Erratum to: Measuring Callous Unemotional Behaviors in Early Childhood: Factor Structure and the Prediction of Stable Aggression in Middle Childhood

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Published online: 18 October 2013
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Erratum to: J Psychopathol Behav Assess DOI 10.1007/s10862-013-9379-9

Soon after the online publication of our manuscript (Willoughby, Mills-Koonce, Gottfredson, and Wagner 2013), we determined that a data management error had occurred in the creation of the analysis dataset. This error resulted in some observations being duplicated and others being omitted. Below, we provide corrected study results and conclusions.

Descriptive Statistics

Updated demographic and behavioral characteristics of the corrected sample are summarized in Table 1. Although the total sample size was unchanged ($N=1,081$), there were slight changes to the numbers of children characterized as having organized versus disorganized attachments (now $N_s=918$ and 163, respectively). Only minor and trivial changes were evident with respect to the demographic characteristics of the sample.

Moreover, as before, there was no evidence that children with organized versus disorganized attachment status differed meaningfully on any of the demographic variables considered. A minor change in the updated Table 1 is that we now report mean (not sum) scores for ADHD, CU, and ODD.

The corrected bivariate correlations for all study variables, including the time specific indicators of teacher-rated aggression which were used to create the aggression trajectory groups, are summarized in Table 2. Two changes were evident. First, child gender and race, caregiver education, and household income to needs ratio were all more strongly associated with membership in the stable elevated aggression trajectory ($|r|s=.25-.47$) than was the case previously. Second, parent-rated ADHD, ODD, and CU behaviors also appeared to be more strongly related to membership in the stable elevated aggression trajectory class ($rs=.18-.27$) than was previously the case. Child disorganization status continued to be unrelated to membership in the stable trajectory class.

Dimensionality of ASEBA Items

The first objective of this study was to examine the factor structure of 17 parent-reported items from the ASEBA that represented ADHD, ODD, and CU behaviors using a large sample of 3-year olds. All of the confirmatory factor models were re-estimated using corrected data. The updated results are summarized in Table 3. Only trivial differences in model fit statistics were evident and none of the substantive conclusions changed. Although the 3-factor model provided a statistically better fit to the data than did any of the 1- or

The online version of the original article can be found at <http://dx.doi.org/10.1007/s10862-013-9379-9>.

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Table 1 Descriptive statistics

	Total sample (<i>N</i> =1081)	Organized attachment (<i>N</i> =918)	Disorganized attachment (<i>N</i> =163)
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Mother education (Years)	14.4 (2.5)	14.5 (2.4)	14.1 (2.6)
Income-to-need	3.0 (2.6) ^A	3.0 (2.6) ^C	3.1 (2.9) ^E
ADHD	0.9 (0.4) ^B	0.9 (0.4) ^D	1.0 (0.4) ^F
CU	0.4 (0.3) ^B	0.3 (0.3) ^D	0.4 (0.4) ^F
ODD	0.7 (0.4) ^B	0.7 (0.4) ^D	0.7 (0.4) ^F
	%	%	%
Child race (White)	82	83	75
Child race (Black)	11	10	19
Child race (Other)	7	7	6
Child gender (Male)	51	52	41
Attachment (Disorganized)	15	0	100
Stable aggression	7	7	10

M - Mean, *SD* - Standard Deviation; Superscript A: *N*=1011; Superscript B: *N*=1026; Superscript C: *N*=862; Superscript D: *N*=864; Superscript E: *N*=149; Superscript F: *N*=162

2-factor models, none of the five initial models met conventional standards for good model fit. However, as before, the revised 3-factor model that introduced four correlated residuals fit the data well (see Table 3). Standardized factor loadings and latent/residual correlations from the final model appear in Fig. 1 (two of the latent and residual correlations had slightly different values using updated data). Chronbach's alpha and maximal reliability estimates for ADHD, ODD, and CU were also unchanged.

Prediction of Stable High Aggression

The second major objective of this study was to test whether individual differences in parent-reported ADHD, ODD, and CU behaviors, as well as children's disorganization status, at age 3 years were prospectively associated with children's membership in a stable elevated trajectory class that was defined by repeated measures of teacher-rated aggression from grades 1–6. The same sequence of logistic regression

Table 2 Bivariate correlations between predictors and outcomes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Male															
2 Black	.04														
3 Other Race	-.04	-.43*													
4 Mom Education	-.05	-.39*	-.11												
5 Income/Needs	-.05	-.54*	-.08	.42*											
6 Disorganized	-.16*	.23*	-.07	-.09	.02										
7 ADHD	.08*	.16*	.02	-.21*	-.15*	.09									
8 CU	.05	.09	.00	-.24*	-.09*	.10*	.53*								
9 ODD	.00	-.02	.00	-.11*	-.08*	.05	.57*	.52*							
10 High/Stable Agg	.25*	.47*	-.08	-.33*	-.35*	.11	.23*	.27*	.18*						
11 Teacher Agg G1	.22*	.22*	-.02	-.12*	-.09*	.07	.08*	.10*	.12*	.46*					
12 Teacher Agg G2	.21*	.23*	-.02	-.14*	-.07	.11*	.18*	.16*	.14*	.58*	.43*				
13 Teacher Agg G3	.15*	.28*	-.01	-.22*	-.14*	.06	.15*	.19*	.11*	.67*	.33*	.48*			
14 Teacher Agg G4	.18*	.29*	.00	-.16*	-.14*	.06	.16*	.17*	.15*	.60*	.41*	.47*	.49*		
15 Teacher Agg G5	.16*	.28*	-.11	-.17*	-.12*	.08	.11*	.13*	.05	.51*	.34*	.40*	.43*	.49*	
16 Teacher Agg G6	.28*	.21*	-.04	-.17*	-.14*	.09*	.07*	.06	.06	.53*	.42*	.35*	.39*	.35*	.43*

Total *N*=1,081; Correlations computed using the WLSMV estimator; **P*<.05

Table 3 Synopsis of confirmatory factor models of ASEBA items

Model	Description	X ² (df)	prob	CFI	RMSEA (90 % CI)
1	1 factor	1402.42 (119)	<.001	.88	.10 (.09,.10)
2	2 factor (CU vs. other)	1300.02 (118)	<.001	.89	.09 (.09,.10)
3	2 factor (ODD vs. other)	1090.86 (118)	<.001	.91	.08 (.08,.09)
4	2 factor (ADHD vs. other)	1041.64 (118)	<.001	.91	.08 (.08,.09)
5	3 factor (CU, ODD, ADHD)	922.09 (116)	<.001	.92	.08 (.07,.08)
	Model 5 vs. Model 1	285.06 (3)	<.001		
	Model 5 vs. Model 2	204.96 (2)	<.001		
	Model 5 vs. Model 3	110.23 (2)	<.001		
	Model 5 vs. Model 4	82.25 (2)	<.001		
6	Correlated residuals	443.02 (112)	<.001	.97	.05 (.05,.06)

N=1176; chi square difference tests computed using DIFTEST option in Mplus; *prob* - probability; *CFI* - Comparative Fit Index; *RMSEA* - Root mean squared error of approximation; *CI* - Confidence interval

models was estimated. The initial covariates only model was now predictive of membership in the stable elevated aggression group, $\chi^2_{(5)}=56.5$, $p<.0001$. Child race and gender, as well as maternal education made independent contributions (see Table 4). In the second model, none of the interactions were statistically significant (see full model of Table 4). Moreover in follow-up models that are not presented, none of the lower order interactions were statistically significant either. The final trimmed model retained all predictors as main effects. The demographic factors continued to exert unique effects. African American (odds ratio and 95 % confidence intervals (OR [95 % CI]=3.5 [1.8–7.0], $p=.0003$) and male children (OR [95 % CI]=2.0 [1.1–3.6], $p=.02$) were all at increased risk for being in the stable elevated aggression trajectory group. Higher levels of maternal educational attainment were associated with a decreased risk for child membership

in the stable elevated aggression trajectory group (OR [95 % CI]=0.9 [0.7–0.98], $p=.03$). Finally, among the behavioral predictors, only CU exerted a unique effect. Specifically, higher levels of maternal ratings of CU behavior at age 3 were associated with increased risk for membership in the stable elevated aggression trajectory group (OR [95 % CI]=2.9 [1.1–7.7], $p=.03$). Neither ADHD nor ODD had unique effects (see Table 4).

Conclusions

The previous conclusions regarding the factor structure of ASEBA items were unchanged. Parents of preschool-aged children can differentiate CU from more commonly assessed dimensions of disruptive behavior. The previous conclusions

Note: χ^2 (df) = 443.0 (112), $p < .001$, CFI = .97, RMSEA (90% CI) = .05 (.045 - .055); All coefficients $p < .001$

Fig. 1 Standardized coefficients from final confirmatory factor analysis

Table 4 Synopsis of logistic regression models

	Covariates only			Full model			Trimmed model		
	Beta	SE	<i>p</i>	Beta	SE	<i>p</i>	Beta	SE	<i>p</i>
Intercept	−.29	.87	.74	−2.32	1.51	.12	−1.93	1.04	.06
Black	1.34	.32	<.001	1.39	.35	<.001	1.27	.35	<.001
Other Race	.17	.55	.76	.34	.61	.58	.37	.57	.51
Male	.75	.28	<.01	.71	.31	.02	.69	.30	.02
Mother Education	−.21	.07	<.01	−.15	.07	.03	−.16	.07	.03
Income-to-Needs	−.10	.09	.24	−.10	.09	.27	−.09	.09	.29
Disorganized Attachment				.402	4.01	.32	.34	.35	.33
ADHD Sx				−.25	1.40	.86	.25	.44	.57
CU Sx				5.12	2.88	.08	1.06	.50	.03
ODD Sx				.15	1.85	.94	.24	.45	.59
ADHD*ODD				.93	1.58	.56			
CU*ODD				−3.58	3.34	.28			
ADHD*CU				−1.74	2.73	.52			
ADHD*CU*ODD				1.23	2.47	.62			
Disorganized*ADHD				4.05	4.01	.31			
Disorganized*CU				4.17	7.75	.59			
Disorganized*ODD				6.74	4.99	.18			
Disorganized*ADHD*ODD				−5.38	4.48	.23			
Disorganized*CU*ODD				−5.59	7.71	.47			
Disorganized*ADHD*CU				−5.12	6.54	.43			
Disorganized*ADHD*CU*ODD				5.36	5.44	.32			
−2LL		482.5			444.2			444.21	
Max Rescaled R ²		.14			.19			.17	
Likelihood Ratio χ^2 (df)		56.2(5)	<.001		69.9(20)	<.001		61.6(9)	<.001

N=966; *SE* - Standard error; *p* - Probability; *LL* - Log likelihood; *Sx* - Symptom

regarding the predictive validity of parent-reported CU did change. Individual differences in CU behaviors at age 3 were uniquely predictive of stable elevated aggression from 1st-6th grade. Whereas individual differences in ADHD and ODD behaviors at age 3 may be developmentally normative and

not predictive of future risk for aggression, individual differences in CU at age 3 are not normative and may be a risk factor for subsequent aggression. Collectively, these results provide support for the measurement of CU behaviors in early childhood.