

Supplementary Material

1 Structural Validity and Reliability of the measures

To test the fit of the measures used to assess the construct in the study, we used confirmatory factor analysis (CFA) with MPLUS (v. 8.2) (Muthén & Muthén, 1998-2017). The CFAs were conducted using the estimator weighted least squares mean and variance (WLSMV) and a polychoric correlation matrix, which are considered less biased and more accurate in estimating the factor loadings (λ) of ordered categorical data (Li, 2016). Model fit was assessed using the indices and cut-off points suggested by Hu and Bentler (1999): non-significant values of chi-square (χ 2) or less than three times the degrees of freedom; values higher than .95 of comparative fit index (CFI) and Tucker-Lewis index (TLI); and values lower than .08 of root mean square error of approximation (RMSEA). The goodness-of-fit of all the measure models is reported in Supplementary Table 1.

1.1 Students' perceptions of teachers' use of effective feedback

The factor model of students' perceptions of teachers' use of effective feedback presented good indicators of CFI and TLI, but less suitable fit accordingly to the RMSE indicators. A review of the modification indices (MI) revealed several large values for residual covariances between several items, which appears to result from overlapping item content. As suggested by Byrne (2012), once at a time, we correlated the items indicated by the MIs: items 1 and 2 and items 7 and 8. The modified model presented a very good fit (Supplementary Table 1). All trajectories in the measure were statistically significant, and all had $\lambda \ge .50$, as can be observed in Supplementary Figure 1. Reliability values were also adequate (CR = .89).

1.2 Students' behavioural engagement

To confirm the validity of the two-dimensional hierarchical structure of the measure in our sample, we conducted a CFA using the WLSMV estimator. The results indicated that there was also evidence of structure validity (Supplementary Table 1). Composite reliability was also adequate for the global measure (CR = .88). All trajectories in the measure were statistically significant, and all had $\lambda \ge .50$ or very close to .50, as can be observed in Supplementary Figure 2.

1.3 Students' school identification

We conducted a CFA to confirm the validity of the three-dimensional hierarchical structure of the measure in our sample using the WLSMV estimator. Good fit index values were adequate (Supplementary Table 1). Still, a review of the modification indices (MI) revealed a larges values for residual covariances between items 1 and 2. After correlating these items, the modified model presented a very good fit (Supplementary Table 1). Only the item 3 presented a factor loading inferior to .50 (see Supplementary Figure 3), but we maintain the item since researchers suggest that it is important to have at least 3 items per factor (e.g., Marsh, Hau, Ball, & Grayson, 1998). The global measure presented good levels of reliability (CR = .84).



Supplementary Figure 1. Confirmatory factor analysis factor loadings (with WLSMV estimator) for the teachers' use of feedback measure; fe_eff = Effective Feedback.



Supplementary Figure 2. Confirmatory factor analysis factor loadings (with WLSMV estimator) for the students' behavioural engagement measure (engageme); eng_aw = Academic Work Engagement; eng_cp = Class Participation.



Supplementary Figure 3. Confirmatory factor analysis factor loadings (with WLSMV estimator) for the students' school identification (sch_id); cap_wil = Capacity and Will; pra_val = Practical Value; bel-wel = Belonging and Well-being.

Supplementary Table 1 Goodness of Fit Indices for the Measure Models

	X^2					RMSEA			
Measure	Value	df	р	CFI	TLI	Value	LL 90% CI	UL 90% CI	р
Teachers' Feedback	176.045	20	<.001	.970	.958	.081	.071	.093	<.001
Teachers' feedback with MIs ^a	61.30	18	<.001	.992	.987	.045	.033	.058	.716
Behavioral engagement	60.38	27	.002	.992	.990	.032	.021	.043	.996
School identification	218.28	32	<.001	.945	.961	.070	.061	.079	< 001
School identification with MIs ^b	177.35	31	<.001	.969	.955	.063	.054	.072	.008

Note. Confirmatory Factor Analysis with WLSMV Estimator. MIs = Modification indices; CFI = comparative fit index; TLI = Tuker-Lewis index; RMSEA = Root Mean Square Error of Approximation; LL = lower limit; UL = upper limit; CI = confidence interval.

^a with correlation between items 1 and 2, and items 7 and 8.

^b with correlation between items 1 and 2.

2 References

- Byrne, B. M. (2012). *Structural equation modelling with Mplus. Basic concepts, applications and programming.* Routledge.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. https://doi.org/10.1080/10705519909540118
- Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods*, 48(3), 936–949. https://doi.org/10.3758/s13428-015-0619-7
- Marsh, H. W., Hau, K. T., Balla, J. R., & Grayson, D. (1998). Is more ever too much? The number of indicators per factor in confirmatory factor analysis. *Multivariate Behavioral Research*, 33(2), 181-220. doi:10.1207/s15327906mbr3302_1
- Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus statistical analysis with latent variables. User's guide* (8th Edition). Muthén & Muthén.