Supporting information for *Profiling depression in childhood and adolescence: the role of conduct problems* by Riglin et al.

Appendix S1: Latent profile analysis model selection

Latent profile analysis aims to group similar individuals into categories. Starting with a single k-profile solution, $k+1$ solutions were extracted until the optimum number of profiles was reached (i.e. the fewest number of profiles that describe associations between depressive symptoms and conduct problems). As recommended, a number of criteria were used to determine the optimum number of profiles: 1) improved model fit for $k+1$ compared to k solutions according to the bootstrap likelihood ratio test (BLRT) or a robust chi-square difference test (for twin data; see below) and the Bayesian information criterion (BIC)(Nylund, Asparouhov, & Muthen, 2008); 2) high entropy values (>=.80; Clark & Muthén, 2009); 3) the extent to which profiles were theoretically meaningful (Muthen & Muthen, 2000). For fitting latent profile models to twin data, a two-level approach was used which accounts for twin non-independence. This involves modelling two latent profile variables (one for 'Twin a' and one for 'Twin b', to which individuals from each twin pair were randomly assigned) for which the parameters are held equal but where the probabilities for Twin a are not influenced by the probabilities for Twin b and vice versa (Muthen, Asparouhov, & Rebollo, 2006). The BLRT cannot be computed for two-levels models, instead a robust chi-square difference test was used (Satorra & Bentler, 2001).

Model comparisons for both samples are shown in Table S1. In both samples, a significant improvement in model fit from 1 to 9 profiles was indicated by BLTR or χ^2 change. However BIC and loglikelihood values evened out from 8 to 9 profiles. This suggests that fewer than 8 profiles did not adequately describe associations between depressive symptoms and conduct problems in either sample. Thus an 8 profile solution was selected for both samples.

Table S1: Model comparisons for latent profile analyses

Profiles	Free parameters	Loglikelihood value	BIC	Entropy	BLTR: 2 times the loglikelihood difference
School sample					
1	6	-6751.379	13532.387		
2	10	-6417.843	12887.538	.912	667.071[*]
3	14	-6272.889	12619.850	.912	289.909[*]
4	18	-6187.190	12470.675	.888	171.398[*]
5	22	-6126.065	12370.647	.913	122.249[*]
6	26	-6083.867	12308.473	.908	84.396[*]
7	30	-6054.291	12271.542	.856	59.152[*]
8	34	-6022.602	12230.387	.835	63.377[*]
9	38	-6005.211	12217.828	.840	34.782[*]
Profiles	Free parameters	Loglikelihood value	BIC	Entropy	Satorra-Bentler Scaled Chi-Square
1	8	-10557.399	21170.083		
2	10	-10215.965	20501.037	.878	146.746[*]
3	15	-10007.167	20117.995	.858	193.099[*]
4	21	-9829.090	19803.305	.816	425.869[*]
5	28	-9721.909	19637.318	.818	33.965[*]
6	36	-9610.104	19468.995	.833	-139.997[#]
7	45	-9528.773	19368.530	.823	-1047.405[#]
8	55	-9455.856	19291.803	.830	223.929[*]
9	66	-9412.587	19281.284	.828	69.087[*]

[*]$p<.0001$ [#]p values not computed for negative values. BIC = Bayesian Information Criterion, BLTR = bootstrap likelihood ratio test.

References

Clark, S. L., & Muthén, B. (2009). Relating latent class analysis results to variables not included in the analysis. *Submitted for publication*.

Muthen, B., Asparouhov, T., & Rebollo, I. (2006). Advances in behavioral genetics modeling using Mplus: Applications of factor mixture modeling to twin data. *Twin Research and Human Genetics, 9*, 313-324.

Muthen, B., & Muthen, L. K. (2000). Integrating person-centered and variable-centered analyses: Growth mixture modeling with latent trajectory classes. *Alcoholism-Clinical and Experimental Research, 24*, 882-891.

Nylund, K. L., Asparouhov, T., & Muthen, B. O. (2008). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study.

Satorra, A., & Bentler, P. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*, 507-514.