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Tony Xing Tan
University of South Florida

Robert F. Dedrick
University of South Florida

Kofi Marfo
Aga Khan University, kofi.marfo@aku.edu

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Factor Structure and Clinical Implications of Child Behavior Checklist/1.5–5 Ratings in a Sample of Girls Adopted from China

Tony Xing Tan,[1] EdD, Robert F. Dedrick,[2] PhD, and Kofi Marfo,[3] PhD

[1]Department of Psychological and Social Foundations, [2]Department of Educational Measurement and Research, and [3]Center for Research on Children's Development & Learning, University of South Florida–Tampa

Objective   This study assessed psychometric properties of the Child Behavior Checklist (CBCL/1.5–5) and explored clinical insights from its use in a sample of adopted Chinese girls.   **Methods**   Parental ratings were obtained on 707 adopted Chinese girls, ages 1.50–5.92 years ($M = 3.24$, $SD = 1.26$). Confirmatory factor analysis (CFA), employing robust weighted least squares estimation, was used to evaluate the instrument's seven-factor correlated structure. Profiles of scores were analyzed descriptively for clinical insights.   **Results**   The CFAs indicated that the fit of Achenbach and Rescorla's (2000 *Manual for the ASEBA preschool forms & profiles*. Burlington, VT: University of Vermont, Research Centre for Children, Youth, & Families) model to the data obtained from the adopted Chinese girls was acceptable using either a 2-point response scale or the original 3-point response scale for the 67 items from which the seven syndromes or correlated factors are derived. Values for the root mean square error of approximation (RMSEA) for the 2-point and 3-point response scales were .049 and .053, respectively. The RMSEA of .049 for the model using the dichotomously scored items was slightly better than what Achenbach and Rescorla (2000) reported for the same model (.06).   **Conclusions**   The study provides additional evidence of the factorial validity of the CBCL/1.5–5 and supports its use with Chinese girls adopted into North American families. While the Chinese girls showed similar or better behavioral adjustment, compared to a reference group from the CBCL's normative sample, they tended to manifest higher levels of sleep problems.

Key words   adopted children; Chinese girls; confirmatory factor analysis; Child Behavior Checklist (CBCL/1.5–5); Internalizing Behavior Problems; Externalizing Behavior Problems.

Compared to the 1483 Chinese children who entered the United States with their American adoptive parents from 1985 to 1994, the initial 10-year period following the official opening of China's borders to international adoptions, 32,609 were adopted into the United States between 2001 and 2005 (US Department of State, 2006).[1] During this period, China has consistently been the leading source of international adoptions in the U.S. The 7906 adopted Chinese children arriving in the United States in 2005 represent a remarkable 69% increase over the number adopted just 5 years earlier (4681 in 2001). It is now estimated that the adoptive population of young Chinese children in the United States is approaching 60,000 (Tan & Marfo, 2006). There is a steadily growing interest in the United States in research on international adoptions, but relatively little of the emerging research (especially research with reasonably large samples) focuses on Chinese adoptions.

Judging from the number and uniqueness of Chinese adoptions, there is good reason to expect an increase in behavioral and developmental research on this population. For example, unlike other international adoptions, ∼80% of children adopted from China are infants (Tan, 2004) and >95% are girls. The latter is clearly a

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[1]Statistics on adopted Chinese children are based on the number of immigrant visas issued to Chinese orphanage children entering the United States with their adoptive parents/families.

reflection of the dual influence of a cultural preference for male children and the Chinese government's "one-child" policy (Miller & Hendrie, 2000; Tan & Marfo, 2006), a situation that results in the abandonment of more infant girls than boys. Upon discovery, abandoned Chinese children are likely to be placed in orphanage care in one of China's Child Welfare Institutes (CWIs), from where they may be adopted into families in North America and other industrialized nations.

Very little is known, beyond established theoretical speculations in the literature and generic research on children reared in institutional settings, about how early abandonment and the experience of being raised in the CWIs might affect these children's social and emotional development later in life, especially in the context of adoptive childrearing in totally different cultures. Many of the children adopted from China show significant developmental delays and face the multiple challenges of catching up with their physical, intellectual, and social development, forming attachments to their adoptive parents, and acquiring a new language. One study examining the health and developmental status of a clinic-referred group of adopted Chinese children found developmental delays to be common (Miller & Hendrie, 2000). Using the Peabody Developmental Motor Scales and the University of Michigan Early Intervention Development Profile as evaluation tools, the researchers classified children as delayed if their developmental age in any domain was less than or equal to two-thirds of their chronological age. Delay rates, expressed in terms of the proportion of the sample that met the above definition, were 28% for social-emotional, 30% for activities of daily living, 32% for cognitive, 43% for language, and 49% and 55% for fine and gross motor, respectively. Forty-four percent of the children were classified as globally delayed because they had significant delays in three or more developmental domains. Miller and Hendrie reported an additional finding with implications for short-term as well as long-term behavioral and developmental sequelae, namely the discovery of a 14% lead exposure rate in both the clinic-referred sample $(n = 192)$ and the comparison sample of nonreferred children $(n = 260)$.

In the general international adoption research literature, concerns about transitional adaptation issues and long-term developmental outcomes have stimulated investigations focusing on attachment disorders, behavior problems, and the protective influences within adoptive families that have the potential to mitigate the effects of these problems (Chisholm, 1998; Chisholm, Carter, Ames, & Morison, 1995; Fisher, Ames, Chisholm,

& Savoie, 1997; Marcovitch et al., 1997; McGuinness, McGuinness, & Dyer, 2000). The Child Behavior Checklist (CBCL — Achenbach, 1991, 1992; Achenbach & Rescorla, 2000), by far one of the most widely used measures of problem behavior and behavioral adjustment in children, has been used quite extensively in research on international adoptions [see Bérubé & Achenbach (2006) for an extensive bibliography].

The CBCL's prominence in major national studies, such as the NICHD Study of Early Child Care and Youth Development in the United States (NICHD Early Child Care Research Network, 2005), makes it a particularly important tool for research on internationally adopted children from the point of view of opportunities to interpret new findings in relation to normative data on the constructs measured by the instrument. The CBCL is already being used in the emerging research on adopted Chinese children (Tan & Marfo, 2006; Tan & Yang, 2005), and the CBC/1.5–5 is particularly appropriate for this emerging research because of its expanded age range covering the early childhood years.

Prior to the introduction of the CBCL/1.5–5, researchers used either the CBCL/2–3 (Achenbach, 1992) or the CBCL/4–18 (Achenbach, 1991), depending on the age of the sample being studied. Both instruments have been used in studies of children from different cultural/ethnic backgrounds (e.g., Crijnen, Achenbach, & Verhulst, 1997), including samples from Australia, China, Germany, the Netherlands, Norway, and the United States (Bérubé & Achenbach, 2006). These studies have supported the construct validity of the scores from the CBCL/2–3 and CBCL/4–18.

To date, however, the measurement quality of the CBCL/1.5–5 has not been evaluated outside of the initial work by Achenbach and Rescorla (2000). In a secondary analysis of data from the NICHD Study of Early Child Care and Youth Development (SECCYD), Konold, Hamre, and Pianta (2003) ostensibly examined the seven factors underlying the CBCL/1.5–5. It is important to note, however, that their analyses represent only an approximate test of the factor structure of the CBCL/1.5–5 because their data were actually based on responses to the CBCL/2–3, and their sample was restricted to 2-year-old children. Although the CBCL/1.5–5 is similar to the CBCL/2–3, the revisions to the instrument and its expanded use with children from 1.5 to 5 years warrant reexamination of its measurement quality (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999; Thompson & Vacha-Haase, 2000).

In an effort to both assess the appropriateness of this revised, expanded-age version for use with adopted Chinese children and to add to the ongoing broader validation of the constructs underlying this new member of the Achenbach System of Empirically Based Assessment (ASEBA), the present study evaluated the seven-factor structure of the CBCL/1.5–5 in a sample of children, ages 1.50–5.92 years, who were adopted from China. Confirmatory factor analysis (CFA) of the underlying seven syndromes in this sample of adopted Chinese children provides a unique opportunity to test the generalizability of the constructs underlying the CBCL/1.5–5 to samples of families with young transracially adopted children who may have atypical developmental trajectories.

In addition to the core technical psychometric analysis, the study also examined the prevalence, not only of the broader syndromes assessed by the CBCL but also the individual behavioral adjustment problems from which the syndromes and the instrument's composite scores (*internalizing, externalizing, and total*) are derived. This additional descriptive analysis is particularly important from a clinical and intervention perspective. Since 1986, when the first international adoption clinic was established at the University of Minnesota, there has been a gradual proliferation of such clinics within medical schools and private-sector hospitals around the country. These clinics specialize in the evaluation of medical, developmental, and nutritional problems as well as the delivery of therapeutic interventions to internationally adopted children and their families. The significance of the work done at these clinics has been underscored in a number of recent publications (e.g., Costello, 2005; Miller, 2005; Miller & Hendrie, 2000; Nalven, 2005; Schulte & Springer, 2005; Weitzman & Albers, 2005; Weitzman & Avni-Singer, 2005). With the majority of this nation's pediatric psychologists most likely working in hospital and other medical settings (Mesibov, 2002), emerging research — such as the present study — on the developmental and behavioral characteristics of adopted Chinese children should be of profound interest to the field of pediatric psychology as its professionals are likely to become increasingly involved in evaluating children, implementing interventions, and collaborating with pediatricians to meet the needs of these children and their families.

The CBCL/1.5–5

The Child Behavior Checklist (CBCL) for ages 1.5 to 5 years (CBCL/1.5–5; Achenbach & Rescorla, 2000) is a revision of the 1992 checklist for children age 2–3 years (CBCL/2–3; Achenbach, 1992). Revisions included adding two items (*Shows panic for no good reason* and *Rapid shifts between sadness and excitement*) and slightly rewording six items (e.g., *Can't sit still or restless* was reworded *Can't sit still, restless, or hyperactive*). The revised CBCL/1.5–5 asks parents/caregivers to rate 99 specific child behaviors (e.g., *Clings*) as 0 (*Not True* of the child), 1 (*Somewhat or Sometimes True*), or 2 (*Very True or Often True*) and provides parents/caregivers an opportunity to write in three additional problem behaviors. Based on extensive psychometric analyses, which have included exploratory and confirmatory factor analyses, Achenbach and Rescorla (2000) identified in children from ages 1.5 to 5 years the following seven clusters representing common problems or syndromes from 67 of the items on the CBCL/1.5–5: Emotionally Reactive (9 items), Anxious/Depressed (8 items), Somatic Complaints (11 items), Withdrawn (8 items), Sleep Problems (7 items), Attention Problems (5 items), and Aggressive (19 items). In addition to these seven syndrome scores, the CBCL/1.5–5 produces an Internalizing Problems score, formed by combining Emotionally Reactive, Anxious/Depressed, Somatic Complaints, and Withdrawn, as well as an Externalizing Problems score, formed by combining Attention Problems and Aggressive. Sleep Problems is treated as a separate syndrome. A Total Problems score is derived from the 67 items that form the seven syndromes, 32 items that represent other problems (e.g., *Chews inedibles*), and one item added by the parent/caregiver (if a parent/caregiver writes in more than one additional problem, the one item that has the highest score is included in the Total Problems score).

Method
Sample

Following approval by the Institutional Review Board of the researchers' institution, participants were recruited through internet adoption discussion groups and adoption agencies beginning in early 2005. Through one group moderator, a recruitment letter, with an introduction of the research project by this moderator, was posted on the message board of the internet moderators' group. The other moderators were asked to disseminate the recruitment letter to members of their respective groups. At the same time, the recruitment letter, together with the same introduction, was mailed to the directors of 10 adoption agencies in the United States (e.g., Chinese

Children's Adoption International, China Adoption With Love, Inc., and Alliance for Children).

Overall, the study was endorsed by at least 120 internet discussion groups and six adoption agencies. The groups included organizations associated with Chinese adoptions in general (e.g., Families with Children from China; Raising China Children), as well as groups with a more specific focus. The latter included (a) groups for families of children adopted from certain regions of China and (b) groups organized around specific developmental issues and topics, such as attachment, special needs, identity, and general postadoption adjustment. As most families belong to more than one organization, some received information about the study simultaneously from multiple sources. Parents interested in participating in the study contacted the research program directly with information about the number of children they had adopted from China, number of biological children, age of each child, and a regular mailing address.

A total of 1001 families from the United States and 91 families from other countries (e.g., Canada, Australia, and the UK) requested surveys. The US families were from 49 states, with California, Massachusetts, New York, and Florida being the four states with the largest number of families requesting surveys. The surveys were mailed to the adoptive parents via regular mail within 2 days of receiving the parents' request. An email confirming the mailing of surveys was sent to the adoptive parents within a week thereafter. For the returned surveys, an email thanking the family was sent, and for surveys that were not returned within 3 weeks, an email reminder was sent to the parents. A total of 850 families (~77.8%) returned the surveys. The total number of children within these families was 1188, of whom 1115 (93.9%) were adopted from China; the rest were the biological children of the adoptive families.

Since this study focuses on the psychometric properties and clinical implications of the CBCL/1.5–5, only those adopted children between ages 1.5 and 5 years were included in the analyses reported here. Of the 757 adopted children who fell in this age range, 29 (3.8%) were boys and 21 (2.8%) were adopted into countries such as Australia, the UK, and Spain. In order for the current analysis to focus on girls who were adopted by families in North America, the 29 boys and 21 children who were adopted into countries other than the US and Canada were excluded from the data analysis. As a result, 707 girls remained for the current analysis. The children were adopted from orphanages in 21 Chinese provinces, mostly between 2000 and early 2004. Over 70% of the children were from five provinces, including Hunan (21%), Guangdong (17.7%), Jiangxi (14.6%), Guangxi (10.2%), and Anhui (7.7%). These girls' ages ranged from 1.50 to 5.92 years ($M = 3.24$, $SD = 1.26$) and were adopted between the age of 4.5–55 months ($M = 13.29$, $SD = 5.84$). At the time of the study, these children had lived in the adoptive home from 1 to 63.5 months ($M = 25.6$, $SD = 15.41$). Additional information on the children—including preadoption care settings, health and anthropometric indicators, developmental delay indicators, and postadoption exposure to day care, preschool, and intervention services—is summarized in the left block of Table I.

The adoptive parents of the 707 girls were predominantly White (95%). Additional information regarding family structure, employment, educational background, and household income is summarized in the right block of Table I. Clearly noticeable is the large percentage of families with high incomes and educational backgrounds.

Instrument and Procedures

The child's current behavioral adjustment was assessed with the parental form of the Child Behavior Checklist (CBCL/1.5–5; Achenbach & Rescorla, 2000). We did not specify which parent should fill out the surveys, but the returned surveys were completed by 580 mothers (95.1%) and 30 fathers (4.9%).

Factor Model and Statistical Analyses

The measurement model underlying the CBCL/1.5–5 consists of seven correlated factors or syndromes with each of the 67 items associated with these syndromes loading on only one factor. Two sets of analyses were conducted. In the first set, robust weighted least squares estimation (WLSMV) with ''mean- and variance-adjusted chi-square test statistic'' (Muthén & Muthén, 1998–2004, p. 402) was used to analyze the matrix of polychoric correlations for the 67 ordered categorical items (0 = Not True, 1 = Somewhat or Sometimes True, or 2 = Very True or Often True). The second set of analyses was similar to the first except that WLSMV was used to analyze the matrix of tetrachoric correlations for the 67 items, which were dichotomized such that category 0 (Not True) was compared to the combination of Categories 1 and 2 (Somewhat or Sometimes True, Very True or Often True). The second set of analyses was conducted to replicate Achenbach and Rescorla's (2000) CFA reported in the Manual for the ASEBA Preschool Forms & Profiles. Achenbach and Rescorla (2000)

Table I. Summary Characteristics of Children and Parents in the Sample

Adopted children (N = 707)	n	%	Adoptive families (N = 610)	n	%
Preadoption care settings			Family structure		
Institutional care since CWI entry	514	72.6	Two-parent households	473	77.7
Various forms of foster care	193	27.4	Raised/raising biological children	202	33.4
Medical/anthropometric variables			Mothers' employment status		
Under weight	314	44.5	Full-time	315	51.6
Intestinal parasites	58	8.2	Part-time	128	21.1
TB	50	7.1	Stay-at-home	167	27.4
Developmental delays[a]			Mothers' education level		
Gross motor skills	290	41.1	High school	8	1.3
Fine motor skills	192	27.2	Some college	52	8.5
Social skills	116	16.5	4-year college	234	38.4
Emotional maturity	94	13.3	Graduate (master's)	213	35.0
Cognitive skills	63	8.9	Doctoral/postdoctoral	102	16.8
Postadoption interventions			Household income ($) in 2004		
Speech/language therapy	139	19.7	Under 49,999	53	8.9
Physical therapy	91	12.9	50,000–89,999	213	35.5
Counseling/psychotherapy	22	3.1	90,000–149,999	202	33.7
Medical procedure(s)	66	9.3	150,000 and above	131	21.9

[a]Developmental delay occurrence rates are based on parental reports of information from professional assessments of their children.

dichotomized the response scale ''to avoid statistical risks associated with low frequency cells'' (p. 57). Results of their CFA using weighted least squares of the tetrachoric correlations of the dichotomized item responses from 1728 participants in the National Survey revealed that the seven-factor correlated model had acceptable fit as judged by the root mean square error of approximation (RMSEA) of .06 (Achenbach & Rescorla, 2000).

For each set of analyses in the present study (i.e., using the 3-point response scale and polychoric correlations and the 2-point response scale and tetrachoric correlations), Achenbach and Rescorla's seven-factor correlated model was tested. Each factor was scaled by fixing the first factor pattern coefficient to 1.0. Items were specified to load on only one factor (loadings on the other factors were set to zero) and error-covariances were fixed to zero. All CFAs were conducted using Mplus version 3.0 (Muthén & Muthén, 1998–2004). The RMSEA (Steiger, 1990) was used as the primary measure of model fit. The RMSEA is a parsimony-adjusted index that indicates the degree of misfit per degree of freedom. Calculation of the RMSEA is based on the noncentrality parameter, which assesses the degree of misspecification of the hypothesized model [see Hu & Bentler (1999) for the formula for the RMSEA]. Yu's (2002) simulation study found that the RMSEA performed well in controlling Type I and Type II errors with categorical variables and WLSMV. Hu and Bentler's (1999) cutoff value of ≤.06 for the RMSEA was used as a general indicator of acceptable fit. As a secondary measure of model fit,

Bentler's (1992) normed comparative fit index (CFI) was used. The CFI is an incremental fit index that assesses the relative improvement in fit of the specified model over a null model (covariances between the observed variables are assumed to be zero in the population); the CFI also is based on the noncentrality parameter. The adequacy of the CFI for evaluating models with large numbers of categorical items (e.g., 67 in CBCL/1.5–5) has not been fully determined, and therefore, this measure was used as an ancillary measure of fit. Hu and Bentler's (1999) cutoff value of ≥.95 for the CFI was used as a general indicator of acceptable fit. In addition to these statistical criteria, substantive issues such as the interpretability of the parameter estimates were considered in evaluating the acceptability of the models. Factor loadings and intercorrelations of the syndromes obtained from the adopted Chinese sample were also compared with those reported in the *Manual for the ASEBA Preschool Forms & Profiles* for the National Survey.

Results

Table II provides descriptive statistics for the normalized *T* scores for the seven syndrome scores and for Internalizing, Externalizing, and Total Problems scores. These *T* scores were determined using Achenbach and Rescorla's (2000) normative sample for the CBCL/1.5–5. Table II also includes the percentage of cases in the normal, borderline, and clinical ranges. Results indicated that the syndrome with the greatest percentage of cases

Table II. Descriptive Statistics of *T* Scores for the Seven Syndrome Scores, Internalizing, Externalizing, and Total (*N* = 707)

Scale	Cronbach's α	*M*	*SD*	Skewness	Kurtosis	Normal (%)	Borderline (%)	Clinical (%)
Emotional Reactive	.69[a]/.73[b]	53.03	5.45	2.82	12.24	94.2	4.4	1.4
Anxious/Depressed	.64[a]/.66[b]	52.49	5.23	3.01	10.90	95.3	3.0	1.7
Somatic Complaints	.41[a]/.80[b]	52.24	4.29	2.23	4.60	95.9	3.5	0.6
Withdrawn	.63[a]/.75[b]	52.86	5.04	2.51	7.59	96.3	1.8	1.8
Sleep Problems	.76[a]/.78[b]	55.01	7.17	2.16	6.06	91.8	2.8	5.4
Attention Problems	.68[a]/.68[b]	51.97	4.39	2.99	9.11	96.3	1.6	2.1
Aggressive Behavior	.89[a]/.92[b]	51.87	4.53	4.22	25.26	97.9	1.1	1.0
Internalizing	.82[a]/.89[b]	45.33	9.61	0.43	−0.01	91.1	5.9	3.0
Externalizing	.90[a]/.92[b]	43.62	9.71	0.53	0.67	94.1	3.5	2.4
Total Problems	.93[a]/.95[b]	44.56	9.21	0.60	0.66	94.2	2.7	3.1

For the seven syndrome scales the cut-off point for the normal range is a *T* score <65, borderline is from 65 to 69, and the clinical range is ≥70. For Internalizing, Externalizing, and Total Problems the cut-off point for the normal range is a *T* score <60, borderline is from 60 to 63, and the clinical range is ≥64.

[a]Cronbach's alpha reliability for the 707 children adopted from China.

[b]Cronbach's alpha reliability reported by Achenbach and Rescorla (2000, p. 155).

in the borderline/clinical ranges was Sleep Problems (8.2%; *M* = 55.01, *SD* = 7.17 for *T* scores), while the syndrome with the lowest percentage of cases in the borderline/clinical ranges was Aggressive Behaviors (2.1%; *M* = 51.87, *SD* = 4.53 for *T* scores).

The children's Internalizing Problem *T* scores ranged from 29 to 82 (*M* = 45.33, *SD* = 9.61), Externalizing Problem *T* scores ranged from 28 to 88 (*M* = 43.62, *SD* = 9.71), and Total Problems *T* scores ranged from 28 to 89 (*M* = 44.56, *SD* = 9.21). The percentages of cases in the borderline/clinical ranges for the Internalizing, Externalizing, and Total Problems scores were 8.9, 5.9, and 5.8%, respectively. Note that for the seven syndrome scales the cutpoint for the normal range is a *T* score <65, borderline is from 65 to 69, and the clinical range is ≥70. For Internalizing, Externalizing, and Total Problems, the cutpoint for the normal range is a *T* score <60, borderline is from 60 to 63, and the clinical range is ≥64.

Comparisons of the *T* scores for the seven syndromes in the present sample with those reported by Achenbach and Rescorla (2000) for their sample of 700 non–referred children who provided the norms for the CBCL revealed mostly small to moderate effects. Effect sizes (ES) for the syndromes, calculated using (*M* Achenbach and Rescorla − *M* current sample)/pooled *SD*, were all positive except for Sleep Problems, which had a small negative effect (ES = −.12). The adopted Chinese children had slightly higher levels of sleep problems. The remaining effects sizes were positive and ranged from .17 (Emotionally Reactive) to .44 (Aggressive Behavior). Effect sizes for Externalizing (ES = .65), Internalizing (ES = .48), and Total Problems (ES = .58) indicated that Achenbach and Rescorla's (2000) sample had moderately higher mean *T* scores compared with the sample of children adopted from China.

Examination of the individual items[2] revealed five items to be *Somewhat/Sometimes True* or *Very True/Often True* for at least 50% of the children: *Can't stand waiting* (60.7%; Aggressive), *Wants lots of attention* (60.4%; Aggressive), *Whining* (55.9%; Emotionally Reactive), *Demands must be met immediately* (51.8%; Aggressive), and *Easily jealous* (50.5%; Other Problems). At the other extreme, 38 items were reported to be *Somewhat/Sometimes True* or *Very True/Often True* for <10% of the children. The six behaviors with the lowest frequency (<2%) in descending order were *Throws up/Vomits* (Somatic Complaints), *Nausea* (Somatic Complaints), *Headaches* (Somatic Complaints), *Holds breath* (Other Problems), *Smears bowel movement* (Other Problems), and *Shows little interests in things* (Withdrawn).

For Achenbach and Rescorla's (2000) sample of 230 nonreferred girls, there were 19 items that were *Somewhat/Sometimes True* or *Very True/Often True* for at least 50% of the children (Achenbach and Rescorla's norms for females were used since the Chinese sample was female). Interestingly, the top two reported problem behaviors in the adopted Chinese sample were the same as those reported by Achenbach and Rescorla (2000) for their nonreferred sample of girls (*Can't stand waiting* and *Wants lots of attention*).

The biggest difference in reported behaviors between the adopted Chinese children and the Achenbach and Rescorla sample (2000) was for *Feelings get hurt easily*. This behavior was reported in 44.1% of the adopted Chinese sample, compared to 71% in Achenbach and

[2]A table reporting the percentage of adopted Chinese girls for whom each of the CBCL items was rated as 1 (Somewhat/Sometimes True) or 2 (Very True/Often True) is available, upon request, from the authors.

Table III. Summary of Standardized Factor Loadings for the Seven-Factor Correlated CFA Model for the Current Study and the Study by Achenbach and Rescorla (2000)

| Syndrome | No of Items | Current study (sample with adopted Chinese children) | | | | (Achenbach & Rescorla, 2000) | |
| | | Three category response scale[a] | | Two category response scale[b] | | Two category response scale[b] | |
		Mean of factor loadings (SD)	Range of factor loadings	Mean of factor loadings (SD)	Range of factor loadings	Mean of factor loadings (SD)	Range of factor loadings
Emotionally Reactive	9	.63 (0.14)	.43 to .84	.61 (0.15)	.39 to .83	.54 (0.12)	.33 to .73
Anxious/Depressed	8	.65 (0.15)	.43 to .83	.64 (0.17)	.43 to .90	.49 (0.20)	.21 to .76
Somatic Complaints	11	.59 (0.12)	.29 to .69	.50 (0.20)	.13 to .75	.62 (0.18)	.38 to .96
Withdrawn	8	.72 (0.11)	.57 to .86	.71 (0.12)	.54 to .87	.60 (0.21)	.28 to .86
Sleep Problems	7	.70 (0.08)	.61 to .81	.70 (0.08)	.59 to .81	.57 (0.10)	.44 to .76
Attention Problems	5	.71 (0.12)	.51 to .82	.69 (0.13)	.49 to .78	.52 (0.08)	.39 to .59
Aggressive Behavior	19	.70 (0.07)	.57 to .82	.70 (0.07)	.58 to .79	.51 (0.17)	.16 to .79

[a]Polychoric correlations were computed for the items measured on the three category response scale.
[b]Tetrachoric correlations were computed for the items measured on the two category response scale.

Rescorla's (2000) nonreferred sample of girls. The two largest differences in which the behavior was reported more often in the adopted Chinese sample were for *Speech problems* and *Talks, cries in sleep*; 19.4% and 43.4% of the adopted Chinese sample were reported to have these problems, respectively, compared to 7% and 30% in Achenbach and Rescorla's nonreferred sample of girls.

Cronbach's alpha reliability coefficients for the seven syndrome scores and for Internalizing, Externalizing, and Total Problems for the sample of children adopted from China were slightly lower but similar to those reported in the *Manual for the ASEBA Preschool Forms & Profiles* (Achenbach & Rescorla, 2000). The one exception was for Somatic Complaints. The 11-item syndrome had a Cronbach's alpha of .41 in the present sample whereas Achenbach and Rescorla reported a value of .80. Item-to-syndrome correlations for Somatic Complaints in the adopted Chinese sample ranged from −.02 (*Diarrhea*, endorsed by 9.3% of the parents) to .29 (*Painful bowel movement*, endorsed by 7.8% of the parents). The second largest discrepancy between the current results and those reported by Achenbach and Rescorla was for Withdrawn with Cronbach's alphas of .63 and .75, respectively (Table II).

Results of the CFA of the seven-factor correlated model indicated that the fit of the model to the data from the adopted Chinese children was acceptable based on either the dichotomous response scale (RMSEA = .049) or the original 3-point response scale (RMSEA = .053). The RMSEA of .049 for the model using the dichotomously scored items was slightly better than what Achenbach and Rescorla (2000) reported for the same model (.06). Values of the CFI for the seven-factor correlated model based on the dichotomous response scale (CFI = .866) or

the original 3-point response scale (CFI = .857) were less than the cutoff value of .95 suggesting that the overall fit of the model was marginal. As noted earlier, the performance of the CFI for models with large numbers of categorical variables has not been investigated and therefore these results should be viewed with caution (analyses by Achenbach and Rescorla have not included the CFI).

Standardized factor loadings from our data set for the seven-factor correlated model based on the dichotomous and 3-point response scales are summarized in Table III. Descriptions of the loadings focus on those based on the dichotomous response scale because Achenbach and Rescorla (2000) have not presented results for models using the 3-point scales. All loadings in the sample of adopted Chinese children were >.40 with the exception of *Throws up/Vomits* (Somatic Complaints, loading = .13), *Nausea* (Somatic Complaints, loading = .27), *Diarrhea* (Somatic Complaints, loading = .28), and *Twitching* (Emotionally Reactive, loading = .39). The items *Throws up/Vomits* and *Nausea* had very little variability with only 1.7% of the parents indicating that the behavior was a problem. *Twitching* and *Diarrhea* had slightly more variability with 4.8 and 9.3% of the parents, respectively, indicating that the behavior was a problem.

Also included in Table III are the loadings reported by Achenbach and Rescorla (2000) for the same model using the dichotomous response scale in their sample of 1728 National Survey participants. Overall, the loadings from the present study and those reported by Achenbach and Rescorla were highly similar. The average loading in the present sample was .65 (SD = 0.15, range = .13–.90) compared to the average of .55 (SD = .16, range = .16–.96) reported by Achenbach and Rescorla. In general, the loadings for the adopted Chinese sample

were higher with the exception of Somatic Complaints where the average for the adopted Chinese sample was .50 ($SD = .20$, range $= .13-.75$) compared to the average of .62 ($SD = .18$, range $= .38-.96$) reported by Achenbach and Rescorla.

Tucker's congruence index, phi, was used to assess the level of agreement in the loadings for the present sample and those reported by Achenbach and Rescorla (2000) in their sample of 1728 National Survey participants. The phi coefficient is equal to

$$\frac{\sum_{i=1}^{p} b_{iC} b_{iA}}{\sqrt{\sum_{i=1}^{p} b_{iC}^2 \sum_{i=1}^{p} b_{iA}^2}}$$

where b_{iC} and b_{iA} are the i-th factor loadings for the p items for the Chinese sample and Achenbach and Rescorla's (2000) sample, respectively. Values $> .90$ suggest a high level of agreement between the factor loadings (Hurley & Cattell, 1962). Overall, there was good agreement on the loadings with the exception of Somatic Complaints ($\phi = .86$). The ϕ coefficients were .95 for Emotionally Reactive, .97 for Anxious/Depressed, .97 for Withdrawn, .99 for Sleep Problems, .98 for Attention Problems, and .95 for Aggressive Behavior.

Table IV contains the Pearson product moment correlations of the seven syndromes based on the T scores for the sample of children adopted from China and Achenbach and Rescorla's (2000) correlations for the same syndromes obtained from their sample of non-referred children ($N = 563$). Achenbach and Rescorla's (2000) correlations were slightly higher in all cases with the exception of the correlation between Withdrawn and Sleep Problems (.23 and .17 for the sample of adopted Chinese children and Achenbach and Rescorla's sample, respectively). The correlations for the adopted Chinese sample ranged from .15 (Anxious/Depressed and Attention Problems) to .61 (Emotionally Reactive and Anxious/Depressed), with a median correlation of .29. For Achenbach and Rescorla, the correlations ranged from .17 (Withdrawn and Sleep Problems) to .67 (Attention Problems and Aggressive Behavior), with a median correlation of .39. Internalizing and Externalizing Problems correlated .52 in the adopted Chinese sample while the correlation was .59 in the sample reported by Achenbach and Rescorla (2000).

Discussion

The results of this study indicate that the structure of the CBCL/1.5–5 in a sample of adopted Chinese girls is comparable to the seven-factor correlated structure obtained in Achenbach and Rescorla's (2000) national sample. Fit of the model in the sample of adopted Chinese children, as judged by the RMSEA, was acceptable and consistent with Achenbach and Rescorla's (2000) findings. Moreover, the pattern of syndrome correlations and factor loadings in the present study was consistent with Achenbach and Rescorla's model. Further research employing CFA on additional samples of children adopted from China is necessary to test the generality of the present findings. Although ideally, it would be important to examine the factor structure of the CBCL/1.5–5 with mixed gender samples of children adopted from China, current realities in China make it unlikely that a sufficiently large sample of boys could be obtained for such analyses.

Beyond analysis of the instrument's internal structure, investigations examining relationships between CBCL/1.5–5 scores and other theoretically relevant concepts are needed to support the convergent, discriminant, and predictive validity of the scores from this version of the CBCL. For example, applied researchers

Table IV. Intercorrelations Among T Scores for Seven Syndrome Scores for the Sample of Children Adopted from China ($N = 707$) and Achenbach and Rescorla's (2000) Sample of Nonreferred Children ($N = 563$)

	1	2	3	4	5	6	7
1. Emotionally Reactive	1						
2. Anxious/Depressed	.61[a]/.62[b]	1					
3. Somatic Complaints	.37[a]/.37[b]	.32[a]/.39[b]	1				
4. Withdrawn	.46[a]/.47[b]	.42[a]/.48[b]	.26[a]/.28[b]	1			
5. Sleep Problems	.27[a]/.40[b]	.29[a]/.32[b]	.19[a]/.30[b]	.23[a]/.17[b]	1		
6. Attention Problems	.23[a]/.40[b]	.15[a]/.35[b]	.20[a]/.23[b]	.34[a]/.41[b]	.25[a]/.34[b]	1	
7. Aggressive Behavior	.48[a]/.54[b]	.34[a]/.40[b]	.22[a]/.26[b]	.41[a]/.40[b]	.28[a]/.35[b]	.50[a]/.67[b]	1

[a]Intercorrelations for the children adopted from China ($N = 707$).
[b]Intercorrelations for Achenbach and Rescorla's (2000) nonreferred sample ($N = 563$).

and developmental practitioners would benefit from knowing the extent to which CBCL/1.5–5 scores are associated with independent measures of valued outcomes such as social competence, language proficiency, adaptation to new settings, and academic skills relevant to school readiness.

Of both conceptual and clinical significance is the key finding that these internationally adopted girls who manifest significant levels of developmental delays (Miller & Hendrie, 2000; Rettig & McCarthy-Rettig, 2006) also show very low levels of borderline or clinical symptoms on the CBCL, and are in some cases rated more favorably than the CBCL's normative sample of nonreferred girls. Incidentally, this finding replicates evidence from earlier research employing a similarly large sample of girls adopted from China. Tan and Marfo (2006) found significantly lower CBCL internalizing, externalizing, and total problem scores in preschool-age adopted Chinese girls ($n = 517$) compared to Achenbach and Rescorla's (2000) normative sample of 700 children. In the same study, the school-age sample of 178 adopted Chinese girls scored significantly lower than a reference group of 390 school-age children from Achenbach and Rescorla's (2001) normative sample on externalizing and total problem scores, although the two groups were comparable on internalizing scores.

This finding of comparable or lower levels of reported behavior problems (relative to the CBCL's normative sample) seems counterintuitive in the face of the kinds of preadoption adversity associated with these children's abandonment and subsequent institutionalized care in suboptimal settings. Coupled with the potential stresses associated with disruptions in the continuity of care at the point of adoption, such preadoption adversity could foreshadow significant problems in behavioral and emotional adjustment. That this does not appear to be the case in our samples of adopted Chinese children is an important finding that could shed light on conventionally held assumptions about the short- and long-term effects of varying forms of early adversity on internationally adopted children.

We propose, first, that cultural differences may account for at least part of the relatively positive profile of behavioral adjustment within the adopted Chinese sample. That is, Chinese societal norms, child-rearing practices, and adult expectations, even within institutional settings, may promote behaviors associated with typical adjustment as assessed on the CBCL. Additionally relevant is the proposition that Chinese girls have ''easy'' temperaments that might reflect the interactive influence of culture and biology (Kagan, Kearsley, & Zelazo, 1979).

Second, adopted Chinese children may have prenatal developmental histories that set them apart from children adopted from other parts of the world. For example, while regular alcohol consumption has been reported in 30% of Russian women of childbearing age, alcohol use by demographically comparable women in China is much less common as a function of prevailing social and cultural forces (Davies & Bledsoe, 2005). Similarly, only an estimated 2% of pregnant Chinese women smoke cigarettes, compared to 16% in Russia and 11–18% in the United States (Grjibovski, Brygen, Svartbo, & Magnus, 2004; Lam, To, Duthie, & Ma., 1992; National Center for Health Statistics — US, 2004; World Health Organization, 1997). These statistics suggest that the long-term behavioral and developmental sequelae for children adopted from China could be more promising under optimal conditions of childrearing. The children in this study had been in their adoptive homes for an average of 25.6 months, and it is conceivable that their profile of behavioral/emotional adjustment may reflect the combined benefits of (a) limited prenatal exposure to the identified teratogenic agents, (b) over 2 years of child-rearing in enriched developmental environments, and (c) exposure to various clinical interventions.

Evidence from one longitudinal study (Pormeleau et al., 2005) supports the contention of greater developmental resilience in adopted Chinese children compared, for example, to those adopted from Russia. Pormeleau and associates followed children adopted from China, Russia, and East Asia (Vietnam, Taiwan, Thailand, South Korea, Cambodia) from the time of their arrival in Canada till 6 months later, collecting anthropometric and developmental data at three data points. The Chinese children showed significantly better and more consistent improvement in Bayley mental and motor development than the Russian children over the three data points.

These speculative explanations would be incomplete without raising the possibility that the finding might also be an artifact of sample selection bias, considering that the results are based entirely on the ratings of volunteer parent participants. It could be argued that the self-selection process had the effect of producing a situation in which mostly parents whose children are adjusting well were the ones agreeing to complete the survey. The plausibility of this explanation is weakened, however, by evidence of wide-ranging variability in parental responses to most of the items on the instrument.

Also undercutting the sample-bias explanation is evidence regarding sleep problems that appears consistent with findings from other studies. While syndrome level *T* scores in the borderline/clinical ranges were generally very low (from 2.1% on Aggressive Behavior to 8.3% on Sleep Problems), and while the adopted Chinese girls scored similarly to or better than the CBCL normative sample on most syndromes, the one syndrome on which they scored worse was Sleep Problems. The item with the widest between-sample gap (13%) favoring the normative sample was *Talks or cries in sleep*, followed by *Wakes up often at night* (6%), *Nightmares* (5%), and *Has trouble getting into sleep* (3%). Our 8.2% borderline/clinical range rate on sleep problems is comparable to Rettig and McCarthy-Rettig's (2006) 9% rate of children with ''many'' sleep problems.

Miller (2005) has observed that while not prominent in the first few days following adoption, sleep difficulties ''frequently occur after arrival home and are related to changes in sleeping environments, time zone changes, and increased expectations of interpersonal interactions with adults'' (p. 1319). Sleep problems in children constitute a public health concern with ramifications for development and learning (Kheirandish & Gozal, 2006; Sadeh, Gruber, & Raviv, 2002), while posing a major challenge to childrearing and personal functioning on the part of parents (Johnson, 1996; Richdale, 1999; Shang, Gau, & Soong, 2006). Thus, for even the relatively small percentage of children falling in the borderline/clinical range, further assessment and timely intervention may be beneficial to the children and their families.

Since this study did not employ a national probability sample, findings may not be generalizeable to the larger population of girls adopted from China. Nevertheless, it is important to note that the participating parents came from 49 states in the United States and a number of locations in Canada, and the children represent 2.4% of the 28,690 Chinese children adopted into the United States between 2000 and 2004. Thus, notwithstanding the acknowledged methodological limitation, the present study does advance our understanding of the behavioral development of adopted Chinese girls. Independent replication of the profile of behavioral adjustment reported here should trigger further conceptual thinking about the multiplicity of factors—including child-level cultural and biological buffers, enriched developmental environments offered by adoptive families, and early intervention efforts—that might influence these children's development.

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