Relative Deprivation and Youth Self-Perception: A Multinational Analysis

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1 Introduction

Relative deprivation theory was first applied in the Sociology of Education literature by Davis (1966), illustrating that lower socioeconomic status (SES) students in schools with high socioeconomic composition (SEC) are less likely to choose careers with high prestige compared to their peers in lower SEC schools. This is known as the 'frog pond' effect within schools. Since then, studies have shown the hierarchical effect of classroom or school level predictors on students' individual academic performances in the U.S. For example, Bryk and Driscoll (1988) found that students from different SES backgrounds do not get equal returns from the same school resources. More specifically, they found that higher SES students have greater improvements in test scores than lower SES students while attending advantaged schools; indicating that students from lower SES families would face a relative deprivation in schools with higher SEC.

Previous studies were mainly U.S. based; however, it is important to examine the universality of the frog pond effect. What is more, the majority of studies focusing on relative deprivation define 'returns from school' as academic outcomes, and few literatures examine how relative SES mediates psychological predictors of a student's gain.

Defined as a "competence-belief to refer to self-inferences concerning abilities the individual makes regarding to sciences" (Makwinya and Hofman, 2015), self-perception is found to predict social competence. In fact, researches show that children's positive self-perception is a significant indicator of their chance of being socially successful (Ozkan and Aksoy, 2017; Phelan et al., 2017). Researches of self-perception focus largely on individual level, cognitive predictors: e.g. parental support (Makwinya and Hofman, 2015), and academic performance (Ghazvini, 2011), etc. There is a lack of multilevel analysis in this area examining the effect of school level factors. A preliminary 3-level null model is run predicting self-perception, and the result shows that the school level intraclass correlation index (ICC) is 0.131, indicating that 13.1% of the variation in self-perception is on the school level; and the country level ICC is 0.065, that is, 6.5% of the variation is on the country level.

To achieve both goals stated above, this study extends the analysis of relative deprivation to a multinational level by examining how a student's relative socioeconomic position influence one's self-perception using the PISA 2015 dataset.

I hypothesize that: 1) Controlling for family SES, school SEC has positive effect on students' self-perception of academic competence. 2) The relative SES within a school has positive affects on students' self-perception; that is, higher SES students benefit more than the lower SES

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students from the same school. 3) The effect of school SEC on students' self-perception differs by family SES between schools.

2 Data & Methods

2.1 Data

This study uses the PISA 2015 dataset on the assessment of educational achievement and attitudes of 15-year-old students across 72 countries who are nearing the end of compulsory education. The student population in the dataset is representative of the full population of 15-year olds attending both public and private schools in each participating country. In my study, I limited the sample to those that provide information on all my major predictors. My final sample includes 347,078 individuals in 12,297 schools and 54 countries.

2.2 Dependent Variable and Main Predictors

"Perceived academic competence" is the outcome variable in this study. This variable is constructed by summarizing the result of a likert scale asking students on their self-perceived competence in science. The main predictors included in this study are in three levels.

The individual level predictors includes family socioeconomic status indicator, measured as the mean parental education level, student demographic information, controlled variables and students' relative socioeconomic disadvantage.

The school level predictors include school type, school location, if the school has a science club, how well-equipped is the school science department, and school socioeconomic composition.

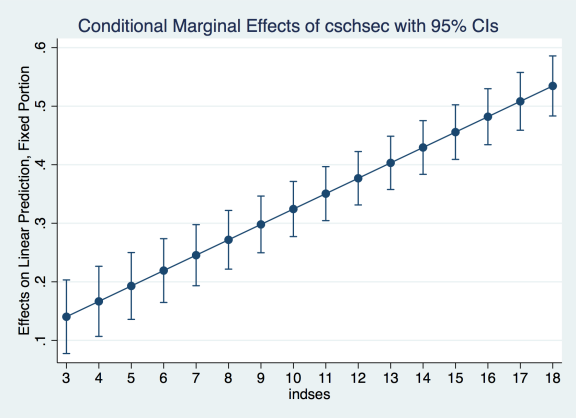
A random effect is added at the country level to capture the variation at the country level.

2.3 Methods

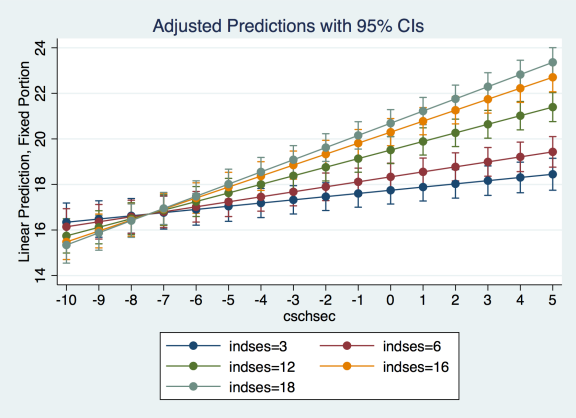
Three-level multilevel linear regression models are used to examine how students' self-perceptions vary by individual, school and country level characteristics. I, first, examine the unconditional variance in self-perception that exists between individuals, between schools, and between countries. **Model 1** adds individual level controls and students' family SES to examine the absolute effect of family SES in the individual level, controlling for other covariates. School type and school locations are added in **model 2** to control for the second level covariates. School's emphasis on science is included in **model 3** to see if there is an association between school focus and student's self-perception. **Model 4** group-mean centers family SES, and adds grand-mean centered school SEC to examine the relative effect of school SEC and family SES when controlling for each other. **Model 5** interacts group-mean centered individual SES with grand-mean centered school SEC to see the effect of school SEC as individual SES increases within a school. Lastly, the **model 6** uncenters family SES and interacts it with group-mean centered school SEC to test the effect of school SEC as family SES increases between schools.

3 Results and Findings

Table 1 shows the multilevel regression estimates of self-perceived academic competence. From the **null model**, the variance within school over students is 52.24, the variance between schools within countries is 8.487, and the variance between countries is 4.218. The school level ICC



(a) The average marginal effects of school SEC as family SES increases between schools



(b) The predicted perceived academic competence by family SES and school SEC between schools

is 0.131, indicating that 13.1% of the variation in self-perception is on the school level; and the country level ICC is 0.065, that is, 6.5% of the variation is on the country level.

Model 4 tests the independent effect of school SEC while holding family SES uncorrelated with the higher level units. This variable significantly improves the model fit ($\chi^2 = 284.42, p < .001$). Result shows that, with a one unit increases in school SEC, the aggregated self-perceived academic competence level increases 0.573 units ($p < .001$). With a one unit increases in family SES, the student's self-perception increases by 0.178 unit within school($p < .001$).

Model 5 leaves family SES uncorrelated with school SEC so that family SES isn't mediating school SEC. The positive interaction term ($p < .01$) indicates that as relative SES increases within school, the effect of school SEC is heightened.

Model 6 examines the effect of school SEC as family SES increases between schools. From model 5 to 6, the school SEC effect is no longer significant by its own, indicating an nonsignificant contextual effect. However, the interaction term is significant, suggesting a significant between effect in family SES. Examining the marginsplots, figure (a) shows that the effect of school SEC on students' self-perception increases as family SES increases between schools. In other words, for a student in a school of some certain socioeconomic composition level, the benefit that the student receives from the school SEC is higher for students from higher SES families. And figure (b) shows that, although for all groups, the students benefit from school more in school of higher SEC, the effect of school SEC differs by family SES. In fact, the higher the individual SES, the more more competent the students would perceive themselves as the school SEC increases.

In summary of this study, family SES positively predicts students' self-perceived academic competence. And controlling for family SES, school SEC has positive effect on students' self-perception of academic competence. That is, students benefit more from advantaged schools in terms of self-perception. The relative SES within a school is positively affecting students' self-perception, indicating that there is a relative deprivation within school for those who are from lower SES backgrounds across countries. And lastly, the effect of school SEC on students' self-perception increases as family SES increases between schools. That is to say, kids from higher SES families benefit more in higher SEC schools than kids from lower SES families.

Table 1: Multilevel Linear Regression Estimate of Students' Self-perceived Academic Competence

		Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Individual Level							
Immigrant (vs Native)		0.025	-0.005	-0.004	0.014	0.021	0.021
		(0.046)	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)
Family SES		0.199***	0.194***	0.193***	-	-	0.196***
		(0.005)	(0.005)	(0.005)	(0.005)	-	(0.005)
School Level							
Public school (vs. Private)			-0.632***	-0.591***	-0.207*	-0.207*	-0.161*
			(0.080)	(0.079)	(0.082)	(0.082)	(0.082)
Small Town (vs Rural)			0.309**	0.215	0.057	0.057	0.078
			(0.112)	(0.112)	(0.111)	(0.111)	(0.110)
Town (vs Rural)			0.489***	0.349**	0.052	0.052	0.073
			(0.108)	(0.108)	(0.108)	(0.108)	(0.108)
City (vs Rural)			0.561***	0.407***	-0.034	-0.035	-0.025
			(0.111)	(0.111)	(0.113)	(0.113)	(0.113)
Large City (vs Rural)			0.825***	0.639***	0.072	0.071	0.073
			(0.127)	(0.127)	(0.130)	(0.130)	(0.130)
With science club (vs. without)				0.386***	0.310***	0.310***	0.300***
				(0.068)	(0.067)	(0.067)	(0.067)
Quality of science department				-0.145***	-0.107***	-0.107***	-0.107***
				(0.014)	(0.014)	(0.014)	(0.014)
School Socioeconomic Comp.					0.573***	0.573***	0.061
					(0.023)	(0.023)	(0.037)
Family SES - School SEC					0.178***	0.194***	-
					(0.005)	(0.005)	-
Family SES X School SEC						-	0.026***
						-	(0.002)
Relative SES X School SEC						0.024***	-
						(0.002)	-
Constant γ_{000}	19.87***	10.762***	10.919***	12.527***	14.793***	14.808***	12.050***
	(0.281)	(0.315)	(0.332)	(0.367)	(0.382)	(0.382)	(0.387)
Likelihood Ratio Test	-	1889.72***	129.53***	166.73***	284.42***	93.75***	-
Individual Level σ^2	52.244	52.028	52.027	52.028	52.03	52.02	52.016
School Level τ_π	8.487	7.659	7.56	7.426	7.179	7.181	7.147
Country Level τ_β	4.218	4.427	4.339	4.129	4.917	4.917	4.932
School level ICC	0.131	0.119	0.118	0.117	0.112	0.112	0.112
Country level ICC	0.065	0.069	0.068	0.065	0.077	0.077	0.077

$*p < 0.05 * *p < 0.01 * * * p < 0.001$

Note: individual n=347,078, school n=12,297, country n=54. Models control for grade, gender and parental support.

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