-E-N model containing three personality dimensions: Extraversion-Introversion (E), Neuroticism-Emotional Stability (N), Psychoticism-Superego Control (P). His model is operationalized in his most recent version of the Eysenck Personality Questionnaire (EPQ, H. J. Eysenck & S. B. Eysenck, 1975). Eysenck's P-E-N model and the Big Five agree on the inclusion of Extraversion and Neuroticism as basic personality dimensions. Eysenck (1994) insists that Agreeableness and Conscientiousness are facets of his higher order Psychoticism factor. However, Goldberg and Rosolack (1994) argue that Eysenck's P is itself a blend of Agreeablenss and Conscientiousness. Therefore, four of the Big Five factors are present in Eysenck's model. The one Big Five factor not included by Eysenck in his model is the Intellect, Culture or Openness factor.

Another controversy concerns the assumption of orthogonality across the five dimensions or factors. The five factors in the Big Five are conceptualized as being orthogonal (Costa & McCrae, 1995, Goldberg, 1993) and were initially identified with rotation procedures such as the Varimax Rotation. However, the Big Five does not approximate what is called the simple structure, with several facets having large secondary loadings that are both meaningful and replicable. Costa and McCrae (1992) suggested that the correlations among domain scales could be explained by the presence of the secondary loadings of some scales. Indeed, the NEO-PI-R domain scores consistently show nontrivial intercorrelations. Costa, McCrae and Dye (1991) reported a correlation of .43 between Extraversion and Openness and a correlation of -.49 between

Neuroticism and Conscientiousness. Eysenck (1991,1992a, b) pointed out that the magnitude of these correlations is inconsistent with the orthogonal structure.

In addition to the debate about the number of factors necessary for a personality taxonomy and the orthogonality of the factors, there is disagreement about the nature of each individual factor. In fact, the five factors represent the broadest and most general level in the hierarchy of personality traits, and each factor is defined by more specific traits that share a common theme (Costa, McCrae & Dye, 1991). The lack of consensus on the nature of each of the five factors is reflected in the fact that there is yet no agreement on the labels of factors. Factor I is labeled Extraversion or Surgency. Factor II is labeled Agreeableness or Friendly Compliance (versus Hostile Noncompliance). Factor III is labeled Conscientiousness or Will to Achieve, Factor IV is labeled Neuroticism, Emotional Stability, or Ego Strength. Factor V is labeled Culture, Intellect, or Openness to Experience. Discrepancies in labeling and conceptualization of the five factors reflect the evolution of the constructs as well as the multifaceted nature of the constructs themselves. The following is a brief summary of each of the five factors.

Extraversion

There is probably no disagreement on the independence of Extraversion as a major personality dimension. However, there are disputes about which elements are central to Extraversion. The concept of extraversion-introversion is first introduced by Jung (1921) as one of his psychological types. Extraversion and introversion represent different orientations toward the world in Jung's theory, with extraverts orienting towards external experiences and introverts orienting toward internal experience. According to Watson and Clark (1997), Guilford views the impulsive and unreflective aspects of the

original Jungian concept as the core of extraversion, although his model also contained a Social Activity factor, which could be identified as Extraversion. Eysenck developed his Extraversion scale based on Guilford's instrument (Guilford & Zimmerman, 1949) and included both Sociability and Impulsivity in his Extraversion dimensions (Eysenck & Eysenck, 1968). When Eysenck reformulated his model, Impulsivity items were dropped from the Extraversion scale and moved to the Psychoticism scale (Eysenck & Eysenck, 1985).

More recent conceptualization of Extraversion seems to focus on Sociability, Positive Affect and Surgency. While Costa and McCrae (1992) view Sociability (the preference for social interaction and lively activity) as the core of Extraversion, Goldberg (1992) considers Surgency (ambition, tenacity and other leadership characteristics) as the primary characteristics of Extraversion. Hogan's (1983) conceptualization of Extraversion is a combination of both components, and includes both Surgency and Sociability as central to defining Extraversion. Tellegen, Lykken, Bouchard, Wilcox, Segal, & Rich (1988), on the other hand, considers the Positive Affect component (the tendency to experience positive emotions) as the core and proposes that Extraversion be renamed "Positive Emotionality", in correspondence to the negative emotionality nature of Neuroticism. Costa and McCrae's (1992) operationalization of Extraversion in their NEO-PI-R seem to be comprehensive, including facets that correspond to Sociability, Surgency and Positive Emotionality.

Agreeableness

Among the five factors, Agreeableness is represented by the largest number of adjectives in the trait lexicon (Goldberg, 1993). There are debates about the independence

of Agreeableness as a major personality dimension. For example, Eysenck (1994) views Agreeableness as a facet of his higher order Psychoticism factor. However, Goldberg and Rosolack (1994) argued that Agreeableness is an independent aspect of personality.

Agreeableness is viewed as less value neutral when compared with other personality dimensions. Hogan (1983), from the perspective of bioevolutionary theory, emphasized the importance of individual agreeableness to the survival of the group. Costa, McCrae and Dye (1991) conceptualize Agreeableness as a dimension of interpersonal behavior. According to them, Extraversion represents the preferred quantity of social stimulation, while Agreeableness represents the quality of interaction “along a continuum from compassion to antagonism” (Costa & McCrae, 1985, p. 2). Costa et al. (1991) also emphasized that Agreeableness is not only revealed in interpersonal behaviors, but also in social attitudes and philosophy of life (p. 888). Johnson and Ostendorf (1993) suggested that the meaning of agreeableness can be seen either as "possessing a pleasant disposition" or as "conforming to others' wishes”, depending on the method of rotation.

Conscientiousness

Hogan and Ones (1997) viewed the Big Five Conscientiousness dimension as concerned with characteristics that are fundamental for maintaining a group. Because of its predictive value in evaluating job performance, Conscientiousness is the most studied personality dimension in applied psychology (Hogan et al., 1997).

Freud provided an early discussion of the Conscientiousness construct (Hogan et al., 1997). He suggested that Conscientiousness is a product of the superego, which determines one’s attitude toward authority. In Freud’s conceptualization,

Conscientiousness begins in the process of resolving conflicts with authority, first with parents and later on with other authority figures in life, such as supervisors, employers, mentors and experts.

Costa et al. (1991) conceptualized Conscientiousness as having both proactive and inhibitive aspects, with proactive aspect represented by the need for achievement and commitment to work, while the inhibitive aspect represented by moral scrupulousness and cautiousness. The proactive aspect is not strongly represented in Goldberg's conceptualization of Conscientiousness. An examination of Goldberg's (1993) markers suggests that his conceptualization of Conscientiousness emphasizes the inhibitive aspect, such as degree of orderliness. Hogan et al.'s (1997) definition also seems to emphasize the inhibitive aspect. They referred Conscientiousness as "conformity and socially prescribed impulse control" (p. 849). Although not viewed as an interpersonal dimension, Costa, McCrae and Dye (1991) indicated that Conscientiousness has interpersonal implications in that highly conscientious individuals are more likely to be chosen as the leaders of groups.

Neuroticism/Emotional Stability

The lexical tradition and the questionnaire tradition of personality research label the fourth factor in opposite directions. Although there are relatively fewer terms associated with the desirable pole of this factor (Peabody, 1984), it is labeled Emotional Stability in the lexical tradition. Neuroticism, representing the undesirable pole of this factor, is the label used in the questionnaire tradition.

There seems to be an agreement on the centrality of negative emotionality to Neuroticism. Costa and McCrae (1992) viewed the general tendency to experience

negative affects such as fear, sadness, embarrassment, anger, guilt and disgust as the core of Neuroticism. Tellegen (1988) also viewed Neuroticism as negative emotionality, or the propensity to experience a variety of negative affects, such as anxiety, depression, anger and embarrassment.

Intellect/Culture/Openness to Experience

Among the five factors, the fifth factor is the most underrepresented in the trait lexicon. McCrae and Costa (1987) indicated that questionnaires might be better than adjectives for assessing this factor. There were relatively fewer terms associated with this factor than other factors, which might have contributed to confusions about this domain. Indeed, this factor is regarded as the more controversial of the Big Five.

There is no agreement on the label to use for this factor. Intellect was favored by Fiske (1949), Goldberg (1990), Digman and Inouye (1986). Tupes and Christal (1961) and Norman (1963) used the term Culture. Costa and McCrae (1992) adopted the label Openness to Experience. It seems that the fifth factor includes all three components and that Intellect (abilities, analytical, clever, intuitive-logical), Culture (eloquent-inarticulate, sophisticated-simple-headed) and Openness (imaginative-dull, curious-uninquiring) are all markers for this factor.

The fifth factor represents the cognitive aspect of personality structure. There is an ongoing discussion about the relation between personality and intelligence. Eysenck (1994) excluded ability-related traits like intelligence from the personality domain. McCrae and Costa (1985) indicated that Openness to Experience and intelligence are better considered two separate but related dimensions of individual differences. McCrae (1993-1994) correlated Openness to Experience facets to the scores from the Wechsler

Adult Intelligence Scale-Revised (WAIS-R) and found that the Full Scale IQ was modestly related only to Openness to Ideas (.33) and to Total Openness (.33). Studies that include ability terms have typically found that these terms have substantial secondary loadings on the Conscientiousness factor (McCrea, 1987).

Personality Structure-Chinese Personality Structure

The FFM is an empirically based taxonomy of personality traits developed in the English language. Cross-cultural replications of the Big Five are important both for an understanding of personality itself and an understanding of the relationship between culture and personality.

There has been relatively little research on personality structure in Chinese people. Among the handful of studies on this topic, some have used translated instruments. For example, McCrae, Costa, and Yik (1996) translated the NEO-PI-R into Chinese and administered it to a combined sample of 352 college students in Hong Kong. Factor analysis results were a clear replication of the original NOE-PI-R factor structure (Costa & McCrae, 1992), with 29 of 30 facets have their highest loading on the intended factor. The exception was the Action facet (O4), which did not have a clear loading on any factor. There were other minor differences as well. For example, Modesty (A5) had its primary loading on E instead of A, and Warmth (E1) had a large secondary loading on A. The internal consistencies of the scales were also generally comparable between the Chinese and American samples (Costa & McCrae, 1992), with the exception of Values (O6).

Chinese personality studies have also used Chinese personality instruments. McCrae, Costa and Yik (1996) reported a group of studies based on Chinese personality

instruments: the Multi-Factor Personality Inventory (MFPI) and the Multi-Trait Personality Inventory (MTPI). One of such studies (Lew, 1985) used the MFPI and extracted eight factors: Weak Morality-Strong Morality, Neuroticism-Emotional Stability, Extraversion-Introversion, Dominance-Humility, Open-mindedness-Authoritarianism, High Conformity-Low Conformity, Tender-mindedness-Tough-mindedness, and Reflectivity-Impulsiveness. Lew and Hau's (1987) study also used the MFPI and extracted eleven factors, adding Adventurism-Cautiousness, Liberalism-Conservatism, Idealism-Realism to the original eight. Cheung, Onger, Hau, Lew, and Lau (1992) used the MTPI and extracted five factors: Outgoing-Withdrawn, Self-Serving-Principled, Conforming-Non-conforming, Unstable-stable, Strict-Accepting. These authors concluded that these factors appeared to correspond to Extraversion, Low Conscientiousness, Low Openness, Neuroticism, and Low Agreeableness, respectively.

Yang and Bond's (1990) study was unique in that it investigated the relation between personality constructs developed using indigenous instruments and those developed using imported instruments by including both a translated instrument and a Chinese indigenous instrument. The same subjects rated a variety of target persons on a pool of Chinese indigenous personality adjectives and on a list of translated bipolar personality descriptors (Tupes & Christal, 1961). Five factors were extracted from both the indigenous and the imported personality descriptors. The Chinese indigenous factors were labeled Social Orientation-Self-Centeredness, Competence-Incompetence, Expressiveness-Conservatism, Self-Control-Impulsiveness, and Optimism-Neuroticism.

The relation between these two sets of five factors was investigated. Young and Bond (1990) concluded that there was no exact one-to-one correspondence between

imported and indigenous factors, and the five indigenous factors seemed to be explained by various combinations of the five imported factors. Among the five indigenous factors, Social Orientation seemed to mainly correspond to Agreeableness, while Optimism mainly to Emotional Stability. The rest of Chinese indigenous factors each corresponded to at least two imported factors, for example, Competence to both Emotional Stability and Culture; Expressiveness to Extraversion, Emotional Stability and Culture; and Self-Control to Agreeableness and Emotional Stability. On the other hand, the one Big Five factor that did not emerge among the Chinese indigenous factors is Conscientiousness, which was only mildly related to four of the five Chinese factors. Triandis (1997) speculated that the Chinese culture put such an emphasis on Conscientious behaviors that individual differences on this factor do not stand out.

In summary, the Big Five structure identified in Western populations can be measured in Chinese samples by use of imported instruments. When indigenous instruments are used, more than five factors are usually extracted. Comparison between indigenous and imported personality constructs indicated that there was no clear-cut correspondence between them. McCrae, Costa and Yik (1996) suggested that although the Big Five summarized the universal aspects of Chinese personality structure, there might be some indigenous aspects not represented by this model.

Personality Structure-Younger Age Groups

Empirical evidence supporting the Big Five is mainly based on studies of adult subjects. In a sense, the Big Five represents the adult personality end of the developmental continuum. The value of the Big Five would be enhanced if it can be shown that Big Five dimensions in adults have developmental antecedents (Graziano,

1994). Attention has now turned toward exploring the personality structure during childhood and adolescence.

Studies Using Adjective Rating Scales

Research on personality structure in younger age groups have used lists of adjective trait terms similar to those used in the adult lexical studies. One of the first studies cited by many is conducted by Digman and Inouye (1986). Digman et al.'s (1986) study is replicated by Graziano and Ward (1992) and Victor (1994). All three studies use Digman's adjective trait list. In addition to trait adjectives selected from the adult Big Five literature, the instrument also includes behavioral definitions relevant to classroom behavior (Digman et al., 1986). All three studies have teachers rate on students in their early adolescence, ranging from 12 to 14 years old. In all three studies, factor analyses of teachers' ratings resulted in five robust factors that corresponded to those found in adult personality studies. Digman et al. (1986) suggested different names for three of them, and the five factors were interpreted as: Factor I Extrovert-Introvert, Factor II Friendly Compliance versus Hostile Noncompliance, Factor III Will to Achieve, Factor IV Ego Strength versus Emotional Disorganization, and Factor V Intellect. Although five factors are extracted, Shiner (1998) points out the child five factors are not the same as the adult five factors. For example, she indicates that Agreeableness assessed in children includes "descriptors suggesting submissiveness both to other children and to adults; and Openness mainly includes aspects of intellect, not Openness." (p. 317).

Mervielde, Buyst, and De Fruyt (1995) also had teachers rate their students but using a different adjective list than the one used by Digman et al. (1986). They selected five bipolar scales for each of the Big Five from the list of Goldberg's markers

(Goldberg, 1992). Again, five factors emerged. Factor analyses at different age levels revealed some age differences. Although three of the five factors, Agreeableness, Extraversion and Neuroticism, emerged as independent factors across all grade levels, Conscientiousness and Openness to Experiences factors emerged as distinct factors only in teacher ratings of children aged 6 to 8 and 8 to 10. In the teacher ratings of pupils aged 4 to 6 and 10 to 12, Conscientiousness and Openness seemed to blend into one common factor, with Openness marker loaded on Conscientiousness. This blend of Big Five Conscientiousness and Openness in teacher ratings of their students was also found when school children rated their peers (Mervielde & De Fruyt, 1992).

In addition to instruments based on Big Five dimensions, adjective lists based on other theories of personality structure have also been used in studying children's personality structure. For example, Tsoi and Nicholson (1982) conducted two studies, one on a preschool sample with a mean age of 5.7 years, and the other on a school-age sample with a mean age of 8.65 years. The teacher rating scale used was based on the Eysenckian dimensions. Four factors emerged in both samples, and were labeled Good Pupil, Extraversion, Psychoticism, and Neuroticism. Although the labels followed the Eysenckian tradition, they were clearly identifiable as Conscientiousness, Extraversion, Low Agreeableness and Neuroticism respectively in terms of the Big Five tradition. Some age effects were also reported. While Extraversion emerged as the first factor for the preschool sample, the Good Pupil (Conscientiousness) factor emerged first for the school age sample. Tsoi et al. (1982) suggested that teachers of younger children emphasized activity, while teachers of older children emphasized task-oriented behaviors.

The fact that the Openness factor is missing from Tsoi et al.'s (1982) studies is probably not surprising. Factor analysis methods have been characterized as data-driven, and the emergence and robustness of a factor depends on the number of relevant items for that factor in the instrument. In particular, the Eysenckian ENP model, on which Tsoi's rating scale was based, does not include an Openness or Intellect dimension. In the Digman study (1986), four adjective descriptors (knowledgeable, Sensible, Verbal, and Perceptive) were added in his rating scales as markers for the Intellect factor. Results show that the Intellect factor was as robust as the other four factors.

Taken as a group, it can be concluded from the above studies that the Big Five can be measured in teacher ratings of children ranging from preschool age to early adolescence using adjective lists based on adult personality studies (Shiner, 1998).

Studies Using the CCQ

Other studies have reported research on Big Five in younger age groups using the California Child Q-set (CCQ, Block & Block, 1980), a measure not created to assess the Big Five dimensions. The Big Five have been isolated in adults from the California Adult Q-Set (CAQ; McCrae, et al., 1986). One of the studies of a child sample was conducted by John, Caspi, Robins, Moffitt and Stouthamer-Loeber (1994). They factor analyzed mother ratings of CCQ on 350 boys between 12 and 13 years old and found seven factors. Five of the seven factors resembled the Big Five. The two additional factors were labeled Positive Activity and Irritability. In adult personality structure, these two factors were recognized as facets under the broad Extraversion and Neuroticism factors respectively. However, John et al. (1994) suggested the Positive Activity and Irritability factors were not simply facets of Extraversion and Emotional Stability, but were

relatively independent personality dimensions in early adolescence. The adolescent Extraversion and Neuroticism factors, on the other hand, were defined more narrowly, and better labeled as Sociability and Anxious Distress, respectively. It is further suggested that over the course of adolescence, Positive Activity merged with Sociability to form a single Extraversion dimension in adulthood, and Irritability and Anxious Distress merge into the Neuroticism factor (John et al., 1994).

Van Lieshout and Haselager (1994) analyzed 6 studies of a total of 720 children and adolescents aged from 3 to 18 using a Dutch translation of the CCQ. Principal component analyses of the overall sample resulted in a 7-factor solution. Five of the seven factors correspond to the adult FFM. Among them, Agreeableness and Emotional Stability were more robust than Extraversion and Conscientiousness, while Openness was the least robust factor and tended to include a broad range of items, such as physical attractiveness. The other two factors in the 7-factor solution were labeled Motor Activity and Dependency. Factor analyses were also conducted on subsamples of different age groups (kindergarten age, middle childhood and adolescence), and on subsamples of boys and girls. An extra factor labeled Irritability and Immaturity emerged for the subsample kindergarten age children and for the subsample of girls. It is also found that the Openness factor for the middle childhood and adolescence resembled the adult Openness factor.

To summarize, Big Five factors plus two other factors emerge from studies on child and adolescent personality using the CCQ. The fact that the Big Five were replicated in CCQ provided further evidence for the applicability of Big Five because the five dimensions were not built into the CCQ (Shiner, 1998).

Studies Using Free Descriptions

The studies reviewed so far have used either rating scales based on adult personality studies or other measures not specifically designed for assessing child personality characteristics. It is possible that some important characteristics salient to parents and teachers are not captured because they are not included in the measures used, also some dimensions may appear simply because they are already built into those measures.

The lexical approach to studying adult personality has been applied to the field of child personality. Instead of selecting personality adjectives from the dictionaries, child personality researchers have collected parental and teacher free descriptions of children (Kohnstamm, et al., 1998). The first cross-cultural study of child personality using the free description approach involved seven countries, including Belgium, China, Germany, Greece, Netherlands, Poland and the U.S. Free descriptions of children 3 to 12 years old were collected to create a dictionary of expressions used to describe personality in children. This “bottom-up” natural language approach is based on the assumption that parents and teachers spontaneously mention those characteristics that they think are most important or basic. In addition, it is also believed that parental free descriptions not only depend on their children’s personality characteristics, but also on what parents expect to see in children in their specific cultures, and therefore are culturally sensitive.

Parental free descriptions of children were coded according to a coding manual (Kohnstamm, Halverson, Mervielde & Havill, 1998), which was developed based on the Big Five. The results indicted that 80% of all the descriptors can be coded in terms of one of the Big Five categories. Specifically, Extraversion received the largest proportion of

descriptors, followed by Agreeableness and Openness to Experience, which in turn were followed by Conscientiousness and Neuroticism, although the last two also received substantial proportion of descriptors. In addition, the results demonstrated some age differences in the frequency of descriptors under each Big Five category (Slotboom, Havill, Pavlopoulos, & De Fruyt, 1998). For example, parents of older children use less high-end Extraversion descriptors, more high-end Agreeableness descriptors, and more low-end Conscientiousness descriptors than parents of younger children. There were no overall age differences in the Neuroticism descriptors.

The study also yielded some interesting cultural differences. For example, Chinese parents produced a large proportion of Conscientiousness descriptors. Chinese parents also used more low-end Conscientiousness descriptors than the other six countries. Parents in the U.S. were lowest in proportions of negative descriptors. Conscientiousness seems to be a more important personality trait to Chinese parents.

Those descriptors that parents and teachers use most frequently in describing children were then used to construct a child personality instrument: Inventory of Child Individual Differences (ICID, Halverson, Havill & Deal, 2002). It is believed the ICID captures those personality characteristics that are most salient to parents and teachers.

In conclusion, although empirical evidence supports the usefulness of the Big Five model as a theoretical framework for exploring personality structure in children, the major dimensions of child personality remains unclear. In addition, it is not clear whether the five factors extracted from child personality studies are the same as Big Five. More research is needed on the major dimensions of personality during childhood and on the emergence and development of the Big Five structure.

Temperament

Many researchers interested in individual differences in the behaviors of infants and young children have focused on the concept of temperament. While there is no universal agreement on the definition of this construct, there is general agreement on several points.

One is that temperament is a set of traits that reflects broad behavioral tendencies and gives coherence to behaviors across time and situation. Bates (1989) defines temperament as a set of behavioral dispositions that distinguish one individual from another. In addition, Bates thinks that these behavioral dispositions are manifested primarily in the context of social interaction. Chess and Thomas (1977) differentiate between behavioral style, motivation and ability, and define temperament as the style component of behavior rather than the motivation for or the contents of specific behavioral acts.

Second, there is also agreement that individual differences in emotionality/affectivity are central for defining temperamental characteristics. Behavioral tendencies, such as characteristic activity level, withdrawing from the unfamiliar, are regarded as manifestations, in part, of emotional reactivity. Allport (1937) views temperament as including the individual's characteristic affective qualities, such as prevailing quality and intensity of emotional reactivity. Goldsmith et al. (1987) view temperament as individual differences in the expression of primary emotions. Martin et al. (1999) have also argued that emotionality, including both positive and negative emotionality, is at the heart of what can be labeled temperamental behaviors.

A third point of agreement is that temperament characteristics can be observed early in life. Buss and Plomin (1984) considered early appearance as a requirement for a trait to be considered a temperament dimension. Specifically, they required that temperament traits emerge during the first year of life.

There is also agreement that temperament traits have their origins in the biology of the individual, although the expression of these biologically determined individual characteristics could be influenced by developmental events and environmental experiences. Buss and Plomin (1984) considered heritability as another characteristics of temperament traits, and defined temperament as a heritable biological predisposition for a particular behavior style. Rothbart defined temperament as "constitutional differences in reactivity and self-regulation, with 'constitutional' seen as the relatively enduring biological makeup of the organism influenced over time by heredity, maturation, and experience" (Rothbart & Derryberry, 1981, p. 37). Temperament functioning is seen as influenced by maturation and experience. Because of its biological foundation, temperament traits are likely to demonstrate heritability and continuity of expression across time (Goldsmith et al., 1987).

Temperament Structure-Traditional Models

Although there is agreement that temperament is a multi-dimensional construct, there is some disagreement on the structure of temperament. Traditional models of temperament include those developed by Thomas and Chess (1977) and by Buss and Plomin (1984).

The study of temperament in childhood has long been dominated by the nine-dimensional structure proposed by Thomas & Chess (1977). These nine dimensions of

temperament are Activity Level, Rhythmicity, Approach/Withdrawal, Adaptability, Mood, Threshold, Intensity, Distractibility, and Persistence/Attention Span. Thomas and Chess's model was developed for clinical purposes and was not theoretically derived. In addition, the nine dimensions were based on observations of infants and young children (Thomas, Chess, & Birch, 1968), and may not be developmentally appropriate when studying older children.

Thomas and Chess's nine-dimensional model has had a profound impact in the field of temperament, and many parent and teacher temperament questionnaires were developed based on this model. Factor analyses have been conducted to provide empirical evidence for these nine dimensions. Martin, Wisenbaker and Huttunen (1994) reviewed 12 studies using questionnaires that were developed based on Thomas and Chess's model. They demonstrated factor analytical evidence for five factors. These include Activity Level, Task Persistence, Social Inhibition, Negative Emotionality, and Adaptability. Rhythmicity and Threshold have also appeared in several studies.

Buss and Plomin (1984) took a different approach and developed a temperament model by specifying criteria for a trait to be considered a temperament dimension, including evidence of substantial heritability and appearance within the first year of life. According to these criteria, four temperament traits were represented in their original temperament model. These four dimensions were labeled Emotionality, Activity, Sociability and Impulsivity, which gave rise to the acronym EASI. Impulsivity was later dropped from the model because of a lack of evidence of heritability (Goldsmith et al, 1987), and this resulted in the current EAS model of temperament.

Martin and Bridger (1999) points out that although traditional models of temperament are valuable for temperament research in general, and instrument development in particular, they fail to take into account the many important theoretical and empirical development that have occurred since the 1980's.

Temperament Structure-Recent Developments

The temperament models developed by Rothbart, Martin and their colleagues are recent additions to the temperament literature. Both have based their models on recent theoretical and empirical development in the field of temperament, including the neurobiological processes underlying temperament.

One such development comes from the research conducted by Gray (1991). Gray has hypothesized that there are three major brain systems that may form the neurological foundation for important aspects of temperament. Two of these systems have received most attention from temperament researchers. They are referred to as the behavioral inhibition system (BIS) and the behavioral activation system (BAS). Gray also included a third fight/flight system. The essential defining characteristic of the BIS and BAS is their responsiveness to cues of punishment and to cues of reward. The BIS is the set of structures that is particularly responsive to cues of punishment, and the BAS is the set of structures that is particularly responsive to cues of reward. According to Gray, both systems are present in all individuals, although there are large individual differences in the sensitivity of these systems. In addition, the BIS and BAS are hypothesized to be independent of each other. Martin has theorized a two-factor model of temperament in part based on Gray's research. Rothbart has also related her temperament dimensions to Gray's BIS and BAS.

Other theoretical and empirical development has also influenced the temperament research. For example, based on research on the development of attention system, Rothbart and colleagues (Rothbart, 1989) have suggested that individual differences in attentional self-regulation represent a basic dimension of temperament.

In addition to using contemporary theory to identify central constructs of temperament, recent developments in research on temperament structure have gone hand in hand with instrument construction. Rothbart and her colleagues constructed a temperament instrument, the Child Behavior Questionnaire (CBQ, Rothbart et al. 2001) to assess theoretically derived temperament dimensions. CBQ includes fifteen scales measuring a variety of temperament characteristics: Activity Level, Anger-Frustration, Attention Focusing, Discomfort, Fear, High-intensity Pleasure, Impulsivity, Inhibitory Control, Low-intensity Pleasure, Perceptual Sensitivity, Positive Anticipation, Sadness, Shyness (versus Social Aapproach), Smiling/Laughter, Soothability (taken from Rothbart et al., 2001, p1406).

Factor analyses of these fifteen scales repeatedly indicate three higher order factors across age and samples (Ahadi, et al., 1993, Rothbart, et al., 2001). They are labeled Extraversion (Surgency), Negative Affectivity, and Effortful Control. According to Ahadi and Rothbart (1994), the Extraversion (Surgency) factor indicates an underlying positive emotion, approach, or reward orientation, and represents the behavioral manifestation of Gray's (1981) Behavioral Activity System. The Negative Affectivity factor is conceptualized as general threat sensitivity with accompanying negative affect, and is related to Gray's (1987) Behavioral Inhibition System. The Effortful Control factor

is conceptualized as a superordinate self-regulatory system that can assert control over other temperament systems.

Martin and Bridger (1999) have argued for a two-factor model of temperament. According to Martin, Inhibition and Impulsivity are the two higher order dimensions underlying various temperament traits. Inhibition is viewed as a marker for individual differences in the sensitivity of the behavioral inhibition system (Gray, 1991). It is reflected in the tendency to withdraw from novel situations, to be hesitant in approaching unfamiliar people, and to be cautious about engaging in new activities. Impulsivity is theorized to be behavioral manifestations of the behavioral Activation System. It is represented by behaviors indicating an active, reward dependent interaction with the environment.

Empirical evidence in support of Martin's two-factor model comes from studies using his Temperament Assessment Battery for Children-Revised (TABC-R) (Martin et al., 1999). The TABC-R includes four temperament scales and one aggregate scale. The four scales are Inhibition, Activity Level, Negative Emotionality, and Lack of Task Persistence. The Impulsivity aggregate scale is made up of the last three of the four scales. Martin and Bridger (1999) found that Inhibition ratings by both parents and teachers were correlated near zero with the aggregate impulsivity ratings. They also found that Negative Emotionality, Activity Level, and Lack of Task Persistence are moderately to highly correlated. Empirical evidence demonstrating that Inhibition and Impulsivity are orthogonal to each other seems to support the theoretical ideas connecting inhibition and impulsivity to the BIS and BAS systems.

In summary, competing theories on the basic dimensions of temperament exist, and the adequacy and usefulness of these newly developed models are yet to be tested. Compared with the growing consensus on the structure of personality in adults, the lack of consensus on the structure of temperament makes comparison of research findings difficult. Most researchers have now realized the need to unify the temperament study by finding a common language. Kohnstamm, Halverson, Mervielde and Havill (1998) pointed out that progress in the field of temperament "would be facilitated if consensus were reached on what the most important and 'basic' dimensions of temperament are in infancy, in childhood, and in adolescence." (p. Vii)

Relationship between Temperament and Personality

There is a conceptual connection between temperament and personality. The term temperament is often reserved for individual differences in infancy and childhood, and the term personality is usually used to refer to individual differences in adolescents and adults. Hagekull (1994) simply conceptualizes temperament as early appearing personality traits. Digman (1994) also related the differences between temperament and personality dimensions to the different ages of the subjects. Although it is not clear as to at what age it is appropriate to begin to think about individual differences in young children as reflective of personality as opposed to temperament, it is widely accepted that the early appearing, biologically entrained temperament traits provided a foundation for later personality (Goldsmith et al., 1987). For example, Buss (1989) describes temperaments as basic building blocks for personality. Personality, on the other hand, is thought of as resulting from the interaction of temperament base with maturation and social environment. In addition to conceptual connection, temperament and personality

also share methodological similarities in the manner they are assessed and in the use of factor analysis for defining structure (Hagekull, 1994).

Big Five and their Temperament Precursors

The growing consensus on the Big Five in the adult personality studies also inspired great interest in linking temperamental characteristics to the five personality factors. Ahadi and Rothbart (1994) have stated that the Big Five provided us with a target framework for attempting to identify how infant and child temperamental dimensions connect with later personality dimensions. A number of researchers have attempted to identify possible developmental precursors of the five personality factors (Martin et al., 1994; Ahadi & Rothbart, 1994; Hagekull, 1994; Digman, 1994).

Although there is no agreement on the temperament traits that are fundamental for the development of personality, some of the precursors of the Big Five seem to be recognizable. Martin et al. (1994) concludes that individual differences in seven temperamental characteristics have been most widely studied. Using these seven temperamental characteristics as a starting point, they provide hypotheses regarding the possible developmental antecedents of the Big Five factors.

According to their hypotheses, most of the temperamental characteristics can be linked to more then one Big Five personality factors. For example, Activity Level assessed in childhood and adolescence seems to developmentally precede Extraversion. Activity Level assessed during infancy may be developmentally predictive of Neuroticism; since emotionality and activity level are clearly linked in infancy. Negative Emotionality is conceptually linked to both Agreeableness and Neuroticism. Adaptability may also link to both Agreeablenss and Neuroticism in adulthood. Inhibition

is related to both Extraversion and Neuroticism. Also according to the hypotheses offered by Martin et al. (1994), the only temperamental characteristics that has a one-to-one correspondence with a personality factor is Lack of Persistence, which is linked to Conscientiousness. Martin et al. (1994) indicate that it is difficult to form hypotheses about the link between Biological Rhythmicity and Threshold and the Big Five dimensions.

Although Martin et al. (1994) identified temperament traits as possible precursors for four of the Big Five personality dimensions, they do not demonstrate developmental connections between temperament factors and the Openness to Experience factor. It is suggested that temperamental factors of childhood are probably not related to Openness, which may be predicted from childhood cognitive abilities.

Rothbart and colleagues (Ahadi et al., 1994; Rothbart et al., 2001) also explore the relations between major temperamental dimensions in infancy and the Big Five in adulthood. They discuss possible developmental precursors of later personality factors on the level of higher-order temperament factors, rather than on the level of individual temperament trait. Rothbart et al. (2001) suggested that her three higher order temperament factors correspond to three of the five Big Five factors. Specifically, the Extraversion (Surgency) factor corresponds to the Big Five Extraversion/Positive Affect, the Negative Affectivity factor corresponds to Neuroticism, and the Effortful Control factor to Conscientiousness. Rothbart and colleagues do not relate any temperamental factors to the Big Five Agreeableness and Openness factors.

Sources of Information: Mother versus Teacher

Martin et al. (1994) suggest that the issues of structure are conceptually more complex in childhood due to the rapid developmental changes. Studying child temperament and personality is further complicated by the fact that children are not capable of providing self-report on their temperament and personality. Halverson et al. (1994) emphasized the importance of considering the sources of information on child temperament and personality. This is important partly because the correlations between parent and teacher reports are low. Achenbach, McConaughy, and Howell (1987) reviewed studies involving different sources of information on behavior problems and temperament in children and adolescents and reported that the mean correlation between parent and teacher ratings was .27.

Parents and teachers see behaviors in different environments. Home and school are the two most important social contexts for children, and they present different expectations and demands. Children behave differently at home and in school. It is not that their temperament and personality changes, but that the expression of temperament and personality is influenced by social contexts.

The relative salience of temperament and personality characteristics is also different depending on the situation. For example, Halverson et al. (1994) suggests that Negative emotions have a greater salience at home than at school. Children express these emotions more readily at home, while in the school, most children inhibit intense emotional expression. On the other hand, issues of activity level are highly salient in the school because focused attention is a critical behavior in this environment.

Observing children in school settings limits the range of observable behaviors, but the same is true for parents observing children in home settings (Mervielde, 1994). For example, teachers are in an excellent position to observe social inhibition early in the school year. As the child becomes more familiar with the school or day care environment, it may be more difficult for teachers to rate this behavior accurately. Teachers can provide information about the child that is sometimes unobtainable by parents. For example, task persistence is not as easily assessed by mothers of preschool children as by teachers. This temperamental characteristic is most easily observed when the child is asked to perform a difficult learning task. Therefore, teachers have the advantage to see individual differences in this behavior. Parents, on the other hand, less often put children in this type of situation.

In addition to the above differences, teachers observe the behaviors of children in the context of a same age cohort, and therefore have a normative group to compare the behaviors of a target child. Parents, on the other hand, have little normative information.

Teacher and parent ratings may give rise to different factor structures on scales designed to measure the same constructs. Martin et al. (1994) find that factor analyses of teacher ratings of child temperament on measures derived from the Thomas and Chess model typically result in three factors, whereas parent ratings using the same measures typically produce five to seven factors.

There is some evidence that parent and teacher ratings have differential validity (Halverson et al., 1994). For example, parental temperament ratings of emotional intensity, mood, or negative emotionality have been found by a number of researchers to predict emotional problems or behavior problems in children (e.g., Thomas & Chess,

1977). Parental temperament ratings of task persistence, activity level, or distractibility have, however, typically been found to be weak or nonsignificant predictors of academic achievement (e.g., Burk, 1980). A reverse pattern seems to emerge from teacher ratings. That is, there is evidence that teacher ratings of activity level, distractibility, and task persistence of school age children relate substantially to academic achievement. However, teachers often have difficulty rating the factors of emotional intensity and mood (Presley & Martin, 1994).

Because parents and teacher observe the behaviors of children in different environments, parent report and teacher reports are both important sources of information about children. To date, there has been a lack of studies where both parent and teacher ratings are available on the same group of subjects.

Purposes of Study

The principal purpose of the current study is to determine the major dimensions of personality in teacher ratings of Chinese children using the ICID. A second purpose of this study is to examine the relationship between two sets of child personality factors (i.e., the ICID factors and the DSS facctors) that are developed based on completely different approaches. Further, this study investigates the relations between temperament traits and personality dimensions.

The literature reviewed in this chapter seems to lead to the following hypotheses regarding the factor structure of the ICID, the degree of correspondence between the ICID factors and the DSS factors, and the relations between temperament traits and personality dimensions.

Hypothesis I: Exploratory factor analysis of the ICID is expected to result in 3 or 4 factors. The rational for this hypothesis is based on the review of child temperament studies using measures based on the Thomas and Chess model (Martin, et al., 1994). It seems that factor analyses of teacher ratings of child temperament produce fewer factors than parent ratings. In other words, teachers do not seem to differentiate some constructs the way parents do.

Hypothesis II: Each of the factors that are developed from the ICID is expected to correlate significantly with one or more of the DSS factors, although the number of factors from factor analyzing the ICID is not expected to be the same as that from factor analyzing the DSS.

Hypothesis III: If correlation analysis of TABC-R scales supports a two-factor model of temperament, the higher order temperament dimensions are expected to account for a substantial amount of variance in each of the personality factors developed from the ICID. There is a conceptual connection between temperament and personality and most researchers agree that child temperament provides a foundation for later personality. If correlation analysis does of support a two-factor temperament model, the individual TABC-R scale is expected to account for a substantial amount of variance of each ICID factors.

CHAPTER 3

METHODS

Subjects

Teachers participating in this study came from one kindergarten and one elementary school in the city of Dalian, a capital city located in Northeast China. The majority of teachers were female. Each teacher rated about twenty children in his/her class.

In China, kindergartens are full time programs for children between 3 and 5 years of age and serve the dual purposes of childcare and educational preparation. Children in kindergarten are generally grouped by age: juniors (3-year-olds), middle (4-year-olds) and seniors (5-year-olds). The class size in kindergarten is 25-40 children. Each kindergarten class has a lead teacher and at least one assisting teacher. The official age to enter elementary school is 6. The relative age at each grade level is the same as that in the U.S. The class size at elementary school is 40-50 students and there is a lead teacher for each class. Curriculum at the elementary school level is more or less comparable to that in the U.S., with emphasis on reading and math. However, unlike the U.S., different subjects are taught by different teachers. A typical school day is divided into 6 class periods, four in the morning and two in the afternoon, with each class period lasting 45 to 50 minutes. There is a 10 to 15-minute recess time after each class period.

A demographics page was completed for each child rated, including the child's gender, age, and grade level. Demographic data are provided in Table 3. The sample for this study included 657 children (312 boys, 333 girls, 12 with missing data) aged 2 to 13

years. These children were enrolled in kindergarten (26% of the children) and in the first through sixth grades in elementary school (74% of the children). Among elementary school children, most came from second and third grades. Although no ethnicity information is available, the majority had Han ethnic background. Han is the major ethnicity, which accounts for more than 90% of the total population of China.

Instrumentation

Three instruments were used in this study. The items included in these instruments are given in Appendix A, B and C respectively.

Temperament Assessment Battery for Chilren-Revised

The Temperament Assessment Battery for Children-Revised (TABC-R, Martin & Bridger, 1999) was designed to assess temperamental characteristics of children 2 to 7 years of age. It was originally developed based on the work of Thomas and Chess (1977) and was later revised based on current temperament theory and factor analytic studies. TABC-R has a Parent Form and a Teacher Form. The Teacher Form was used in this study. TABC-R-Teacher Form has 29 items rated on a 7-point Likert-type scale ranging from “hardly ever” to “almost always”.

The TABC-R-Teacher Form includes four temperament scales and one aggregate scale. The four scales are Inhibition, Activity Level, Negative Emotionality, and Lack of Task Persistence. The Impulsivity aggregate scale is made up of the last three of the four scales. The Inhibition scale assesses social inhibition and measures a child’s tendency to physically withdraw or to become emotionally upset when meeting unfamiliar people (e.g., child is shy with adults he/she does not know.) The Negative Emotionality scale measures a child’s tendency to become emotionally upset (e.g., child gets upset with

other children). The Activity Level scale assesses the tendency to engage in energetic gross motor activity (e.g., child seems to have difficulty sitting still). The Lack of Task Persistence scale measures different aspects of attention and the ability to continue a task that is difficult (e.g., child starts an activity and does not finish it). Negative Emotionality, Activity Level, and Lack of Task Persistence make up the Impulsivity aggregate scale. Martin et al. (1999) has theorized that the Inhibition and the Impulsivity dimensions are generally unrelated, while the scales that make up the Impulsivity dimension are generally correlated with each other. The correlations among TABC-R scales support this hypothesis.

Martin et al. (1999) demonstrated that the TABC-R-Teacher Form has adequate reliability. Reliability data include internal consistency reliability and test-retest reliability. The internal consistency reliabilities for the TABC-R-Teacher Form scales range from .86 to .93. The short-term test-retest reliability (4 to 8 weeks) ranges from .47 to .71. Preliminary validation studies indicated that the TABC-R scales were correlated in meaningful ways with child behavior problems, cognitive abilities, and personality traits.

It should be noted that the TABC-R was originally designed for younger children (i.e., 2 to 7 years). In this study, a few changes were made to make some items more appropriate for use by Chinese teachers when rating older children.

Inventory of Child Individual Differences

The Inventory of Child Individual Differences (ICID, Halverson, Havill & Deal, 2002) is a child personality instrument designed for use with children 3 to 12 years of age. The parent form and the teacher form of the ICID are the same. During a preliminary study conducted by separate researchers in different countries (Kohnstamm, et al., 1998),

Table 3 Demographic Characteristics of Children

Characteristics		n	%
Child Gender			
	Male	312	47.50%
	Female	333	50.70%
	Missing Data	12	1.80%
Child Age in Years			
	Two	6	0.90%
	Three	39	5.90%
	Four	8	1.20%
	Five	66	10.00%
	Six	55	8.40%
	Seven	113	17.70%
	Eight	106	16.10%
	Nine	50	7.60%
	Ten	15	2.30%
	Eleven	123	18.70%
	Twelve	57	8.70%
	Thirteen	6	0.90%
	Missing Data	13	1.80%

parents and teachers were asked to provide free descriptions of their children. The descriptors were then categorized, and the most representative descriptors in each category were used in the construction of the ICID. The ICID currently consists of 144 items rated on a 7-point Likert-type scale ranging from “Much Less than the Average Child” to “Much More than the Average Child”.

Based on analyses of ICID data obtained in three countries (U.S., Greece, and China), 15 scales were determined to represent culturally decentered personality traits in children (Halverson, et al., 2002). These 15 scales are: Achievement Orientation (e.g., has a drive to do better), Activity Level (e.g., energetic), Antagonism (e.g., aggressive towards others), Compliance (e.g., cooperative), Considerate (e.g., sensitive to others’ feelings), Distractible (e.g., easily distracted), Fear/Insecure (e.g., afraid of a lot of things), Negative Affect (e.g., moody, whiny), Open to Experience (e.g., curious, creative), Organized (e.g., does things carefully and with thought), Positive Emotions (e.g., cheerful), Intellect/Quick to Learn (e.g., quick to understand what is said or going on), Shy (e.g., slow to warm up to new people or situations), Sociable (e.g., loves to be with other people), and Strong Willed (e.g., wants things his/her own way).

The ICID has been shown to have adequate internal consistency reliability, with alpha coefficients for different age groups ranging from .71 to .94 (Halverson, et al., 2002). Preliminary validity data, including factorial validity, correlations with behavioral problems and temperament dimensions, were also available.

Digman and Shmelyov Scale

The Digman and Shmelyov Scale (DSS) is an adjective rating scale used by Digman and Shmelyov (1996) in their study on the structure of temperament and

personality in Russian children. The DSS adjectives were drawn from various sources, including previous research on child personality by Digman and colleagues (Digman & Inouye, 1986; Digman, Takmoto-Chock, 1981), temperament literature (e.g., the work by Martin and by Rothbart), as well as Russian educators knowledgeable of the concepts commonly used to describe Russian children. Compared with the ICID, which is based on a free description approach, the DSS is based on a completely different approach. It includes child individual differences that are considered important by researchers. The DSS consists of 60 unipolar adjectives rated on a 7-point Likert-type scale ranging from "Much Less than the Average Child" to "Much More than the Average Child".

Exploratory factor analysis of the DSS resulted in a five-factor model, which clearly mirror the adult Big Five model. Factor 1 is the Extraversion dimension of the Big Five, indicated by such terms as gregarious, cheerful and (negatively) withdrawn. Factor 2 is the Agreeableness dimension, indicated by such terms as considerate and (negatively) jealous and spiteful. Factor 3 is the Conscientiousness dimension (e.g., conscientious, planful, and persevering). Factor 4 is the Emotional Stability-Neuroticism dimension (e.g., touchy and complaining). Factor 5 is the Intellect dimension (e.g., original, perceptive, and imaginative).

The Digman and Shmelyov (1996) study demonstrated the usefulness of the Big Five model in organizing child individual differences. Data from a large cross-culture sample indicated that the five DSS scales have high coefficient alphas, ranging from .73 (Openness) to .89 (Conscientiousness).

Translation of the TABC-R, the DSS and the ICID was conducted in three steps. First, the original instruments were translated into Chinese by the author of this study,

who is knowledgeable about the psychological constructs of interest and is fluent in both Chinese and English. Next, the Chinese versions were backtranslated into English. Revision of the Chinese versions was made by comparing the original and the backtranslated English versions. Finally, both the English and the Chinese versions of these instruments were sent to Wen Liu, an assistant professor at Liao Ning Teachers' College. Ms. Wen conducted an independent translation of these instruments. Her translation was then compared with the Chinese versions of the author and the final versions were formed.

Procedure

The data used in this study were collected by Ms. Wen Liu, an assistant professor from the Department of Education, Liao Ning Teachers' College in her home city Dalian. The data were collected on two occasions, in September 2000 and May 2001 respectively. The same procedures of collecting data were followed on both occasions. First, Ms. Liu contacted the principals of one kindergarten and one elementary school in order to obtain permission for the data collection. Next, Ms. Liu gathered the teachers together in a group meeting and explained the detailed procedures, including the specific instructions for completing the rating scales. Each teacher rated about twenty children in her/his class. For each child rated, the teacher completed a questionnaire packet, which included the ICID, the TABC-R and the DSS. The number of questionnaires collected in September 2000 was 303, and that in May 2001 was 254.

Data Analysis

The data collected will be analyzed to answer the following three questions: 1) what is the factor structure underlying the 15 ICID scales for this Chinese data set? 2)

how do the ICID factors, developed based on a bottom-up approach, relate to the DSS factors, developed based on a top-down approach? 3) how much variance of the ICID factors can be explained by temperament traits, as measured by the TABC-R

Before answering those questions, it is first necessary to conduct reliability analyses in order to determine whether all the scales are internally consistent for the current sample. Scales that have an alpha coefficient above .70 will be considered to have adequate internal consistency reliability.

For the first question, exploratory factor analysis using Principle Axis Factoring (PAF) analysis will be conducted to determine the factor structure of the 15 ICID scales. Factor analysis results, Eigenvalue-1 criteria, Scree test and theoretical consideration will all be used to determine the final number of factors extracted. In addition, Direct Oblimin rotation method will be used to examine the intercorrelations among the factors. Factor analysis procedures will also be conducted on subsamples of younger children (age 3 to 7 years), older children (age 8 to 12 years), boys and girls.

For the second question, data analyses will begin by conducting an exploratory factor analysis to determine the factor structure of the DSS in the current data set. Again, Factor analysis results, Eigenvalue-1 criteria, Scree test and theoretical consideration will all be used to determine the final number of factors extracted. Next, factor scores for the ICID factors and for the DSS factors will be derived respectively. Finally, a correlation analysis will be conduced on the ICID factors and the DSS factors and the results will be summarized in a matrix of correlations. In the present study, a correlation is considered high if the correlation coefficent is at or above .70, moderate if it is between .40 and .69, mild if it is between .20 and .39. The relationship is orthogonal if the correlation

coefficient is below .20. For each ICID factors, if it is highly correlates with one DSS factor and is orthogonal to other DSS factors, then it is assumed to have a one-on-one correspondence with that DSS factor.

For the third question, the following data analyses will be conducted. First, a correlation analysis will be conducted on the TABC-R scales to assess whether the correlations among scales support the theoretical hypotheses that Inhibition and Impulsivity dimensions are generally unrelated, and the scales that make up the Impulsivity dimension are generally correlated. If those hypotheses are supported, which suggests the existence of two higher order temperament factors, a factor analysis with a forced 2-factor solution and Varimax rotation will be conducted. Factor scores will be formed based on the factor analysis results. Multiple regression analyses will then be conducted to examine how well the two temperament dimensions predict personality factors in the current data. Even though the data were collected at the same time, temperament dimensions will be used as predictors and personality dimensions as criteria in the regression analysis. If, however, the current data do not support a two-factor model, the four TABC-R scales will be used as predictors in the multiple regression analyses.

CHAPTER 4

RESULTS

Reliability

In the present study, Chinese teachers completed the Inventory of Child Individual Differences, the Digman & Shmelyov Scale and the Temperament Assessment Battery for Chilren-Revised on children 3 to 12 years old. Reliability analyses were conducted to determine whether all the scales from the three instruments used are internally consistent for the current Chinese teacher sample. Scales that have an alpha coefficient above .70 were considered to have adequate internal consistency reliability.

The alpha coefficients for the ICID, the DSS and the TABC-R scales are presented in Table 4, 5 and 6 respectively. Ten out of the fifteen ICID scales had alphas over .70. Among the remaining five scales, Activity Level (alpha .69), Fearful-Insecure (alpha .68) and Shy (alpha .68) had alphas close to .70. The Positive Emotion scale had an alpha of .60. However, if one of the items (Item 77: My child is affectionate) was deleted, the alpha increased to .80, indicating that that particular item may represent a different construct for Chinese teachers. The Strong Willed scale has an alpha of .60.

All five scales from the DSS had alpha coefficients over .70. For the four TABC-R scales, Inhibition and Lack of Persistence had alphas over .70. The Activity Level scale (alpha .60) only had 4 items, which may have accounted for the relatively low alpha coeffient. The Negative Emotionality scale had an alpha of .67. If one of the items (Item 18: When child loses a game, he/she takes it lightly) was deleted, the alpha increased to .73.

Overall, reliability analyses based on alpha coefficients indicated that most of the ICID and TABC-R scales were internally consistent for this sample based on ratings of Chinese teachers.

Descriptive Statistics

Scale scores were derived by first converting raw scores into standardized z-scores with a mean of 0 and a standard deviation of 1. This standardization process allowed for more direct interpretation of scores, as they were normed on this Chinese sample. Items worded in the reverse direction were recoded. The scale score was derived by summing the z-scores of all the items included in each scale.

Descriptive statistics for the ICID scales, the DSS scales, and the TABC-R scales are reported in Table 4, 5 and 6 respectively. Statistics reported include sample size, means and standard deviation, minimum, maximum and range.

Exploratory Factor Analysis

Inventory of Child Individual Differences

In order to determine the underlying structure of the fifteen ICID scales, the correlation matrix was submitted to an exploratory factor analysis. A Principle Axis Factoring (PFA) analysis was performed to identify the latent structure of these scales.

Three factors had eigenvalues greater than 1. However, a scree test indicated the presence of four factors. Forced two-factor and five-factor solutions were also conducted. The forced 5-factor solution was not successful and the extraction was terminated when the communality of a variable exceeded 1.0. Tables 7, 8 and 9 present the four-factor, three-factor, and two-factor structures of the ICID scales, including those loadings that are at or above .40. Based on examination of the salient variables and their loadings

obtained in the above factor analyses, in addition to theoretical considerations, the 4-factor solution was selected as representing the underlying structure of the fifteen ICID scales in this data set. The Big Five theory of personality structure served as a theoretical basis in interpreting the ICID factor structure.

In the four-factor solution, factor 1 is represented by seven scales: Considerate, Compliance, Positive Emotions, Sociable, Achievement Orientation, Open to Experience and Intellect/Quick to Learn. The Intellect/Quick to Learn scale loaded primarily on factor 4 and secondarily on factor 1. In terms of Big Five theory, this factor is a combination of Agreeableness, Extraversion and Intellect/Openness. Given that this factor represents a 'super' factor, it is difficult to find a label that can capture its nature. For the present study, factor 1 was labeled as the Good Child factor.

Factor 2 in the four-factor solution included three scales: Strong Willed, Negative Affect and Antagonism. Factor 3 is represented by two scales: Shy and Fear-Insecure. These two factors seemed to represent two different aspects of the Big Five Neuroticism factor and were labeled as Irritable Neuroticism and Fearful Neuroticism respectively.

Factor 4 in the four-factor solution was represented by three scales: Distractible, Organized (negatively loaded) and Activity Level. This factor is recognizable as a lack of conscientiouness and was labeled as Low Conscientiousness. These 4 factors together accounted for 71.76% of the variance.

In the three-factor solution, scales that comprised factor 4 in the four-factor solution were combined into factor 1 and factor 2, while factor 3 remained the same as factor 3 in the four-factor solution. These three factors accounted for approximately 67 percent of the variance. In the two-factor solution, one factor includes scales that

comprised factor 1 and factor 3 in the four-factor solution, while the other factor includes scales that comprised factor 2 and factor 4 in the four-factor solution. These 2 factors accounted for 57.74 percent of the variance.

In order to identify the structural relations among the four ICID factors, they were subjected to a Direct Oblimin rotation analysis. The factor correlation matrix is presented in Table 10. The highest correlation coefficient (between the Good Child and Low Conscientiousness factors) was -.42. Low Conscientiousness factor was moderately or mildly correlated with all three other factors, with correlation coefficients ranging from .20 to .42. Irritable Neuroticism and Fearful Neuroticism were orthogonal to each other, with a correlation coefficient of -.02. Overall, none of the correlation coefficients exceeded .45. However, the few moderate correlations did not support the conceptualization of the ICID factors as orthogonal.

Age and gender differences in ICID factor structures were examined next. Factor analyses with a forced 4-factor solution were conducted for two age groups (younger age group: 3-7 years and older age group: 8-12 years) and for boys and girls separately. Table 11 presents the comparison of the factor structure of the younger and older age groups. Similar but not invariant factor structures were found for these two age groups. The major differences were that for the younger age group, Acitivity Level covaried with Shy and Fear/Insecure and loaded on the Fearful Neuroticism factor. However, for the older group, Activity Level loaded on Low Conscientiousness. The factor structure for the older age group was a clear replication of that of the total sample.

Table 12 presents the comparison of the factor structures of boys and girls. The factor structures and item loadings were similar across genders, but there were several

exceptions. For boys the Intellect/Quick to Learn Scale (loaded on the Good Child factor for the total sample) loaded on the Low Conscientiousness factor. Second, for boys, the Activity Level scale (loaded on the Low Conscientiousness factor for the total sample) loaded on the Irritable Neuroticism factor. The factor structure for girls was a clear replication of that of the total sample.

Overall, factor analyses of the ICID resulted in a four-factor solution, which was also consistent across age and gender. These results offer considerable support for the hypothesis that less than five factors emerge from teacher ratings of child individual differences.

Digman & Shmelyov Scale

The second research question this study examined was the degree of correspondence between the ICID factors and the DSS factors. Before answering this question, it is first necessary to determine the underlying factor structure of the DSS. Digman and Shmelyov (1996) reported a five-factor structure of the DSS in their study based on a Russian teacher sample.

An exploratory factor analysis using Principle Axis Factoring as a method of extraction was conducted. The Eigenvalue-1 criterion produced a ten-factor solution. However, a scree test indicated the presence of three factors. Factor analyses with forced four- and five-factor solutions were also conducted. After comparing the three-, four- and five-factor solutions, the three-factor solution was chosen as representing the underlying structure of the DSS. When determining the DSS factor structure, Goldberg's (1992) adjectives were used as markers for the Big Five factors. It is noted that although Digman and Shmelyov (1996) obtained a five-factor structure using the DSS, the five-factor

solution (presented in Table 14) derived in the present study did not seem to fit well with Goldberg's (1992) operationalization of the Big Five factors. Table 13 presents the three-factor structure of the DSS. The majority of the loadings were at or above .40, although a few loadings below .40 were also reported.

In the three-factor solution, factor 1 mainly consisted of adjectives that are indicators for Conscientiousness, such as thoughtful, conscientious, diligent and focused. This factor was interpreted as, and labeled Conscientiousness. In addition to Conscientiousness indicators, indicators for Agreeableness (e.g., considerate and trusting) and Intellect/Openness (e.g., knowledgeable and imaginative) also loaded on this factor, although their loadings were lower.

Factor 2 in the three-factor solution was represented by adjectives that are indicators of Neuroticism, such as angry, complaining, tearful and dependent. This factor was interpreted as, and labeled Neuroticism. Factor 3 in the three-factor solution was represented by adjectives that are indicators of Extraversion-Intraversion, such as withdrawn, constrained, energetic and gregarious. It was interpreted as, and labeled Extraversion. These 3 factors together accounted for 41.5 percent of the variance.

These three factors were then submitted to a Direct Oblimin rotation analysis, and the factor correlation matrix is presented in Table 15. None of the correlation coeffients exceeded .11. This result indicated that these three factors were orthogonal to each other.

Relationship between ICID factors and DSS factors

Factor analysis of the ICID resulted in a four-factor solution, while that of the DSS resulted in a three-factor solution. The relation between these two sets of factors was investigated by first calculating a factor score for each of the ICID and DSS factors. For

the ICID, a factor score was derived by summing scores of scales loaded positively and subtracting scores of scales loaded negatively. For the DSS, raw score for each item was converted into a standardized z-score. The factor score was derived by adding up z-scores of items loaded positively and subtracting z-scores of items loaded negatively.

An intercorrelation matrix of the ICID and DSS factors was computed and presented in Table 16. The ICID Good Child factor was highly or moderately correlated with all three DSS factors, with correlation coefficients ranging from .81 (with the DSS Conscientiousness factor) to .35 (with the DSS Neuroticism factor). The ICID Irritable Neuroticism factor was hightly correlated with the DSS Neuroticism factor (.72), mildly correlated with the DSS Conscientiousness factor (-.25), and was orthogonal to the DSS Extraversion factor (.04). The ICID Fearful Neuroticism factor was moderately correlated with two DSS factors, the DSS Extraversion factor (.56) and the DSS Neuroticism factor (.44). It was also mildly correlated with the DSS Conscientiousness (-.21). For the ICID Low Conscientiusness factor, it was moderately correlated with two DSS factors, the DSS Conscientiousness factor (-.69) and the DSS Neuroticism factor (.53). It was orthogonal to the DSS Extraversion factor (.16).

In summary, an examination of Table 16 indicated that the majority of the correlations between ICID factors and DSS factors were moderate to high. Each of the four ICID factors can be related to one or more of the DSS factors. However, there was no one-on-one correspondence between ICID factors and DSS factors.

Regression Analysis

Correlations among the TABC-R Scales

A correlation analysis was conducted on the TABC-R scales to assess whether the correlations among them support the theoretical hypotheses that the Inhibition scale and Impulsivity scales are generally unrelated, while the scales that comprise the Impulsivity dimension (i.e., Negative Emotionality, Activity Level and Lack of Task Persistence) are generally correlated.

The intercorrelations among the TABC-R scales are presented in Table 17. An examination of the correlation matrix indicated that both hypotheses were only partially supported. For the three scales that comprised the Impulsivity dimension, the Negative Emotionality and the Lack of Persistence scales were correlated (.50), as were the Activity Level and the Lack of Persistence scales (.43). However, in contrast to expectation, the Activity Level and the Negative Emotionality scales were not correlated (.15). The Inhibition scale was moderately correlated with the Negative Emotionality and Lack of Task Persistence Scales. The Inhibition scale was not correlated with the Activity Level scale.

Overall, results from correlation analyses based on the Chinese teacher data do not support a two-factor structure (Inhibition and Impulsivity). None of the correlation coefficients exceeds .50, indicating that the correlations among the four TABC-R scales were low or moderate. The individual TABC-R scales were used as predictors in the following multiple regression analyses.

Relationship between ICID factors and TABC-R factors

A correlation matrix between ICID factors and TABC-R scales were calculated and the results are presented in Table 18. For the four TABC-R scales, Inhibition correlated most highly with the ICID Fearful Neuroticism (.61); Negative Emotionality correlated mostly highly with the ICID Irritable Neuroticism (.49); Activity Level correlated most highly with the ICID Low Conscientiousness (.43); Lack of Persistence also correlated most highly with the ICID Low Conscientiousness (.60).

In order to examine how well temperament traits predict personality factors, the following procedure was conducted on each of the four ICID factors. First, the TABC-R scale with the highest correlation coefficient with an ICID factor was identified as the best predictor for that ICID factor. Then, a series of two-predictor multiple regression analyses were conducted, with the best predictor and one of the remaining TABC-R scales as predictors. The results were used to determine the second best predictor for that ICID factor. Next, a series of three-predictor multiple regression analyses were conducted, with the first two best predictors and one of the two remaining TABC-R scales. The results were used to determine the third best predictor. Finally, all four TABC-R were entered in a multiple regression analysis. Table 19 presented the results of these multiple regression analyses.

As presented in Table 19, the amount of variance explained by all four TABC-R scales was, in descending order, 42.7% for the ICID Low Conscientiousness factor, 39,7% for the ICID Fearful Neuroticism factor, 29.6% for the ICID Good Child factor and 28.2% for the ICID Irritable Neuroticism factor. These results indicated that the Low

Conscientiousness and Fearful Neuroticism factors were predicted by temperament traits better than the Good Child and Irritable Neuroticism factors.

The TABC-R Lack of Persistence was the best predictor for two of the four ICID factors (i.e., Good Child and Low Conscientiousness). Inhibition was the best predictor for the ICID Fearful Neuroticism factor; and Negative Emotionality was the best predictor for the ICID Irritable Neuroticism factor. The TABC-R Activity Level was not a best predictor for any of the ICID factors.

Additional Analysis

The present study included three different instruments, making it possible to study the relations among various temperament and personality constructs. Additional analyses using exploratory factor analysis were conducted to determine the underlying factor structure of the ICID, the DSS and the TABC-R scales. Based on examination of various factor structures and theoretical consideration, a four-factor solution was chosen to represent the factor structure of both temperament and personality scales together. Table 20 presents the four-factor structure. When the ICID, the DSS and the TABC-R scales were analyzed together, the resulted factor structure was found to resemble the structure resulted from factor analyzing the ICID scales. Specifically, the DSS Conscientiousness correlated strongly with the ICID Good Child scales; the DSS Neuroticism correlated with the ICID Irritable Neuroticism scales, while the DSS Extraversion correlated with the Fearful Neuroticism scales. Among the four TABC-R scales, Inhibition and Negative Emotion correlated with the ICID Fearful Neuroticism scales, while Lack of Persistence and Activity Level correlated with the ICID Low Conscientiousness scales. These results seem to provide support for the four-factor structure of the ICID.

Table 4 Descriptive Statistics and Coefficient Alphas for ICID Scales

Scales	N	Mean	SD	Minimum	Maximum	Range	Alpha
Achievement Orientation	625	0.00	0.71	-2.86	2.01	4.87	0.75
Activity Level	625	0.01	0.63	-1.87	2.07	3.95	0.69
Antagonism	625	0.00	0.63	-1.57	2.01	3.58	0.81
Compliant	625	0.00	0.72	-2.45	2.11	4.56	0.84
Considerate	625	0.00	0.70	-2.27	2.35	4.61	0.83
Distractible	624	0.01	0.67	-2.15	2.77	4.92	0.76
Fearful, Insecure	625	0.01	0.60	-1.83	3.23	5.06	0.68
Quick to Learn	625	0.00	0.66	-2.18	2.18	4.36	0.88
Negative Affectivity	625	0.01	0.68	-1.96	2.19	4.15	0.75
Openness to Experience	625	0.00	0.58	-1.54	2.05	3.59	0.78
Organized	625	0.00	0.63	-1.98	2.05	4.04	0.75
Positive Emotion	625	0.00	0.64	-2.37	2.40	4.76	0.6
Shy	625	0.00	0.62	-1.88	1.97	3.86	0.68
Sociable	625	0.00	0.65	-2.48	2.18	4.66	0.83
Strong Willed	625	0.01	0.52	-1.48	2.43	3.91	0.6

Table 5 Descriptive Statistics and Coefficient Alphas for DSS Scales

Scales	N	Mean	SD	Minimum	Maximum	Range	Alpha
Extraversion	605	0.00	0.55	-2.45	1.82	4.27	0.85
Agreeableness	607	0.00	0.59	-1.98	1.56	3.53	0.78
Conscientiousness	607	0.00	0.59	-1.83	1.92	3.75	0.89
Emotional Stability	607	0.00	0.66	-2.68	1.58	4.27	0.75
Openness to Experience	604	0.00	0.60	-2.32	2.26	4.58	0.81

Table 6 Descriptive Statistics and Coefficient Alphas for TABC-R Scales

Scales	N	Mean	SD	Minimum	Maximum	Range	Alpha
Inhibition	602	0.00	0.55	-1.79	2.09	3.88	0.7
Activity Level	602	0.00	0.55	-1.91	2.01	3.92	0.6
Negative Emotionality	602	0.00	0.68	-1.55	2.13	3.68	0.67
Lack of Task Persistence	602	0.00	0.59	-2.46	2.35	4.80	0.71

Table 7 Four-factor Solution for the ICID Scales

	Factor			
ICID Scales	1	2	3	4
Considerate	0.94			
Positive Emotion	0.89			
Compliant	0.82			
Achievement Orientation	0.59			0.51
Sociable	0.57			
Open to Experience	0.46			
Intellect/Quick to Learn	0.41			-0.53
Strong Willed		0.75		
Negative Affect		0.66		
Antagonism		0.53		
Shy			0.82	
Fearful, Insecure			0.79	
Distractible				0.74
Organized				-0.63
Activity Level		0.41		0.44

Extraction Method: Principal Axis Factoring.

All loadings greater than .40 are shown.

Table 8 Three-factor Solution for the ICID Scales

	Factor		
ICID Scales	1	2	3
Compliant	0.94		
Achievement Orientation	0.91		
Considerate	0.88		
Intellect/Quick to Learn	0.78		
Positive Emotion	0.76		
Organized	0.68		
Open to Experience	0.59	0.42	
Sociable	0.56	0.43	
Activity Level		0.71	
Strong Willed		0.65	
Negative Affect		0.62	0.40
Antagonism	-0.43	0.59	
Distractible	-0.43	0.45	
Shy			0.84
Fearful, Insecure			0.79

Extraction Method: Principal Axis Factoring.

All loadings greater than .40 are shown.

Table 9 Two-factor Solution for the ICID Scales

	Factor	
ICID Scales	1	2
Intellect/Quick to Learn	0.86	
Positive Emotion	0.84	
Sociable	0.83	
Considerate	0.83	
Open to Experience	0.81	
Compliant	0.74	
Achievement	0.74	
Organized	0.60	
Shy	-0.46	
Fearful, Insecure	-0.45	
Activity Level		0.69
Antagonism	-0.46	0.67
Strong Willed		0.66
Negative Affect		0.63
Distractible	-0.45	0.52

Extraction Method: Principal Axis Factoring.

All loadings greater than .40 are shown.

Table 10 Factor Correlation Matrix in Four-factor Solution for the ICID

	Good Child	Irritable Neuroticism	Fearful Neuroticism	Low Conscientiousness
Good Child	1.00	0.11	-0.40	-0.42
Irritable Neuroticism	0.11	1.00	-0.02	0.34
Fearful Neuroticism	-0.40	-0.02	1.00	0.20
Low Conscientiousness	-0.42	0.34	0.20	1.00

Rotation Method: Oblimin with Kaiser Normalization

Table 11 Comparison of Four-factor Solution of ICID Scales between Young and Old Age Groups

	Younger Age Group				Older Age Group			
	Factors				Factors			
ICID Scales	1	2	3	4	1	2	3	4
Considerate	0.93				0.96			
Compliant	0.90				0.82			
Positive Emotion	0.87				0.88			
Achievement	0.70				0.59			
Sociable	0.57		-0.45		0.60			0.53
Open to Experience	0.51		-0.41		0.44	0.47		
Strong Willed		0.75				0.74		
Negative Affect		0.70				0.57	0.42	
Antagonism		0.59				0.40		
Shy			0.84				0.80	
Fearful, Insecure			0.79				0.82	
Activity Level			-0.54					-0.51
Distractable				0.78				-0.63
Organized				-0.62				0.59
Quick to Learn	0.43			-0.49	0.51	0.41		0.40

Extraction Method: Principal Axis Factoring.

All loadings greater than .40 are shown.

Table 12 Comparison of Four-factor Solution of ICID Scales between Boys and Girls

	Boys				Girls			
	Factors				Factors			
ICID Scales	1	2	3	4	1	2	3	4
Considerate	0.92				0.95			
Positive Emotion	0.87				0.85			
Compliant	0.78				0.89			
Achievement	0.51			-0.55	0.74			0.42
Sociable	0.56		-0.42		0.53		-0.42	
Open to Experience	0.43	0.44			0.51			
Quick to Learn				-0.67	0.52			
Strong Willed		0.81				0.68		
Negative Affect		0.72				0.58		
Antagonism		0.58				0.45		
Fearful, Insecure			0.76				0.82	
Distractible				0.78				-0.64
Organized				-0.65				0.55
Activity Level		0.44						-0.55

Extraction Method: Principal Axis Factoring.

All loadings greater than .40 are shown.

Table 13 Three-Factor Structure of the DSS

	Factor		
	1	2	3
Thoughtful	0.74		
Conscientious	0.74		
Diligent	0.72		
Focused	0.72		
Persevering	0.72		
Planful	0.72		
Controlled	0.69		
Sensible	0.67		
Careful of his/her belongings	0.67		
Cautious	0.65		
Steady	0.64		
Persistent	0.62		
Considerate	0.56		
Knowledgeable	0.56		
Trusting	0.55		
Perceptive	0.55		
Imaginative	0.55		
Obedient	0.53		
Adaptable	0.50		-0.5
Curious	0.48		-0.43

Table 13 Three-Factor Structure of the DSS (Continued 1)

	Factor		
	1	2	3
Soothable	0.45		
Tender	0.42		
Complaining		0.68	
Devious		0.66	
Self-promoting		0.64	
Jealous		0.64	
Touchy		0.63	
Spiteful		0.63	
Fickle		0.62	
Irritable		0.62	
Rude		0.61	
Disorderly		0.61	
Demanding		0.60	
Tearful		0.59	
Impetuous		0.52	
Concerned about acceptance		0.52	
Irresponsible		0.49	
Stubborn		0.44	
Dependent		0.44	

Table 13 Three-Factor Structure of the DSS (Continued 2)

	Factor		
	1	2	3
Rigid		0.43	
Hurrying		0.40	
Afraid		0.40	
Withdrawn			
Talkative			
Sad		0.47	0.50
Cheerful	0.50		-0.50
Energetic	0.49		-0.49
Gregarious	0.43		-0.49
Group-minded	0.43		-0.48
Quiet	0.48		0.48
Closemouthed			0.47
Cool		0.42	0.46
Excitable			-0.45
Directive			-0.42
Frank, open			-0.38
Brave			-0.29

Extraction method: principal axis factoring.

Table 14 Five-Factor Structure of the DSS

	Factor				
	1	2	3	4	5
Controlled	0.79				
Persevering	0.76				
Conscientious	0.74				
Thoughtful	0.73				
Careful of his/her belongings	0.72				
Focused	0.72				
Diligent	0.69				
Planful	0.67				
Obedient	0.63				
Cautious	0.57				
Sensible	0.57				
Steady	0.56				
Persistent	0.56				
Cheerful	0.48		-0.31	0.36	
Group-minded	0.44		-0.30	0.38	
Considerate	0.42				
Gregarious	0.42			0.38	
Trusting	0.38				
Energetic	0.38				
Soothable	0.36				

Table 14 Five-Factor Structure of the DSS (Continued 1)

	Factor				
	1	2	3	4	5
Jealous		0.85			
Angry		0.83			
Spiteful		0.66			
Self-promoting		0.51		0.37	
Touchy		0.48			
Complaining		0.44			
Irritable		0.43		0.36	
Demanding		0.39			
Concerned about acceptance		0.35	0.34		
Withdrawn			0.71		
Constrained			0.67		
Sad			0.61		
Closemouthed			0.56		
Cool			0.54		
Afraid			0.49		
Quiet	0.41		0.48		
Rigid			0.47		
Tender			0.39		
Dependent			0.37		
Tearful		0.33	0.36		

Table 14 Five-Factor Structure of the DSS (Continued 2)

	Factor				
	1	2	3	4	5
Impetuous				0.49	
Hurrying				0.48	
Merry	0.39		-0.36	0.48	
Irresponsible	-0.30			0.44	
Fickle	-0.33		0.34	0.37	
Directive				0.32	
Frank, open				0.31	
Stubborn				0.25	
Perceptive					-0.84
Knowledgeable					-0.75
Imaginative					-0.68
Curious					-0.65
Adaptable					-0.55
Original					-0.54
Brave					-0.34

Extraction method: principal axis factoring.

Table 15 Factor Correlation Matrix in Three-factor Solution for the DSS

	Conscientiousness	Neuroticism	Extraversion
Conscientiousness	1.00	-0.10	-0.11
Neuroticism	-0.10	1.00	0.02
Extraversion	-0.11	0.02	1.00

Table 16 Correlation Matrix between ICID Factors and DSS Factors

	DSS Factors		
ICID Factors	Conscientiousness	Neuroticism	Extraversion
Good Child	0.81	-0.35	-0.59
Irritable Neuroticism	-0.25	0.72	0.04
Fearful Neuroticism	-0.21	0.44	0.56
Low Conscientiousness	-0.69	0.53	0.16

Table 17 Correlation Matrix between TABC-R Scales

	Inhibition	Negative Emotionality	Activity Level	Lack of Persistence
Inhibition	1.00	0.48	-0.11	0.35
Negative Emotionality	0.48	1.00	0.15	0.50
Activity Level	-0.11	0.15	1.00	0.43
Lack of Persistence	0.35	0.50	0.43	1.00

Table 18 Correlation Matrix between TABC-R Scales and ICID Factors

	TABC-R Scales			
ICID Factors	Inhibition	Negative Emotionality	Activity Level	Lack of Persistence
Good Child	-0.38	-0.36	-0.30	-0.42
Irritable Neuroticism	0.19	0.49	0.26	0.37
Fearful Neuroticism	0.61	0.39	-0.13	0.26
Low Conscientiousness	0.28	0.41	0.43	0.60

Table 19 Temperament Predict Personality

	Temperament Scales					
	First Predictor Entered			Second Predictor Entered		
ICID Factors	Scale	R Square	Change	Scale	R Square	Change
Good Child	Lack of Persistence	17.70%	17.70%	Inhibition	24.10%	6.40%
Irritable Neuroticism	Negative Emotionality	23.80%	23.80%	Activity Level	27.60%	3.80%
Fearful Neuroticism	Inhibition	37.50%	37.50%	Negative Emotionality	38.60%	1.10%
Low Conscientiousness	Lack of Persistence	36.10%	36.10%	Activity Level	39.80%	3.70%

Table 19 Temperament Predict Personality (Continued)

	Temperament Scales					
	Third Predictor Entered			All Predictor Entered		
ICID Factors	Scale	R Square	Change	Scale	R Square	Change
Good Child	Activity Level	29.10%	5.00%	Negative Emotionality	29.60%	0.50%
Irritable Neuroticism	Lack of Persistence	28.10%	0.50%	Inhibition	28.20%	0.10%
Fearful Neuroticism	Activity Level	39.40%	0.80%	Lack of Persistence	39.70%	0.30%
Low Conscientiousness	Inhibition	41.90%	2.10%	Negative Emotionality	42.70%	0.90%

Table 20 Four-factor Solution of the ICID, DSS and TABC-R Scales

	Factor			
	1	2	3	4
CONSIDERATE	0.91			
POSITIVE EMOTION	0.88			
COMPLIANT	0.77			
SOCIABLE	0.67			
DSS CONSCIENTIOUSNESS	0.60			-0.52
ACHIEVE ORIENTATION	0.57			-0.47
OPEN TO EXPERIENCE	0.56			
INTELLECT/QUICK TO LEARN	0.51			-0.47
NEGATIVE AFFCT		0.76		
STRONG WILLED		0.73		
DSS NEUROTICISM		0.64		
ANTAGONISM		0.63		
SHY			0.76	
TAB INHIBITION			0.74	
FEAR/INSECURE			0.69	
DSS EXTRAVERSION	-0.49		-0.56	
TAB NEGATIVE EMOTION			.35	
TAB LACK OF PERSISTENCE				0.67
DISTRACTIBLE				0.66
ORGANIZATION				-0.57

Table 20 Four-factor Solution of the ICID, DSS and TABC-R Scales (Continued)

	Factor			
	1	2	3	4
TAB ACTIVITY LEVEL				0.44
ACTIVITY LEVEL				0.41

Extraction Method: Principal Axis Factoring.

CHAPTER 5

DISCUSSION

Rational for the Study

The present study should be considered as part of the continuing search for the major dimensions of child individual differences in personality. Studies on child personality have been relatively neglected among child development researchers until recently (Digman et al., 1986; Shiner, 1998; Halverson et al., 1994). Although the number of studies exploring personality structure during childhood is rapidly growing, the major dimensions of child personality remain unclear. Knowledge about child personality has a lot of theoretical and practical significance. It is important because it provides a framework to many research programs, including the relations between personality characterisics and other outcome variables, such as school achievement, interpersonal relationships and psychopathology.

In the current study, child personality structure is studied by determining the underlying structure of the Inventory of Child Individual Differences (ICID, Halverson, Havill & Deal, 2002) in teacher ratings of Chinese children. The ICID is a newly developed instrument based on parent and teacher free descriptions of children's personality. The resulting ICID factors are therefore based on a bottom-up approach and represent those dimensions that are most salient and important to parents and teachers.

In studying child personality structure, questions arise about the relations between sets of child personality factors developed based on different approaches. The ICID factors are developed based on a bottom-up approach. Measures that are based on a more

top-down approach have also been used. One such measure is the Digman and Shmelyov Scale (DSS, Digman et al., 1996), which includes characteristics that are considered important individual differences in children by temperament and personality researchers. Another purpose of the present study is to investigate whether the free description approach overlooks dimensions that are considered important by researchers and whether there is a one-on-one correspondence between sets of factors developed based on different approaches. These questions can only be answered empirically.

In studying child personality structure, questions also arise about the relations between various personality and temperament constructs. Traditionally, temperament studies focus on individual differences in infancy and early childhood, while personality studies typically involve individual differences in adolescents and adults. From a theoretical point of view, most theorists place more emphasis on heredity when discussing temperament and more emphasis on the environment when discussing personality. To further our understanding of child personality structure, the current study investigates the relationship between the dimensions of temperament and personality in childhood. For example, are temperament traits able to account for a substantial amount of variance of personality factors? It is believed that investigating the above questions will help put child personality constructs in a nomological network and provide preliminary construct validity.

Summary of Results

ICID Factor Structure

The first step in this research was to examine the underlying factor structure of the ICID scales. To do so, an exploratory factor analysis that used Principle Axis Factoring

was employed. Based on comparison of various factor structures, as well as on theoretical considerations, a four-factor solution was chosen as best representing the underlying structure of the ICID scales. The Big Five personality structure, which has been replicated in numerous studies with adults, served as a theoretical basis when determining and interpreting the structure of child personality.

In the four-factor solution, the first factor, in terms of the Big Five, is a combination of Agreeableness (as indicated by the Considerate and Compliance scales), Extraversion (as indicated by the Positive Emotions and Sociable scales) and Intellect/Openness (as indicated by the Achievement Orientation, Open to Experience and Intellect/Quick to Learn scales). This factor is labeled the Good Child factor. The fact that ICID scales that are indicators of different Big Five factors loaded under the same factor indicate that they may not be differentiated from each other by Chinese teachers during this age range (3 to 12 years). As children get older, these characteristics may become more independent from each other.

The second and the third factors resulted from factor analyzing the ICID scales seemed to represent two different aspects of the Big Five Neuroticism factor. Specifically, factor 2 (including three scales: Strong Willed, Negative Affect and Antagonism) can be interpreted as Irritable Neuroticism, while factor 3 (including two scales: Shy and Fear-Insecure) can be interpreted as Fearful Neuroticism. Both Irritable Neuroticism and Fearful Neuroticism are recognized as facets under the broad Neuroticism factor in the adult Big Five, but are relatively independent dimensions during a younger age period.

The last factor in the four-factor solution, when interpreted in terms of the Big Five, is a lack of Conscientiousness (including three scales: Distractible, Organized and Activity Level) and is labeled Low Conscientiousness. It is worth mentioning that activity level is an indicator of Extraversion in adults. The place of activity level in the Conscientiousness construct seems to play different roles for children and adults. It is likely that the behavior indicators of Low Conscientiousness are different for children and adults. For example, children with low Conscientiousness are more likely to be physically active, while adults with low Conscientiousness are much less motorically active than children.

In summary, it appears that teacher ratings of children on the ICID can be related to the Big Five theoretical framework. However, for the age range in this study (3 to 12 years), the Big Five Agreeableness, Extraversion and Intellect/Openness factors combine into one large factor, while the Big Five Neuroticism factor separates into two independent factors. The Big Five Conscientiousness factor is identified as its negative end.

Correspondence between ICID factors and DSS factors

The next question this study examined was the degree of correspondence between the ICID factors and the DSS factors. Before answering this question, it is first necessary to determine the DSS factor structure. Item level exploratory factor analysis of the DSS resulted in a three-factor solution, and the three factors were interpreted as and labeled Conscientiousness, Neuroticism and Extraversion. This three-factor DSS structure can be related to Eysenck's (H. J. Eysenck & M. W. Eysenck, 1985) three-factor model containing Extravsion-Introversion (E), Neuroticism-Emotional Stablity (N), and

Psychologicism-Superego Control (P). As briefly discussed in the Literature Review, Eysenck (1994) insisted that Conscientiousness and Agreeablensss are facets of his higher order Psychoticism factor. In the present factor analysis, Agreeablenss indicators (e.g., considerate, trusting, obedient, soothable and tender) loaded on Conscientiousness, although their loadings were lower than those of the Conscientiousness indicators. It seemed that results from factor analyzing the DSS items provided support for Eysenck's E-N-P model.

The degree of correspondence between the ICID factors and the DSS factors was investigated by examining their intercorrelation. Each of the four ICID factors can be related to one or more of the DSS factors. It seems that the free description approach did not overlook any dimension that are considered important by researchers using other scale construction methods. However, there is no one-on-one correspondence between the ICID factors and the DSS factors.

Relations between Temperament and Personality Constructs

The final question that this study examined was how much variance of personality factors can be accounted for by temperament traits. A series of multiple regression analyses was conducted. Some personality factors are better predicted by temperament traits than others. Specifically, Fearful Neuroticism and Low Conscientiousness factors were better predicted by TABC-R scales than Good Child and Irritable Neuroticism factors, although the amount of variance explained was still subtantial for these latter two factors. These results support the hypothesis that a substantial amount of variance of the personality factors can be explained by temperament traits. If only the best predictor is considered, about 36% of the variance of Low Conscientiousness is explained by the

Lack of Persistencescale; about 37% of the variance of Fearful Neuroticism is explained by the Inhibition scale; about 24% of variance of Irritable Neuroticism is explained by the Negative Emotionality scale, and about 18% of the variance of Good Child is explained by the Lack of Persistence scale.

Some temperament scales seemed to be able to predict personality factors better than others. Martin et al. (2002) indicated that Impulsivity, as a temperament dimension, is the best predictor of personality factors. In the present study, the Lack of Persistence (conceptually similar to Impulsivity) was the best predictor for two of the four ICID factors (Good Child and Low Conscientiousness). On the other hand, the Activity Level was not a best predictor for any of the ICID factors. Inhibition is the best predictor for the ICID Fearful Neuroticism factor; and Negative Emotionality is the best predictor for the ICID Irritable Neuroticism factor.

Factor analysis of the ICID, DSS and TABC-R scales

An exploratory factor analysis was conducted to determine the underlying factor structure of the ICID, the DSS and the TABC-R scales. A four-factor solution was chosen to represent the factor structure of both temperament and personality scales together and the resulted factor structure was found to resemble the structure resulted from factor analyzing the ICID scales. These results seem to provide support for the four-factor structure of the ICID.

Practical Implications

Although temperament and personality has been studied extensively in western cultures, there have been relatively few studies on Chinese children's temperament and personality. Historically in China, mental health has not received as much attention as

physical health and training of child psychosocial professionals has been relatively neglected. With recent dramatic social and economic changes, as well as changes in family structure, parents, teachers and other professionals in China have come to realize the urgent needs to obtain scientific knowledge about children's social/emotional development. Therefore, knowledge gained in this study, as well as other research that focuses on Chinese children, is valuable in contributing to the knowledge base on Chinese children's psychosocial development, and in improving child mental care services in China.

It should be kept in mind that personality structure developed based on data collected in one city of China may not be generalized to the entire country. In general, social and economical development is very unbalanced in China, with coastal areas more developed than inland provinces and large cities more developed than rural areas. As a result, marked differences may exist in terms of the degree of acculturation to Western cultures, children's educational experiences, and so on. Data on children from different areas (especially rural areas) are needed to have a comprehensive understanding of the whole picture and to promote mental health care in underdeveloped areas.

Limitations of this Research

The current study has several limitations. The first one is concerned with data collection. Altogether, fewer than 40 teachers participated in the present study and most of them rated 20 children in their classrooms. This raises concerns about the effects of rater biases in the current sample. A high rater-child ratio may result in decreased variance, which in turn, may lower reliability. If replication of the present study should take place, future researcher may consider recruiting more teachers to reduce rater bias.

A second limitation of this study is that the TABC-R, the DSS and the ICID are new measures with psychometric characteristics that remain to be decumented. Little is known about the validity of these measures directly, although similar constructs have been studied and reported in the literature for some time. However, until the construct validation studies establishing a nomological net have been completed, the validity of these particular measures remains unknown.

Finally, another limitation involves problems with translation. It is necessary to consider the factor of translation when studying personality structure in a different culture. In the present study, all three instruments were translated from English to Chinese. Although translation accuracy is examined via back translation, questions still arise as to the applicability of items to a different culture. Preserving the original meaning during translation may be difficult either because the subjects from another culture have difficulty with the words of the items or with the ideas expressed by the items. It should be kept in mind that translation is a source of variance in ratings of child individual differences using translated instruments.

In summary, despite the above limitations, the current study includes teacher ratings on different instruments, making it possible to study the relations among different constructs. Further, data were collected in a culture where relative little research has been conducted in the area of child temperament and personality.

Considerations for Future Research

Results from the current study need to be replicated in other samples. According to Digman (1994), what is important is not the factor structure emerged from a particular study, but the replicability of factor structure.

In the present study, child personality dimensions were studied by determining the underlying factor structure of the ICID. However, child personality studies go beyond an interest in discovering the underlying factor structure. Knowledge about personality characteristics provides a foundation for understanding behavior problems, academic achievement and other developmental outcomes, such as psychopathology. As we begin to better understand and define the major dimensions of child individual differences, we will begin to understand the processes that shape a child from early childhood into adulthood. This in turn will be useful in predicting future outcomes and allowing for prevention or early intervention services.

The current study utilized cross-sectional data to study child personality. The next question is how do the major dimensions of infancy and childhood gradually evolve into adult personality structure. While cross-sectional data provide descriptions of personality at a given point in time, they cannot provide direct evidence for developmental changes in the individual. Longitudinal study is needed to understand developmental link between temperament in infancy, childhood personality and adulthood personality. The present study provided a point of departure in the life-span conceptualization of individual differences in that if we can better define and delineate individual factors in childhood, we will better be able to examine developmental processes that link personality in childhood to personality in adulthood.

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APPENDIX A

Inventory of Child Individual Differences: Scales & Items

Achievement Orientation

28	responsible
35	lazy
80	self-disciplined
84	a hard worker
94	persists even when things are difficult
142	a drive to do better

Activity Level

6	always busy doing something
33	energetic
44	always on the move
52	active physically
98	likes to play outdoors
111	loves to play sports

Antagonism

17	disobedient
24	mean
29	self-centered
38	aggressive towards others
42	sneaky

43	selfish
46	rude
53	uncooperative
74	disrespectful
Compliance	
3	well-mannered
64	obedient
73	honest
77	cooperative
80	self-disciplined
82	dependable and trustworthy
128	only makes reasonable demands
Considerate	
34	helpful
41	caring
56	considerate
70	loving
71	sensitive to others' feelings
78	sweet
83	thoughtful of others
Distractible	
76	easily distracted
107	gives up easily

115	gets bored easily
118	forgets things easily
135	a short attention span
141	good concentration

Fearful/Insecure

1	insecure
30	fearful
51	easily upset
79	afraid of a lot of things
108	gets feelings hurt easily
114	needs help with a lot of things

Intelligent-Quick to Learn

2	eager to learn
4	intelligent
8R	slow to learn
15	quick to learn
59	good at problem solving
87	quick to understand what is said or going on
127	speaks well
133	difficulty solving problems
136	a good memory
138	good thinking abilities
143	a large vocabulary

Negative Affect-Irritable

20	moody
60	irritable
62	whiny
72	quick-tempered
100	complains frequently
101	gets angry easily

Openness to Experience

19	creative
39	talkative
40	unimaginative
75	interested in new things
81	closed to new ideas
85	curious
106	shows interest in everything
129	likes to ask questions
132	a lot of imagination
144	a sense of humor

Organized

16	a perfectionist
23	careless
37	disorganized
50	organized

55	untidy
97	keeps things neat and tidy
116	does things carefully and with thought
Positive Emotions	
7	affectionate
25	cheerful
48	happy
69	a joy to be with
70	loving
78	sweet
105	gets along well with others
Shy	
13	shy
26	quiet
45	withdrawn
57	slow to warm up to new people or situations
120	prefers to be alone
134	difficulty making friends
140	difficulty in adjusting to new situations
Sociable, Outgoing	
5	lively and enthusiastic
12	sociable
14	a leader

27	friendly
63	outgoing
102	easily adapts to new situations
103	loves to be with other people
122	makes friends easily
137	a lot of friends

Strong Willed

9	strong-willed
11	stubborn
67	hard-headed
96	likes to be the center of attention
110	wants things his/her own way
117	manipulates to get his/her own way
121	likes to take charge

APPENDIX B

Digman and Shmelyov Scale: Scales and Items

Factor 1. Extraversion

1	gregarious
2	cheerful
3	merry
4	group-minded
5	energetic
6	talkative
7	directive
8	quiet
9	closemouthed
10	constrained
11	cool
12	sad
13	withdrawn
18	frank, open
48	concerned about acceptance
59	rigid

Factor 2. Agreeableness

8	quiet
14	tender

15	considerate
16	trusting
17	soothable
18	frank, open
19	self-promoting
20	irritable
21	jealous
22	devious
23	rude
24	angry
25	spiteful
31	obedient
38	stubborn

Factor 3. Conscientiousness

8	quiet
20	irritable
26	diligent
27	planful
28	careful of his/her belongings
29	conscientious
30	focused
31	obedient
32	persevering

33 controlled

34 thoughtful

35 persistent

36 cautious

37 sensible

38 stubborn

39 hurrying

40 excitable

41 impetuous

42 irresponsible

43 fickle

44 disorderly

Factor 4. Emotional Stability

21 jealous

45 brave

46 steady

47 demanding

48 concerned about acceptance

49 afraid

50 complaining

51 touchy

52 tearful

Factor 5. Intellect

30	focused
32	persevering
34	thoughtful
35	persistent
37	sensible
42	irresponsible
48	concerned about acceptance
53	original
54	perceptive
55	knowledgeable
56	curious
57	adaptable
58	imaginative
59	rigid
60	dependent

APPENDIX C

Temperament Battery for Children-Revised: Scales and Items

Inhibition Scale

2. Child is shy with adults he/she does not know.

5 When telling a story, such as what happened on the weekend or during a vacation, the child talks about it loudly, with enthusiasm and excitement.

7. Child will initially avoid new games and activities.

13. Child takes a long time to become comfortable in a new situation.

14 Child plunges into new activities without hesitation.

16. It is difficult to tell what child is feeling.

17 Child will perform before the class with no hesitation.

20. Child is bashful when meeting new children.

25. Child's movements are slow.

Negative Emotionality Scale

4 If another child has a toy he/she wants, this child will easily accept a substitute.

8. Child gets upset by things that don't bother most other children.

9. Child lets other children know when he/she does not like something by yelling and fighting.

18 When child loses a game, he/she takes it lightly.

22. When behavior is corrected by the teacher, this child gets angry or upset.

24. Child overreacts in a stressful situation.

26. Child gets upset with other children.

29. Child seems angry or moody.

Activity Level Scale

1. Child seems to have difficulty sitting still.

10 Child is able to sit quietly for a reasonable amount of time.

27 During free play time, child prefers quiet activities.

28 Child sits still when a story is being told or read.

Lack of Task Persistence Scale

3 If child's activity is interrupted, he/she tries to go back to it.

6. Child is easily drawn away from his/her work by noises in classroom.

11. During free play, child will stick to any activity for only a short time.

12. Child's attention to teacher reading stories is shorter than other children.

15 Child can continue the same activity for an hour.

19 If another child is talking or making a noise while teacher is explaining a lesson, this child remains attentive to the teacher.

21. Child starts an activity and does not finish it.

23. This child is easily side-tracked.