

School-Level Academic and Cultural Demands and Resources: Their Role in Immigrant Students' Motivation and Achievement

SUPPLEMENTARY MATERIALS

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PISA (2018) Codebook Item Codes, Index Labels, Item Parcels

For the substantive factors in the study, we here provide the PISA codebook item codes and index labels for readers to locate and consult the full set of PISA items for each factor. There were two school-level academic demands. One reflected the extent to which school instruction was hindered by staffing or resourcing issues, referred to as *resource shortage* (item code “SC017” in the PISA codebook/dataset). The other reflected the extent to which students’ learning was hindered by the nature of teaching, referred to as *hindered learning* (item code “SC061” in the PISA codebook/dataset). School-level academic resources reflected the extent to which students were provided with resources to support their learning, referred to as *student assistance* (item code “SC052” in the PISA codebook/dataset). Cultural demands were represented by *immigrant socioeconomic disadvantage* that was the proportion of immigrant students in a school that experience socio-economic disadvantage (the product of two items; the percentage of immigrant students in the school by the percentage of students from socio-economically disadvantaged backgrounds [item code “SC048Q03NA” in the PISA codebook/dataset]). Cultural resources comprised *cultural learning* (item code “SC165” in the PISA codebook/dataset), *shared cultural values* (item code “SC166” in the PISA codebook/dataset), and *immigrant (remedial) language support* (item code “SC150” in the PISA codebook/dataset). Motivation comprised *self-efficacy* (labelled the “resilience” index in the PISA codebook/dataset) and *valuing* (labelled the “attlnact” index in the PISA codebook/dataset). Two factors in the study were represented by item parcels. One reflected the extent to which school instruction was hindered by staffing or resourcing issues (referred to as *resource shortage*) and was represented by 3 item parcels as follows: parcel 1 (item codes SC017Q01 SC017Q04 SC017Q08), parcel 2 (item codes SC017Q02 SC017Q05 SC017Q07), and parcel 3 (item codes SC017Q03 SC017Q06). The other reflected cultural resources (referred to as *cultural learning*) and was represented by 3 item parcels as follows: parcel 1 (item codes SC165Q01HA SC165Q04HA SC165Q08HA), parcel 2 (item codes SC165Q02HA SC165Q05HA SC165Q09HA), and parcel 3 (item codes SC165Q03HA SC165Q07HA SC165Q10HA).

Auxiliary Analyses of Socio-Economic Status

Although our school-level study was focused predominantly on school-level variance, we conducted auxiliary analyses on school-level factors in our main model that could provide support for the validity of our approach. In assessing the substantive factors in our study, we considered socio-economic status to be a factor that allowed us to effectively do this. First, we explored the change in hypothesized predictive paths when we included the overall level of socio-economic disadvantage for all students in the school (not just immigrant students) as a covariate. We then calculated the average change in the main manuscript’s Table 3 school-level standardized betas of the substantive predictors for each of the three outcomes when this overall socio-economic disadvantage factor was included. We found minimal average change of $\beta < .01$ for the three outcomes from the main findings in Table 3 ($\Delta = .01$ for school-level self-efficacy, $\Delta < .01$ for

school-level valuing, and $\Delta = .02$ for school-level achievement). Second, we further investigated student- and school-level socio-economic status which was the one school factor for which there were somewhat parallel data across student and school leader PISA (2018) forms. We conducted exploratory multilevel tests via mixed modelling that included student-level socio-economic status and school-level socio-economic disadvantage (our study's focal substantive socio-economic factor) in predicting each of the study's three dependent variables for our immigrant sample. When accounting for student- and school-level socio-economics, these exploratory findings showed the same pattern of statistical significance for school-level socio-economic disadvantage (our focal socio-economic factor) as that shown in the main manuscript's Table 3 central modelling, with school-level socio-economic disadvantage significantly predicting self-efficacy and achievement, but not valuing. Taken together, we consider our findings are stable beyond variance attributable to student-level or whole-school socio-economic disadvantage.