

**Table S1. Multidimensional Assessment of Preschool Disruptive Behavior (MAP-DB) Item Factor Loadings From 4-Dimension, Developmental Confirmatory Factor Analysis (CFA) Model**

	Factor loading
<b>Temper Loss</b>	
1. Lose temper or have a tantrum when frustrated, angry or upset	.89
2. Have a temper tantrum, fall-out, or melt-down	.87
3. Lose temper or have a tantrum to get something he or she wanted	.87
4. Lose temper or have a tantrum when tired, hungry, or sick	.83
5. Become frustrated easily	.73
6. Lose temper or have a tantrum during daily routines such as bedtime, mealtime, or getting dressed	.84
7. Lose temper or have a tantrum with you or other parent	.88
8. Yell angrily at someone	.77
9. Have a short fuse (become angry quickly)	.81
10. Have difficulty calming down when angry	.78
11. Act irritable	.75
12. Get extremely angry	.86
13. Have a hot or explosive temper	.87
14. Stamp feet or hold breath during a temper tantrum, fall-out, or melt-down	.72
15. Keep on having a temper tantrum, fall-out, or melt-down, even when you tried to help him/her calm down	.87
16. Have a temper tantrum, fall-out, or meltdown that lasted more than 5 minutes	.83
17. Lose temper or have a tantrum with other adults	.81
18. Break or destroy things during a temper tantrum, fall-out, or melt-down	.81
19. Have a temper tantrum, fall-out, or melt-down until exhausted	.83
20. Lose temper or have a tantrum "out of the blue" or for no reason	.85
21. Hit, bite, or kick during a temper tantrum, fall-out, or melt-down	.81
22. Stay angry for a long time	.75
<i>M (SD)</i>	.82 (.05)
<b>Noncompliance</b>	
23. Break rules even when he or she knew you were watching	.67
24. Argue when asked to do something	.73
25. Act stubborn	.76
26. Disobey or break rules with you or other parent	.84
27. Say no when told to do something	.77
28. Disobey or break rules during daily routines, such as bedtime, mealtime, or getting dressed	.76
29. Act sassy, talk back or have a smart mouth	.73
30. Disobey or break rules when frustrated, angry or upset	.83
31. Do exactly what you just said not to do	.80

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	Factor loading
32. Disobey or break rules with other adults	.69
33. Refuse to follow directions	.84
34. Ignore directions	.81
35. Disobey or break rules for no reason or out of the blue	.79
36. Disobey or break rules when tired, hungry, or sick	.82
37. Disobey or break rules to get something he or she wanted	.86
38. Not do what you asked no matter what	.72
39. Argue about just about anything	.76
40. Automatically resist whatever you ask	.82
41. Take things he or she was not allowed to have	.78
42. Show off or laugh while misbehaving	.74
43. Do risky things s/he knew were not allowed	.73
44. Misbehave in ways that were dangerous or unsafe	.74
<i>M (SD)</i>	.77 (.05)
<b>Aggression</b>	
45. Act aggressively when frustrated, angry, or upset	.80
46. Act aggressively to try to get something he or she wanted	.81
47. Act aggressively with you or other parent	.83
48. Throw something at someone (not as part of a game)	.80
49. Try to hurt someone to get back at them	.80
50. Hit someone with an object	.79
51. Act aggressively out of the blue or for no reason	.84
52. Break or ruin things on purpose	.79
53. Act aggressively with other adults	.82
54. Do or say mean or "not nice" things to other children	.80
55. Act aggressively towards other children	.84
56. Hit, shove, or kick you or other parent	.78
57. Get into fights	.77
58. Call another child names	.62
59. Pinch, scratch, or pull someone's hair	.69
60. Hit, shove, or kick other children	.77
61. Say or do mean or "not nice" things to other children behind their backs	.71
62. Bully someone	.79
63. Hurt someone on purpose	.81
64. Refuse to let other children play with him/her	.66
65. Threaten someone	.73
66. Tell others not to let someone play with them	.47
67. Hit, shove, or kick other adults	.77
68. Curse at someone	.62
69. Spit at someone	.62
<i>M (SD)</i>	.75 (.09)

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	Factor loading
<b>Low Concern for Others</b>	
70. Not care about other's feelings when frustrated, angry or upset	.86
71. Not seem to care about your or other parent's feelings	.87
72. Keep on doing something that was scaring or upsetting someone	.76
73. Not seem to care about other adults' feelings	.87
74. Act like s/he did not care about pleasing other people	.83
75. Act like s/he did not care when someone was mad or upset	.87
76. Enjoy making others mad	.82
77. Do things to humiliate or embarrass others	.79
78. Act like s/he did not care when someone else felt bad or sad	.79
<i>M (SD)</i>	.83 (.04)

**Table S2. Modeling Factor Invariance across Demographic Subgroups**

Model	Loglikelihood	Number of free parameters	AIC	BIC	Sample-Size Adjusted BIC
<b>By Child Sex (760 Boys, 727 Girls)</b>					
Factor variant model	-88280	943	178446	183449	180453
Factor invariant model	-88559	479	178086	180617	179095
<b>By Child Age (523 3-year-olds, 533 4 year olds, 432 5-year-olds)</b>					
Factor variant model	-88463	1391	179709	187088	182669
Factor invariant model	-89099	477	179151	181682	180166
<b>By Child Race/Ethnicity (533 African-American, 530 Hispanic, 406 White)</b>					
Factor variant model	-86519	1358	175754	182941	178627
Factor invariant model	-87807	466	176546	179012	177532
<b>By Poverty Status (852 Not Poor, 618 Poor)</b>					
Factor variant model	-86923	917	175681	180534	177621
Factor invariant model	-87439	466	175809	178276	176795

Note: Robust maximum likelihood estimation with logit link (Mplus MLR option); Scaling correction factors ranged from 1.00–1.02. In factor variant models, item thresholds and factor loadings are estimated for each group and factor means are fixed to zero. In factor invariant models, item thresholds and factor loadings are equal across groups and factor means are fixed to zero in one group and freely estimated in others. AIC=Akaike Information Criterion; BIC=Bayesian Information Criterion.

**Table S3. Comparisons of Subgroup Differences in Dimensional Scores<sup>a</sup>**

Group	Multivariate F (by Wilks' lambda)	df	TL		NC		AG		LC	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD
Boys, n=760	4.33**	4,1483	.07 <sup>a</sup>	.93	.05	.93	.10 <sup>a</sup>	.92	.10 <sup>a</sup>	.89
Girls, n=728			-.07 <sup>b</sup>	.95	-.06	.97	-.07 <sup>b</sup>	.92	-.04 <sup>b</sup>	.91
3 year olds, n=523	5.02***	8,2964	.10 <sup>a</sup>	.94	.10 <sup>a</sup>	.94	.11 <sup>a</sup>	.90	.08	.87
4 year olds, n=533			.01 <sup>ab</sup>	.95	.00 <sup>ab</sup>	.98	.02 <sup>ab</sup>	.94	.04	.93
5 year olds, n=432			-.13 <sup>b</sup>	.93	-.14 <sup>b</sup>	.92	-.10 <sup>b</sup>	.91	-.04	.89
African American, n=533	13.89***	8,2926	-.11 <sup>a</sup>	1.05	-.14 <sup>a</sup>	1.03	-.03 <sup>a</sup>	1.04	-.06 <sup>a</sup>	1.01
Hispanic, n=530			-.09 <sup>a</sup>	.88	-.12 <sup>a</sup>	.88	-.09 <sup>a</sup>	.83	-.06 <sup>a</sup>	.81
White, n=406			.27 <sup>b</sup>	.83	.32 <sup>b</sup>	.86	.23 <sup>b</sup>	.85	.27 <sup>b</sup>	.83
Non-poor, n=852	8.61***	4,1465	.00	.85	.02	.87	-.01	.84	.02	.82
Poor, n=618			.00	1.06	-.04	1.06	.06	1.03	.05	1.00

Note: Means with different superscript differ at  $p < 0.01$ . AG = aggression; LC = low concern; NC = noncompliance; TL = temper loss.

<sup>a</sup>Derived from multivariate analysis of variance (MANOVA).

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

**Table S4. Comparison of Model Fit:<sup>a</sup> 4-Dimension, Developmental Model vs. Established Models**

Dimensional Models <sup>b</sup>	Log likelihood	Number of free parameters	AIC	BIC	Sample-Size Adjusted BIC
Developmental Model	-87536	474	176021	178536	177030
DSM ODD/CD Model	-88603	469	178143	180631	179141
DB/callous Model	-89373	469	179683	182171	180681
IHH Model	-88524	471	177990	180489	178993

Note: <sup>a</sup>Robust maximum likelihood estimation with logit link (Mplus MLR option). Scaling correction factors ranged from 1.01–1.09. Parentheticals indicate number of dimensions. From weighted least squares estimation with probit link (Mplus WLSMV option),  $\chi^2_{2919}=13007$ . AIC=Akaike Information Criterion; BIC=Bayesian Information Criterion.

<sup>b</sup>Model Structure: Developmental Model (4 dimensions)=Temper Loss + Aggression + Noncompliance + Low Concern dimensions. Disruptive Behavior (DB)/Callous Model (2 dimensions)=DB Dimension (Temper Loss + Noncompliance + Aggression) and Callous Dimension (Low Concern). *DSM* oppositional defiant disorder (ODD)/conduct disorder (CD) Model (2 dimensions)=ODD Dimension (Temper Loss + Noncompliance) and CD Dimension (Aggression + Low Concern). Irritable/Headstrong/Hurtful (IHH) Model (3 dimensions)=Irritable (Temper Loss), Headstrong (Noncompliance), Hurtful (Aggression + Low Concern).