Journal of Clinical Child and Adolescent Psychology
2007, Vol. 36, No. 3, 405–417

Testing the 8-Syndrome Structure of the Child Behavior Checklist in 30 Societies

Masha Y. Ivanova, Thomas M. Achenbach, and Levent Dumenci
Department of Psychiatry, University of Vermont

Leslie A. Rescorla
Department of Psychology, Bryn Mawr College

Fredrik Almqvist and Sheila Weintraub
Department of Child Psychiatry, University of Helsinki

Niels Bilenberg
Department of Child and Adolescent Psychiatry, University of Southern Denmark

Hector Bird
Department of Psychiatry, Columbia University

Wei J. Chen
Institute of Epidemiology, National Taiwan University

Anca Dobrean
Department of Psychology, Babes-Bolyai University

Manfred Döpfner
Department of Child and Adolescent Psychiatry and Psychotherapy, University of Cologne

Nese Erol
Department of Child and Adolescent Psychiatry, Ankara University

Eric Fombonne
Department of Psychiatry, McGill University

António Castro Fonseca
Faculty of Psychology and Educational Sciences, University of Coimbra

Alessandra Frigerio
Child and Adolescent Psychiatry Unit, Eugenio Medea Scientific Institute

Hans Grietens
Faculty of Psychology and Educational Sciences, Katholieke University of Leuven

Helga Hannesdóttir
Division of Psychiatry, Landspítalinn University Hospital

Yasuko Kanbayashi
Department of Letters, Chuo University

Michael Lambert
Department of Human Development and Family Studies,
University of Missouri–Columbia

Bo Larsson
The Norwegian University of Science and Technology, Trondheim

Patrick Leung
Department of Psychology, Chinese University of Hong Kong

Xianchen Liu
Department of Psychiatry, University of Pittsburgh

Asghar Minaei
Sensory Disabilities Department, Research Institute of Exceptional Children

Mesfin S. Mulatu
The MayaTech Corporation

Torunn S. Novik
Department of Child and Adolescent Psychiatry, Buskerud Hospital

Kyung Ja Oh
Department of Psychology, Yonsei University

Alexandra Roussos
Attiki Child Psychiatric Hospital

Michael Sawyer
Department of Paediatrics, University of Adelaide and Research and Evaluation Unit,
Women's and Children's Hospital

Zeynep Simsek
Harran University

Hans-Christoph Steinhausen and Christa Winkler Metzke
Department of Child and Adolescent Psychiatry, University of Zurich

Tomasz Wolanczyk
Department of Child Psychiatry, Medical University of Warsaw

Hao-Jan Yang
Chung Shan Medical University

Nelly Zilber
Falk Institute for Mental Health Studies, Jerusalem and CRFJ (French Research Center in Jerusalem)

Rita Zukauskiene
Department of Psychology, Mykolas Romeris University

Frank C. Verhulst
Department of Child and Adolescent Psychiatry, Erasmus University Medical Center-Sophia's Children's Hospital

There is a growing need for multicultural collaboration in child mental health services, training, and research. To facilitate such collaboration, this study tested the 8-syndrome structure of the Child Behavior Checklist (CBCL) in 30 societies. Parents' CBCL ratings of 58,051 6- to 18-year-olds were subjected to confirmatory factor analyses, which were conducted separately for each society. Societies represented Asia; Africa; Australia; the Caribbean; Eastern, Western, Southern, and Northern Europe; the Middle East; and North America. Fit indices strongly supported the correlated 8-syndrome structure in each of 30 societies. The results support use of the syndromes in diverse societies.

Mental health workers and educators increasingly deal with cultural and ethnic variations among the children they serve. Assessment instruments must therefore be appropriate for children of diverse backgrounds. Assessment instruments developed for U.S. children are also widely used in other societies by indigenous mental health workers. However, before assessment instruments developed in one society can be applied in another society, it is important to determine empirically whether they function similarly in the two societies.

Translations of standardized assessment instruments offer opportunities for testing the applicability of these instruments across societies. Patterns of co-occurring problems can be identified by performing multivariate statistical analyses on problem items reported for large samples of children. These statistically derived patterns can be viewed as "syndromes" of problems that tend to co-occur. Syndromes are often derived statistically via factor analytic methods. Exploratory factor analysis (EFA) is applied to correlations among ratings of problem items to find patterns of co-occurring problems. After EFA has identified patterns of co-occurring items, they are usually tested via confirmatory factor analysis (CFA) in a different sample. CFA tests how well a specified model of item groupings fits a particular dataset.

A key empirical question is whether syndromes derived from particular problem items in one society would also be found for the same problem items in other societies. If an instrument's syndrome structure is replicated across societies, then services, training, and research can focus on the same syndromes in these societies. Of course, additional syndromes might also be found by using different items, informants, and assessment methods.

The similarity of an instrument's syndrome structure across groups is termed *configural invariance* (Vandenberg & Lance, 2000). Configural invariance is the most basic component of measurement invariance. Measurement invariance refers to the notion that an assessment instrument measures the same construct across populations. In addition to configural invariance, other components of measurement invariance include metric invariance (similarity of factor loadings), scalar invariance (similarity of item intercepts), residual invariance (similarity of item residuals), factor variance invariance (similarity of factor variances), factor covariance invariance (similarity of factor covariances), and latent mean invariance (similarity of latent means) (Vandenberg & Lance, 2000). Components of measurement invariance can be conceptualized as a pyramid, with configural invariance as the base on which the other components rest.

The present study was designed to provide a test of the configural invariance of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) in

Correspondence should be sent to Masha Y. Ivanova, Psychiatry Department, University of Vermont, 1 S. Prospect St., Burlington, VT, 05401. E-mail: masha.ivanova@uvm.edu.

each of 30 societies. The CBCL assesses 120 emotional, behavioral, and social problems reported by parents of children ages 6 to 18. Parents rate each item as 0-*not true as far as you know*, 1-*somewhat or sometimes true*, and 2-*very true or often true*, based on the preceding 6 months. The CBCL is part of a multi-informant family of empirically based assessment instruments developed by Achenbach and colleagues (Achenbach, 1991; Achenbach & Rescorla, 2001).

The CBCL syndrome model tested in our study was found to be the best-fitting model for data obtained from parents' ratings of combined U.S. general population and clinical samples of 6- to 18-year-olds (Achenbach & Rescorla, 2001). The 8-syndrome model was derived and tested via EFA and CFA. The EFA consisted of exploratory Unweighted Least Squares (ULS) analyses of polychoric correlations and principal components analyses (PCA) of Pearson correlations. The CFA employed techniques that were robust to violations of multivariate normality: The correlated 8-syndrome model derived from EFA was fitted on tetrachoric correlations using the weighted least squares with standard errors and mean- and variance-adjusted chi-square estimator (WLSMV) via Mplus (Muthén & Muthén, 2001, 2004). The following eight syndromes were obtained: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior. These 2001 syndromes were highly correlated with earlier versions of the syndromes published in 1991 (Achenbach, 1991).

The WLSMV (Muthén & Muthén, 2004) estimator represents a significant advance in CFA of data such as ratings on the CBCL. Because it is an asymptotically distribution-free (ADF) estimator, the WLSMV can be used with ordinal data without assuming multivariate normality. This is extremely important in CFA of problem ratings because problem item distributions are usually non-normal, which limits the utility of estimation procedures that assume multivariate normality. In addition to being robust to violations of multivariate normality, the WLSMV estimator is extremely efficient in comparison to other ADF estimators, such as the ULS.

Prior to our study, CFA was used to test the CBCL factor structure in samples from France, the Netherlands, Turkey, and Korea (e.g., Albrecht, Veerman, Damen, & Kroes, 2001; Berg, Fombonne, McGuire, & Verhulst, 1997; De Groot, Koot, & Verhulst, 1994; Dumenci, Erol, Achenbach, & Simsek, 2004; Dumenci, Oh, & Achenbach, 2003; Van den Oord, 1993). Most of these studies applied the ULS estimation to polychoric correlations to avoid assuming multivariate normality and supported the 1991 CBCL factor model. In one of the few studies that examined the configural invariance of the CBCL in several societies, Hartman et al. (1999) tested the 1991 syndromes in general population samples from Greece, the Netherlands, Israel, Norway, Portugal, and Turkey. With maximum likelihood estimation, all models converged, and the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993) met the authors' criterion for good fit in all six societies (RMSEA $< .07$). With ULS estimation, the model failed to converge for one sample and the RMSEA was outside the acceptable range for the remaining samples.

The present study was designed to test the configural invariance of the correlated 8-syndrome structure of the CBCL in 30 societies. The study differed from previous tests of configural invariance of the CBCL syndrome structure by testing the 2001 CBCL syndromes in each of 30 diverse societies and capitalizing on advances in CFA methodology by using the WLSMV estimator.

Method

Samples

We analyzed data for 58,051 6- to 18-year-olds from the 30 general population samples described in Table 1. The 1991 version of the CBCL was used to rate children in 27 societies, whereas the 2001 CBCL was used to rate children in Iran, Lithuania, and Romania. Conventions required by each investigator's institution for obtaining the parents' informed consent were followed. Consistent with standard procedures (Achenbach & Rescorla, 2001), CBCLs with > 8 missing item ratings were excluded (6% of the CBCLs). *N*s ranged from 628 for Denmark to 4,858 for China. We included data used by Rescorla et al. (in press) in their comparisons of distributions of CBCL scale scores across societies, plus data for 4,331 children who were older than those used by Rescorla et al. Three CBCLs from Portugal and 18 from Taiwan had missing data for age. We included these CBCLs in our analyses after we determined that they were for children whose ages were between 6 and 18.

Tested Model

Figure 1 illustrates the 2001 correlated 8-syndrome model (Achenbach & Rescorla, 2001) that was tested in our study. Each item was assigned to only one factor. Of the 103 items that loaded

Table 1. *Samples Used for Confirmatory Factor Analysis*

Society	Reference	N	Ages (M)	(%) Male	Response Rate (%)	Sampling Procedure
1. Australia	Sawyer et al. (2000)	3,243	6–17 (11.4)	50	86	National household sample
2. Belgium	Hellinckx et al. (1994)	1,102	6–12 (9.0)	50	80	Regional sample in medical settings
3. China	Liu et al. (1999)	4,858	6–15 (10.5)	51	92	Regional household sample
4. Denmark	Bilenberg (1999)	628	6–16 (10.8)	45	60	Regional household sample
5. Ethiopia	Mulatu (1997)	677	11–18 (14.1)	48	92	Regional school sample
6. Finland	Weintraub (2004)	2,093	6–16 (10.3)	49	77	Regional school sample
7. France	Fombonne & Vermeersch (1997)	2,133	6–16 (11.2)	52	62	National sample of employees of a public utility company
8. Germany	Döpfner et al. (1997)	2,477	6–18 (12.3)	50	82	National household sample
9. Greece	Roussos et al. (1999)	1,220	6–12 (9.0)	50	95	National school sample
10. Hong Kong	Leung et al. (2006)	2,276	6–18 (11.7)	49	91	Regional school sample
11. Iceland	Hannesdottir & Einarsdottir (1995)	817	6–16 (10.7)	51	62	Regional school sample
12. Iran	Minaei (2005)	1,424	6–18 (12.0)	52	100	Regional school sample
13. Israel	Zilber et al. (1994)	1,172	6–17 (11.2)	50	80	Regional household sample
14. Italy	Frigerio et al. (2004)	1,254	6–18 (11.9)	47	72	Regional school sample
15. Jamaica	Lambert & Lyubansky (1999)	776	6–18 (11.8)	50	91	Regional school sample
16. Japan	Itani et al. (2001)	4,720	6–16 (10.8)	48	91	Regional school sample
17. Korea	Oh et al. (1997)	3,472	6–17 (12.5)	50	86	National school sample
18. Lithuania	Zukauskiene et al. (2003)	3,443	6–18 (12.2)	49	85	National school sample
19. Netherlands	Verhulst et al. (1996)	1,932	6–18 (11.6)	50	82	National household sample
20. Norway	Novik (1999)	949	6–17 (10.5)	49	45	Regional household sample
21. Poland	Wolanczyk (2003)	3,019	7–18 (13.2)	50	89	National school sample
22. Portugal	Fonseca et al. (1995)	1,375	6–16 (9.8)	51	85	Regional school sample
23. Puerto Rico	Achenbach et al. (1990)	635	6–16 (11.1)	50	92	Island-wide household sample
24. Romania	Domuta (2004)	1,077	6–18 (7.9)	49	80	Regional school sample
25. Russia	Hellinckx et al. (2000)	1,998	12–16 (14.0)	50	71	National household sample
26. Sweden	Larsson & Frisk (1999)	1,354	6–16 (11.2)	48	84	Regional school sample
27. Switzerland	Steinhausen et al. (1997)	2,073	6–17 (11.3)	52	79	Regional school sample
28. Taiwan	Yang et al. (2000)	854	11–17 (13.5)	48	88	Regional school sample
29. Thailand	Weisz et al. (1993), Weisz et al. (1987)	768	6–16 (11.7)	50	83	National school sample for ages 6–11, national household sample for ages 12–16
30. Turkey	Erol & Simsek (1997)	4,232	6–18 (11.5)	51	84	National household sample

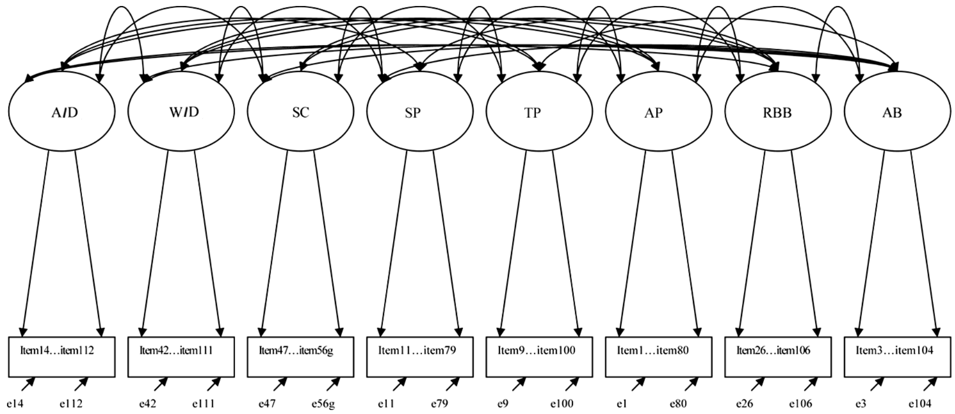

Figure 1. The model that was tested in the study. A/D = Anxious/Depressed, W/D = Withdrawn/Depressed, SC = Somatic Complaints, SP = Social Problems, TP = Thought Problems, AP = Attention Problems, RBB = Rule-Breaking Behavior, AB = Aggressive Behavior.

significantly on the eight factors derived from the 2001 CBCL, we analyzed the 96 items that were the same on the 1991 and 2001 CBCL. We excluded six items that were new on the 2001 CBCL, plus Item 105, which was changed from "Uses alcohol or drugs for nonmedical purposes (describe)" on the 1991 CBCL to "Uses drugs for nonmedical purposes (don't include alcohol or tobacco)" on the 2001 CBCL. The 2001 version of Item 105 excluded alcohol and tobacco because new items assessed alcohol and tobacco usage.

Data Analyses

Tetrachoric correlations between items scored 0 versus 1 or 2 were used. To take account of the binary item scores, we used WLSMV implemented via Mplus 3.0 (Muthén & Muthén, 2004). The primary index of model fit was the RMSEA, which is considered the best fit index for the WLSMV, with values $\leqslant .06$ indicating good fit (Yu & Muthén, 2002). Although other fit indicas do not perform well for binary variables, we also computed the Comparative Fit Index (CFI; Bentler, 1990) and the Tucker-Lewis index (TLI; Tucker & Lewis, 1973). We considered their results to be secondary to the results of the RMSEA. Hu and Bentler (1999) proposed that CFI and TLI values $> .95$ be required for good model fit. However, this criterion has been criticized for incorrectly rejecting correctly specified complex models (Marsh, Hau, & Wen, 2004). As our model was complex, we used Browne and Cudeck's (1993) criterion of $> .90$ for good fit and .80 to .90 for acceptable fit.

Results

The model converged in all 30 samples. As Table 2 shows, the RMSEA ranged from .026 (China) to .055 (Ethiopia), indicating good fit for all 30 societies (25th percentile = .037, 50th = .039, and 75th = .041). The CFI ranged from .730 (Lithuania) to .947 (Puerto Rico), indicating acceptable to good fit for all societies, except Ethiopia, Germany, Hong Kong, and Lithuania (25th percentile = .840, 50th = .870, and 75th = .897). The TLI ranged from .790 (Ethiopia) to .964 (Australia), indicating acceptable to good fit for all societies, except Ethiopia (25th percentile = .900, 50th = .918, and 75th = .944).

For 25 societies, the correlated 8-factor model converged smoothly. Table 2 shows that five societies (Belgium, Jamaica, Norway, Sweden, and Thailand) had one negative residual item variance each. Thus, 5 (.0008) of the 6,600 estimated parameters were outside of the admissible parameter space. We used Van Driel's (1978) procedure for testing out-of-range parameter estimates, which has been recommended by Chen, Bollen, Paxton, Curran, and Kirby (2001) and McDonald (2004). Van Driel's procedure determines whether the inadmissible parameter estimate (e.g., negative residual item variance) is due to sampling fluctuations or a model specification error. It involves forming confidence intervals around the inadmissible parameters using their asymptotic standard errors. If the confidence interval and the admissible parameter space overlap, then the inadmissible point estimate is concluded to be due to sampling fluctuations. For all five negative residual item variances in our study, the 95% confidence intervals included admissible values.

For the 24 societies for which the model converged smoothly, all 96 items loaded significantly on their predicted factors (factor loading $z > 1.96$). For the remaining six societies, all items had significant loadings on their predicted factors, except Item 59 for Taiwan; Item 32 for Jamaica;

Table 2. *Results of Confirmatory Factor Analyses for 30 Societies*

Society	*N*	RMSEA	CFI	TLI	Empirically Underidentified Items[a,b]
1. Australia	3,243	.035	.895	.964	
2. Belgium	1,102	.043	.896	.917	106
3. China	4,858	.026	.922	.947	
4. Denmark	628	.038	.915	.933	
5. Ethiopia	677	.055	.755	.790	
6. Finland	2,093	.037	.894	.935	
7. France	2,133	.040	.841	.879	
8. Germany	2,477	.034	.737	.930	
9. Greece	1,220	.040	.880	.913	
10. Hong Kong	2,276	.041	.794	.946	
11. Iceland	817	.039	.880	.906	
12. Iran	1,424	.036	.934	.956	
13. Israel	1,172	.038	.880	.901	
14. Italy	1,254	.038	.870	.884	
15. Jamaica	776	.041	.836	.863	18
16. Japan	4,720	.030	.896	.950	
17. Korea	3,472	.039	.837	.943	
18. Lithuania	3,443	.042	.730	.923	
19. The Netherlands	1,932	.035	.841	.910	
20. Norway	949	.039	.869	.895	73
21. Poland	3,019	.037	.908	.957	
22. Portugal	1,372	.039	.853	.926	
23. Puerto Rico	635	.040	.947	.951	
24. Romania	1,077	.042	.865	.913	
25. Russia	1,998	.049	.804	.901	
26. Sweden	1,354	.033	.898	.918	103
27. Switzerland	2,073	.041	.858	.902	
28. Taiwan	836	.044	.921	.943	
29. Thailand	768	.037	.848	.875	56g
30. Turkey	4,232	.038	.854	.894	
Total	58,051				

Note: RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis index.
[a]Items with negative residual variances.
[b]The number is the item's number on the Child Behavior Checklist.

Items 59 and 60 for Puerto Rico; and Items 30, 56d, 59, 60, 72, 79, and 83 for Ethiopia.

Table 3 presents descriptive statistics for item factor loadings *for each society*, including means, medians, standard deviations, and ranges. Mean factor loadings for each society ranged from .48 (Ethiopia) to .70 (Australia). The mean of mean factor loadings for each society was .62 (25th percentile = .59, 50th = .62, and 75th = .64, respectively). Table 4 presents descriptive statistics for factor loadings separately for each item *across the 30 societies*, including means, medians, standard deviations, and ranges. Mean factor loadings across society ranged from .37 (Item 32. *Feels he/she has to be perfect*) to .87 (Item 103. *Sad*). The mean of mean factor loadings across societies was also .62 (25th percentile = .55, 50th = .64, and 75th = .69). When considered by syndrome, the mean factor loadings ranged from .55 for Thought Problems to .68 for Aggressive Behavior.

As presented in Table 3, we also computed descriptive statistics for factor covariances for each society, including means, medians, standard deviations, and ranges. Mean factor covariances ranged from .60 (France) to .78 (Iran), with an overall mean of .70.

Discussion

Our results indicated that the correlated 8-syndrome structure fit well when tested separately in 30 societies. The societies were quite diverse, representing world regions differing greatly in political, educational, and mental health systems, as well as childrearing practices. RMSEAs were

Table 3. *Descriptive Statistics for Factor Loadings and Factor Covariances by Society*

		Factor Loadings				Factor Covariances			
Society	*N*	*M* Loading	*Mdn* Loading	*SD*	Range[a]	*M* Covariance	*Mdn* Covariance	*SD*	Range
1. Australia	3,243	.70	.71	.11	.38–.90	.73	.74	.10	.52–.88
2. Belgium	1,102	.64	.66	.16	.26–1.06	.64	.63	.17	.22–.88
3. China	4,858	.61	.62	.11	.29–.80	.76	.79	.11	.54–.93
4. Denmark	628	.63	.68	.18	.17–.99	.73	.75	.12	.50–.91
5. Ethiopia	677	.48	.51	.21	−.11–.86	.72	.75	.14	.40–.88
6. Finland	2,093	.65	.68	.14	.29–.99	.68	.71	.11	.50–.87
7. France	2,133	.58	.61	.13	.23–.92	.60	.62	.14	.36–.88
8. Germany	2,477	.63	.64	.08	.41–.80	.70	.69	.11	.54–.92
9. Greece	1,220	.59	.61	.15	.16–.92	.69	.70	.15	.39–.89
10. Hong Kong	2,276	.65	.67	.11	.35–.86	.74	.77	.11	.53–.91
11. Iceland	817	.62	.64	.15	.26–.98	.64	.65	.16	.25–.86
12. Iran	1,424	.63	.64	.12	.25–.88	.78	.80	.10	.55–.93
13. Israel	1,172	.60	.62	.13	.16–.85	.66	.68	.13	.33–.86
14. Italy	1,254	.58	.59	.13	.19–.87	.63	.66	.13	.38–.82
15. Jamaica	776	.56	.59	.18	.06–1.04	.64	.64	.19	.28–1.00
16. Japan	4,720	.65	.68	.11	.40–.89	.75	.77	.11	.51–.94
17. Korea	3,472	.63	.64	.08	.43–.84	.76	.77	.09	.54–.91
18. Lithuania	3,443	.63	.64	.12	.31–.87	.72	.73	.11	.47–.91
19. Netherlands	1,932	.61	.62	.14	.25–.91	.62	.61	.13	.38–.85
20. Norway	949	.62	.64	.16	.16–1.06	.68	.68	.10	.51–.88
21. Poland	3,019	.67	.68	.09	.41–.83	.75	.77	.10	.53–.91
22. Portugal	1,372	.59	.62	.13	.16–.87	.68	.74	.15	.37–.90
23. Puerto Rico	635	.63	.66	.14	.22–.88	.74	.77	.13	.47–.93
24. Romania	1,077	.62	.65	.15	.13–.90	.71	.75	.12	.45–.90
25. Russia	1,998	.62	.64	.12	.20–.81	.69	.71	.15	.33–.91
26. Sweden	1,354	.64	.66	.16	.20–1.00	.66	.66	.11	.46–.88
27. Switzerland	2,073	.60	.62	.13	.23–.94	.68	.67	.11	.49–.95
28. Taiwan	836	.66	.67	.11	.38–.93	.74	.77	.10	.54–.89
29. Thailand	768	.55	.57	.15	.17–1.08	.69	.70	.13	.49–.89
30. Turkey	4,232	.59	.59	.12	.13–.84	.66	.72	.18	.30–.90

[a] Loadings $\geqslant 1$ are for the 5 out of 6,600 estimated parameters that were outside of the admissable parameter space.

$< .06$ for all samples, indicating good model fit. The model fit the data with minimal problems for all societies except Ethiopia, as Table 2 shows. Even for Ethiopia, the RMSEA was .055 and the mean loading for items on their predicted factors was a substantial .48. Small model underidentification problems were found for five societies. They constituted less than .0008 of all estimated parameters. Across all societies, the mean loading of items on their predicted factors was a substantial .62. The factors were correlated, with the mean of factor covariances across societies being .70.

As another test of the cross-cultural validity of the CBCL, Rescorla et al. (in press) performed comparisons of CBCL syndrome scores for the 6- to 16-year-old children in the 30 data sets described here, plus a U.S. general population sample. For the eight syndromes, effect sizes for mean score differences among societies ranged from 4% (Rule-Breaking Behavior) to 9% (Anxious/Depressed), with most clustering in the 5 to 6% range. These values were in the small to medium effect size range, using Cohen's (1988) criteria. Societies differed more on scores for internalizing kinds of problems (i.e., Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints syndromes) than on scores for externalizing kinds of problems (i.e., Rule-Breaking Behavior and Aggressive Behavior syndromes). Thus, although the results of our study indicated that the correlated 8-syndrome structure fit the data well when tested separately in 30 societies, the results of the Rescorla et al. study indicated some variations in the mean level of syndrome scores across these societies.

Assessment of children's problems requires data not only from parents but from teachers and the children themselves. The Teacher's Report Form (TRF) and the Youth Self-Report (YSR) are teacher- and self-report counterparts to the CBCL that have similar syndrome structures. For the TRF, Ivanova et al. (in press) tested a correlated 7-syndrome structure comprising the Anxious/

Table 4. *Descriptive Statistics for Factor Loadings Across 30 Societies by Syndrome*

Syndromes and Items	*M* Loading	*Mdn* Loading	*SD*	Range[a]
Anxious/Depressed	*.59*	*.62*	*.12*	*.37–.72*
14. Cries a lot	.58	.60	.11	.14–.74
29. Fears	.38	.40	.13	−.11–.61
30. Fears school	.55	.59	.15	.02–.73
31. Fears doing bad	.51	.50	.10	.32–.72
32. Must be perfect	.37	.40	.12	.06–.55
33. Feels unloved	.71	.70	.06	.60–.88
35. Feels worthless	.72	.74	.08	.50–.84
45. Nervous	.71	.74	.10	.38–.85
50. Anxious	.67	.66	.08	.50–.80
52. Feels guilty	.64	.66	.09	.37–.80
71. Self-conscious	.56	.57	.11	.22–.74
91. Talks about suicide	.62	.64	.11	.26–.80
112. Worries	.64	.68	.11	.37–.78
Withdrawn/Depressed	*.65*	*.63*	*.12*	*.51–.87*
42. Rather be alone	.51	.54	.12	.17–.70
65. Won't talk	.68	.70	.10	.34–.81
69. Secretive	.61	.65	.14	.21–.82
75. Shy	.52	.53	.10	.27–.71
102. Underactive	.63	.63	.07	.48–.76
103. Sad	.87	.88	.07	.76–1.00
111. Withdrawn	.72	.73	.10	.35–.86
Somatic Complaints	*.59*	*.63*	*.12*	*.41–.74*
47. Nightmares	.64	.66	.09	.33–.80
49. Constipated	.47	.49	.12	.20–.72
51. Dizzy	.65	.65	.11	.45–.90
54. Overtired	.74	.76	.09	.44–.90
56a. Aches	.67	.66	.08	.52–.83
56b. Headaches	.60	.62	.11	.23–.84
56c. Nausea	.72	.73	.09	.40–.91
56d. Eye problems	.41	.41	.14	−.08–.65
56e. Skin problems	.41	.42	.12	.23–.64
56f. Stomachaches	.60	.61	.10	.30–.82
56g. Vomiting	.63	.65	.14	.32–1.08
Social Problems	*.59*	*.61*	*.11*	*.40–.71*
11. Dependent	.52	.50	.08	.30–.68
12. Lonely	.55	.58	.10	.28–.69
25. Doesn't get along	.70	.68	.09	.55–.87
27. Jealous	.61	.61	.08	.35–.76
34. Others out to get him/her	.71	.72	.08	.50–.84
36. Accident-prone	.52	.53	.08	.28–.65
38. Teased	.67	.67	.06	.51–.76
48. Unliked	.71	.71	.09	.52–.86
62. Clumsy	.61	.61	.08	.42–.74
64. Prefers younger kids	.44	.45	.13	.12–.69
79. Speech problems	.40	.40	.12	.13–.64
Thought Problems	*.55*	*.57*	*.09*	*.39–.72*
9. Can't get mind off thoughts	.57	.58	.08	.38–.70
18. Harms self	.67	.68	.17	.26–1.04
40. Hears things	.59	.59	.14	.26–.92
46. Twitching	.59	.57	.08	.44–.77
58. Picks skin	.50	.51	.10	.17–.68
59. Sex parts in public	.51	.59	.20	.09–.83

(*Continued*)

Table 4. *Continued*

Syndromes and Items	*M* Loading	*Mdn* Loading	*SD*	Range[a]
60. Sex parts too much	.49	.50	.16	.06–.74
66. Repeats acts	.61	.63	.09	.42–.74
70. Sees things	.57	.57	.10	.31–.78
76. Sleeps less	.46	.46	.08	.31–.61
83. Stores things	.47	.50	.12	.10–.64
84. Strange behavior	.72	.74	.12	.44–.99
85. Strange ideas	.64	.65	.12	.36–.87
92. Sleep talks/walks	.39	.38	.09	.17–.56
100. Trouble sleeping	.52	.54	.08	.28–.68
Attention Problems	*.65*	*.64*	*.07*	*.53–.73*
1. Acts young	.53	.53	.08	.32–.66
8. Can't concentrate	.67	.68	.07	.53–.83
10. Can't sit still	.61	.60	.09	.34–.77
13. Confused	.73	.74	.08	.48–.86
17. Daydreams	.58	.57	.09	.38–.74
41. Impulsive	.73	.73	.06	.53–.84
61. Poor schoolwork	.61	.61	.08	.34–.74
80. Stares blankly	.70	.70	.08	.55–.92
Rule-Breaking Behavior	*.63*	*.64*	*.09*	*.45–.78*
26. Lacks guilt	.62	.64	.10	.38–.80
39. Bad friends	.64	.65	.10	.35–.76
43. Lies, cheats	.73	.73	.07	.51–.87
63. Prefers older kids	.45	.43	.08	.27–.63
67. Runs away	.67	.67	.13	.34–.94
72. Sets fires	.56	.57	.12	.11–.72
73. Sex problems	.62	.61	.19	.13–1.06
81. Steals at home	.68	.70	.09	.49–.80
82. Steals outside home	.66	.64	.13	.42–.89
90. Swearing	.69	.70	.08	.53–.85
96. Thinks of sex too much	.60	.61	.09	.33–.79
101. Truant	.54	.54	.14	.16–.84
106. Vandalism	.78	.76	.12	.47–1.06
Aggressive Behavior	*.68*	*.68*	*.04*	*.61–.74*
3. Argues	.61	.62	.10	.34–.77
16. Mean	.69	.68	.07	.52–.85
19. Demands attention	.63	.66	.09	.35–.74
20. Destroys own things	.65	.65	.07	.50–.81
21. Destroys others' things	.69	.70	.06	.56–.81
22. Disobedient at home	.71	.73	.06	.54–.79
23. Disobedient at school	.64	.65	.07	.48–.81
37. Fights	.66	.66	.07	.55–.81
57. Attacks people	.68	.69	.09	.32–.80
68. Screams	.68	.71	.09	.37–.81
86. Stubborn	.74	.75	.06	.59–.82
87. Mood changes	.72	.71	.07	.58–.84
88. Sulks	.64	.67	.11	.31–.78
89. Suspicious	.68	.67	.10	.44–.87
94. Teases	.65	.65	.08	.45–.80
95. Temper	.71	.72	.07	.50–.83
97. Threats	.73	.75	.07	.61–.89
104. Loud	.67	.69	.07	.42–.77

Note: Values in italics are descriptive statistics for syndromes.
[a] Loadings $\geqslant 1$ are for the 5 out of 6,600 estimated parameters that were outside of that admissable parameter space.

Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Rule-Breaking Behavior, and Aggressive Behavior syndromes, plus a hierarchical 3-syndrome structure for attention problems in 20 societies. The 20 societies included Lebanon and all societies tested in this study except Belgium, Ethiopia, Germany, Iceland, Israel, Korea, Norway, Russia, Sweden, Switzerland, and Taiwan. The model converged for all 20 samples, and the RMSEA indicated acceptable to good model fit in each society. For the YSR, Ivanova et al. (in press b) tested the fit of the correlated 8-syndrome structure comprising the eight syndromes tested in the present study in 23 societies, which included Spain and all societies tested in the study, except Belgium, China, France, Italy, Portugal, Russia, Taiwan, and Thailand. The model converged in all 23 samples, and RMSEA values indicated good model fit in each society. The results the present study and the Ivanova et al. (in press a, in press b) studies provide preliminary evidence for the similarity of syndromes measured by the CBCL, TRF and YSR in very different societies.

Limitations and Implications

Our findings do not necessarily imply a universal or exhaustive syndrome structure for child psychopathology. Because it was developed in the (U.S.), the CBCL may assess children's problems that are particularly relevant for U.S. children but may fail to assess additional problems that could be relevant for children elsewhere. Although they tap diverse problems, the items could be supplemented by additional items that might yield different syndromes in particular societies or even in all societies. Other assessment methods, such as clinical interviews, are needed for comprehensive mental health evaluations of children and adolescents. Furthermore, other syndrome structures could have fit the data as well.

To account for the nonnormal distribution of our data, we used the WLSMV estimator. The WLSMV is a recently developed advanced estimator that is robust to violations of multivariate normality (Muthén & Muthén, 2004). Because the WLSMV is so computationally intensive, it is not now feasible to use the WLSMV to test components of measurement invariance other than configural invariance. To conclude that an assessment instrument measures the same construct across different societies, it is necessary to formally test all components of measurement invariance. It is important to recognize that the results of the present study and the Ivanova et al. (in press a, in press b) studies do not necessarily imply that the CBCL, TRF, and YSR measure the same psychological constructs across the 30 societies. Rather, the finding of configural invariance for the correlated 8-syndrome structure across societies should be interpreted as *preliminary* evidence that the patterning of problem items assessed by these instruments is similar in the tested societies.

The findings of our study have important practical implications for mental health professionals. Efficient assessments of child psychopathology that are calibrated across societies are badly needed, especially where mental health resources are scarce. The syndromes tested in this study can be readily assessed by parent-, teacher-, and self-ratings. Translations of the CBCL, TRF, and YSR are available in over 79 languages. The results also have implications for our evolving understanding of child psychopathology. The findings of our study and the Ivanova et al. (in press a, in press b) studies support the tested syndromes as templates for conceptualizing children's emotional and behavioral difficulties in many societies. These templates can provide mental health professionals around the world with a common language for communicating about child psychopathology. Such a language can facilitate international collaboration in clinical care and research, which can promote cross-fertilization of research programs and sharing of resources. Because they have empirical support in many societies, the syndromes can also contribute to a shared framework for training mental health professionals in these societies.

References

Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist/4–18 and 1991 Profile*. Burlington: University of Vermont, Department of Psychiatry.

Achenbach, T. M., Bird, H. R., Canino, G., Phares, V., Gould, M. S., & Rubio-Stipec, M. (1990). Epidemiological comparisons of Puerto Rican and U.S. mainland children: Parent, teacher, and self-reports. *Journal of the American Academy of Child and Adolescent Psychiatry*, *29*, 84–93.

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington: University of Vermont, Research Center for Children, Youth, and Families.

Albrecht, G., Veerman, J. W., Damen, H., & Kroes, G. (2001). The Child Behavior Checklist for group care workers: A study regarding the factor structure. *Journal of Abnormal Child Psychology*, *29*, 83–89.

Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin*, *107*, 238–246.

Berg, I., Fombonne, E., McGuire, R., & Verhulst, F. (1997). A cross-cultural comparison of French and Dutch disturbed children using the Child Behavior Checklist (CBCL). *European Child and Adolescent Psychiatry*, *6*, 7–11.

Bilenberg, N. (1999). The Child Behavior Checklist (CBCL) and related material: Standardization and validation in

Danish population based and clinically based samples. *Acta Psychiatrica Scandinavica*, *100*, 2–52.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.

Chen, F., Bollen, K. A., Paxton, P., Curran, P. J., & Kirby, J. B. (2001). Improper solutions in structural equation models. *Sociological Methods and Research*, *29*, 468–508.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York: Academic Press.

De Groot, A., Koot, H. M., & Verhulst, F. C. (1994). Cross-cultural generalizability of the Child Behavior Checklist cross-informant syndromes. *Psychological Assessment*, *6*, 225–230.

Domuta, A. (2004). *Evaluarea sindromului ADHD la varsta prescolara ADHD assessment in greschooless*. Unpublished doctoral dissertation, Babes-Bolyai University, Cluj Napoca, Romania.

Döpfner, M., Plück, J., Berner, W., Fegert, J. M., Huss, M., Lenz, K., et al. (1997). Psychische Auffälligkeiten von Kindern und Jugendlichen in Deutschland-Ergebnisse einer repräsentativen Studie: Methodik, Alters-, Geschlechts- und Beurteilereffekte Psychic disturbance of children and adoloscents in Germany: Results of representative study: Married, age, gender, and related effects. *Zeitschrift für Kinder- und Jugendpsychiatrie und Psychotherapie*, *25*, 218–233.

Dumenci, L., Erol, N., Achenbach, T. M., & Simsek, Z. (2004). The measurement structure of the Turkish translation of the Child Behavior Checklist using confirmatory factor analytic approaches to construct validation. *Journal of Abnormal Child Psychology*, *32*, 337–342.

Dumenci, L., Oh, K-J., & Achenbach, T. M. (2003). *Confirmatory factor analysis of Korean Child Behavior Checklist scores*. Burlington: University of Vermont Research Center for Children, Youth and Families.

Erol, N., & Simsek, Z. (1997). Mental health profiles of Turkey: Behavioral/emotional problems and competencies in Turkish children. In N. Erol, C. Kilic, M. Ulusoy, M. Kececi, & Z. Simsek (Eds.), *Mental health profiles of Turkey: A preliminary report* (pp. 12–33). Ankara, Turkey: Aydogdu.

Fombonne, E., & Vermeersch, S. (1997). Children from the GAZEL cohort: 1-Prevalence and patterns of service utilization for emotional and behavioural symptoms. *Revue d'Épidémiologie et de Santé Publique*, *45*, 29–40.

Fonseca, A. C., Simoes, A., Rebelo, J. A., Ferriera, J. A., Cardoso, F., & Temudo, P. (1995). Hyperactivity and conduct disorder among Portuguese children and adolescents: Data from parents' and teachers' reports. In J. Sergeant (Ed.), *Eunethydis: European approaches to hyperkinetic disorder* (pp. 115–129). Zürich, Switzerland: Fotorotar.

Frigerio, A., Cattaneo, C., Cataldo, M., Schiatti, A., Molteni, M., & Battaglia, M. (2004). Behavioral and emotional problems among Italian children and adolescents aged 4 to 18 years as reported by parents and teachers. *European Journal of Psychological Assessment*, *20*, 124–133.

Hannesdottir, H., & Einarsdsottir, S. (1995). The Icelandic Child Mental Health Study. An epidemiological study of Icelandic children 2–18 years of age using the Child Behavior Checklist as a screening instrument. *European Child and Adolescent Psychiatry*, *4*, 237–248.

Hartman, C. A., Hox, J., Auerbach, J., Erol, N., Fonseca, A. C., Mellenbergh, G. J., et al. (1999). Syndrome dimensions of the Child Behavior Checklist and Teacher Report Form: A critical empirical evaluation. *Journal of Child Psychology and Psychiatry*, *40*, 1095–1116.

Hellinckx, W., Grietens, H., & De Munter, A. (2000). Parent-reported problem behavior in 12–16-year-old American and Russian children: A cross-national comparison. In N. Singh, J. P. Leung, & A. Singh (Eds.), *International perspectives on child and adolescent mental health: Selected Proceedings of the First International Conference on Child & Adolescent Mental Health* (pp. 205–222). Kidlington, UK: Elsevier.

Hellinckx, W., Grietens, H., & Verhulst, F. (1994). Competence and behavioral problems in 6- to 12-year-old children in Flanders (Belgium) and Holland: A cross-national comparison. *Journal of Emotional and Behavioral Disorders*, *2*, 130–142.

Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.

Itani, T., Kanbayashi, Y., Nakata, Y., Kita, M., Kuramoto, H., Negishi, T., et al. (2001). Standardization of the Japanese version of the Child Behavior Checklist/4-18. *Psychiatria et Neurologia Paediatrica Japonica*, *41*, 243–252.

Ivanova, M. Y., Achenbach, T. M., Rescorla, L. A., Dumenci, L., Almqrist, F., Bathiche, M., et al. (in press a). Testing the Teacher's Report Form Syndromes in 20 societies. *School Psychology Review*. Manuscript submitted for publication.

Ivanova, M. Y., Achenbach, T. M., Rescorla, L. A., Dumenci, L., Almqrist, F., Bilenberg, N., et al. (in press b). The generalizability of the Youth Self-Report syndrome structure in 23 societies. *Journal of Consulting and Clinical Psychology*. Manuscript submitted for publication.

Lambert, M. C., & Lyubansky, M. (1999). Behavior and emotional problems among Jamaican children and adolescents: An epidemiological survey of parent, teacher, and self-reports for ages 6–18 years. *International Journal of Intercultural Relations*, *23*, 727–751.

Larsson, B., & Frisk, M. (1999). Social competence and emotional/behaviour problems in 6–16 year-old Swedish school children. *European Child and Adolescent Psychiatry*, *8*,'24–33.

Leung, P. W., Kwong, S. L., Tang, C. P., Ho, T. P., Hung, S.'F., Lee, C. C., et al. (2006). Test-retest reliability and criterion validity of the Chinese version of the CBCL, TRF, and YSR. *Journal of Child Psychology and Psychiatry*, *47*, 970–973.

Liu, X., Kurita, H., Guo, C., Miyake, Y., Ze, J., & Cao, H. (1999). Prevalence and risk factors of behavioral and emotional problems among Chinese children aged 6 through 11 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, *38*, 708–715.

Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indices and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling*, *11*, 320–341.

McDonald, R. P. (2004). Respecifying improper structures. *Structural Equation Modeling*, *11*, 194–209.

Minaei, A. (2005). *Manual of ASEBA School-Age Forms for "Iranian Children*. Tehran, Iran: Research Institute for Exceptional Children.

Mulatu, M. S. (1997). *Stress, coping, and adaptation in Ethiopian adolescents: Testing the applicability of the transactional model of stress and coping*. Unpublished doctoral dissertation, Queen's University, Kingston, Ontario, Canada.

Muthén, L. L., & Muthén, B. O. (2001, 2004). *Mplus: User's guide*. Los Angeles: Author.

Novik, T. S. (1999). Validity of the Child Behavior Checklist in a Norwegian sample. *European Child and Adolescent Psychiatry*, *8*, 247–254.

Oh, K. J., Lee, H., Hong, K.-E., & Ha, E. H. (1997). *Korean-Child Behavior Checklist*. Seoul, Korea: Chung Ang Aptitude.

Rescorla, L. A., Achenbach, T. M., Ivanova, M. Y., Dumenci, L., et al. (in press). Problems reported by parents of children ages 6 to 16 in 31 cultures. *Journal of Emotional and Behavioral Disorders*.

Roussos, A., Richardson, C., Marketos, N., Kyprianos, S., Lazaratou, H., Mahaira, O., et al. (1999). *Achenbach's Child Behavior Checklist and Teacher's Report Form for Greek referred children ages 6–12 years old*. Unpublished manuscript, Attiki Child Psychiatry Hospital, Athens, Greece.

Sawyer, M. G., Kosky, R. J., Graetz, B. W., Arney, F., Zubrick, S. R., & Baghurst, P. (2000). The National Survey of Mental Health and Wellbeing: The child and adolescent component. *Australian and New Zealand Journal of Psychiatry*, *34*, 214–220.

Steinhausen, H. C., Metzke, C. W., Meier, M., & Kannenberg, R. (1997). Behavioral and emotional problems reported by parents for ages 6 to 17 in a Swiss epidemiological study. *European Child and Adolescent Psychiatry*, *6*, 136–141.

Tucker, L. R., & Lewis, C. (1973). The reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, *38*, 1–10.

United States Census Bureau. (2005). *School enrollment-Social and economic characteristics of students: October 2003*. Washington, DC: Author.

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, *3*, 4–70.

Van den Oord, E. J. (1993). *A genetic study of problem behavior in children*. Rotterdam, The Netherlands: Erasmus University.

Van Driel, O. P. (1978). On various causes of improper solutions in maximum likelihood factor analysis. *Psychometrika*, *43*, 225–243.

Verhulst, F. C., van der Ende, J., & Koot, H. M. (1996). *Handleiding voor de CBCL/4-18*. Rotterdam, The Netherlands: Erasmus University, Department of Child and Adolescent Psychiatry.

Weintraub, S. (2004). Unpublished Child Behavior Checklist rattings J. the data.

Weisz, J. R., Suwanlert, S., Chaiyasit, W., Weiss, B., Achenbach, T. M., & Eastman, K. L. (1993). Behavioral and emotional problems among Thai and American adolescents: Parent reports for ages 12–16. *Journal of Abnormal Psychology*, *102*, 295–402.

Weisz, J. R., Suwanlert, S., Chaiyasit, W., Weiss, B., Achenbach, T. M., & Walter, B. R. (1987). Epidemiology of behavioral and emotional problems among Thai and American children: Parent reports for ages 6–11. *Journal of the American Academy of Child and Adolescent Psychiatry*, *26*, 890–897.

Wolanczyk, T. (2003). *Zaburzenia emocjonalne i behawioralne u dzieci i mlodziezy w Polsce. Emotional and behavioural problems in children and adolescents in Poland*. Warszaw, Poland: Akademia Medyczna w Warszawie.

Yang, H.-J., Soong, W.-T., Chiang, C.-N., & Chen, W. J. (2000). Competence and behavioral/emotional problems among Taiwanese adolescents as reported by parents and teachers. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*, 232–239.

Yu, C. Y., & Muthén, B. O. (2002). *Evaluation of model fit indices for latent variable models with categorical and continuous outcomes* (Technical Report). Los Angeles: UCLA, Graduate School of Education and Information Studies.

Zilber, N., Auerbach, J., & Lerner, Y. (1994). Israeli norms for the Achenbach Child Behavior Checklist: Comparison of clinically-referred and non-referred children. *Israeli Journal of Psychiatry and Related Sciences*, *31*, 5–12.

Zukauskiene, R., Ignataviciene, K., & Daukantaite, D. (2003). Subscale scores of the Lithuanian version of CBCL: Preliminary data on the emotional and behavioural problems in childhood and adolescence. *European Child and Adolescent Psychiatry*, *12*, 136–143.

Received February 21, 2006
Accepted January 11, 2007