

University of Groningen

Oh, the education (you think) you'll have! Relative deprivation and students' academic expectations, aspirations, and attainment

Nieuwenhuis, J.; Chiang, Y.-L.

Published in:
British Journal of Sociology of Education

DOI:
[10.1080/01425692.2021.1959300](https://doi.org/10.1080/01425692.2021.1959300)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2021

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Nieuwenhuis, J., & Chiang, Y.-L. (2021). Oh, the education (you think) you'll have! Relative deprivation and students' academic expectations, aspirations, and attainment. *British Journal of Sociology of Education*, 42(7), 1037-1054. <https://doi.org/10.1080/01425692.2021.1959300>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



Oh, the education (you think) you'll have! Relative deprivation and students' academic expectations, aspirations, and attainment

Jaap Nieuwenhuis & Yi-Lin Chiang

To cite this article: Jaap Nieuwenhuis & Yi-Lin Chiang (2021) Oh, the education (you think) you'll have! Relative deprivation and students' academic expectations, aspirations, and attainment, British Journal of Sociology of Education, 42:7, 1037-1054, DOI: [10.1080/01425692.2021.1959300](https://doi.org/10.1080/01425692.2021.1959300)

To link to this article: <https://doi.org/10.1080/01425692.2021.1959300>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 11 Aug 2021.



Submit your article to this journal [↗](#)



Article views: 2079



View related articles [↗](#)



View Crossmark data [↗](#)

Oh, the education (you think) you'll have! Relative deprivation and students' academic expectations, aspirations, and attainment

Jaap Nieuwenhuis^{a,b}  and Yi-Lin Chiang^c 

^aDepartment of Sociology, University of Groningen, Groningen, the Netherlands; ^bDepartment of Sociology, Zhejiang University, Hangzhou, China; ^cDepartment of Sociology, National Chengchi University, Taipei, Taiwan

ABSTRACT

Scholars generally agree that financial deprivation negatively affects students' educational outcomes. However, while absolute levels of resources are important, individuals' perceived relative economic well-being also shape their educational outcomes. This article asks whether attending school with peers from comparably richer families is related to adolescents' educational expectations, aspirations, university plans, and university attainment. We test the relative deprivation theory by comparing three different forms of the Yitzhaki Index. Data for this study comes from the Taiwan Youth Project, which consists of two cohorts of adolescents ($N=5098$) from 162 middle school classrooms. The results show that relative deprivation in the classroom is negatively related to students' educational expectations, aspirations, and plans to attend university. Yet, relatively deprivation is not associated with higher educational attainment when controlling for absolute measures of family background. These results highlight the need for a more nuanced understanding of perceived relative economic disadvantages in shaping student outcomes.

ARTICLE HISTORY

Received 18 September 2020


Accepted 30 June 2021

KEYWORDS

Adolescents; educational inequality; relative deprivation; Taiwan; Yitzhaki Index

Introduction

Scholars generally agree that socioeconomic inequality affects adolescent academic outcomes. However, as levels of inequality rise across the world, whether and how relative levels of socioeconomic inequality influences students' educational expectations, aspirations, and attainment become especially important questions (Alvaredo et al. 2017). Relatively few examine how rising levels of socioeconomic inequality shape educational outcomes (Browman et al. 2019; Piketty 2014). The few who do suggest that relative deprivation directly and negatively affects educational attainment (Destin et al. 2012; Esposito and Villaseñor 2019; Wilkinson and Pickett 2007). Adolescents who experience relative deprivation perceive themselves as having fewer chances for upward social mobility and are less motivated to work hard in school compared to their relatively better-off peers (Destin and Oyserman 2009; Walker and Pettigrew 1984). Yet, literature typically separately explores

CONTACT Jaap Nieuwenhuis  j.g.nieuwenhuis@rug.nl

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

these results. Thus, how relative socioeconomic deprivation and absolute socioeconomic background simultaneously shape student outcomes requires further examination.

This study examines the relationships between relative deprivation and adolescents' educational expectations, aspirations, and higher educational attainment. Specifically, we study four types of educational outcomes: Students' expectations for educational attainment, their aspirations of educational attainment, whether they plan to attend university, and whether they actually attend university. The reason to employ all four outcome measures is because each highlights a different aspect of students' educational development. Expectations and aspirations differ in that the former focuses on the most likely outcome students expect in the light of their perceived obstacles, while the latter measures students' idealistic hopes (Beal and Crockett 2010). Whether students plan to attend university measures students' concrete plans for higher educational attainment, and university attendance captures students' educational attainment.

Using data from the Taiwan Youth Project (TYP), a panel survey of adolescents in northern Taiwan, we compare students' family household income with that of their classmates' families to determine adolescents' relative standing in the socioeconomic hierarchy in their classrooms. We situate and test the relative deprivation theory within the classroom context and provide a longitudinal perspective on how students' transition to higher education unfolds over the period from early- to late-adolescence. In doing so, this study contributes to furthering the understanding of how relative deprivation shapes adolescent perceptions of the level of education they think they can attain, and the outcomes of whether they will actually obtain higher education.

This article proceeds as follows. We first review literature on relative socioeconomic deprivation and point out that studies have paid insufficient attention to how relative deprivation shapes educational outcomes. Next, we detail the three formulations of the Yitzhaki Index, which are competing measurements of relative deprivation. We highlight differences between the three formulations, because these variations potentially lead to different observed relationships between relative socioeconomic disadvantage and education outcomes. We then briefly describe the Taiwanese context, and then, present the data and analyses on each of the four outcomes (educational expectations, aspirations, higher educational plans, and attainment). Finally, we discuss the implications and limitations of the findings.

Relative deprivation in the classroom

Contextual socioeconomic disadvantage and advantage are generally linked to lower and higher academic outcomes for adolescents, respectively. Adolescents in affluent contexts enjoy more financial and cultural resources that help them do better in education, whereas students from disadvantaged environments do not enjoy these financial and cultural resources. Absolute levels of socioeconomic resources have been studied in many contexts, such as the family (Chiang 2018; Lareau 2011), schools (Nieuwenhuis 2018; Portes and MacLeod 1996), and neighborhoods (Dietz 2002; Nieuwenhuis and Hooimeijer 2016). Together, these studies point out that socioeconomic advantages, whether at the family, school, or neighborhood level, are positively related to adolescents' educational outcomes. However, while research sheds light on the importance of socioeconomic resources on educational advantages, how students understand their situation

in comparison to others and how their subjectivity is related to their educational outcomes remains unclear.

The relative deprivation theory posits that individuals compare themselves to a relevant reference group consisted of their peers. Because the theory emphasizes subjective relative socioeconomic resource, the underlying hypothesis is that one's *perceived* socioeconomic background is more important on individual educational outcomes than the *absolute level* of socioeconomic background. At the individual level, when one perceives his/her own socioeconomic situation as worse-off compared to the comparison group and believe that his/her relatively disadvantaged position is unfair, such a perception often leads to negative externalities (Walker and Pettigrew 1984). Studies that employ the relative deprivation framework to examine individual level differences primarily focus on health and psychological outcomes (Adjaye-Gbewonyo and Kawachi 2012; Smith et al. 2012). At the societal level, studies often examine the relationship between perceived relative deprivation and status outcomes. Browman et al. (2019) find that members from low socioeconomic strata often perceive few opportunities for upward social mobility, have low motivation, and obtain low levels of status attainment when they perceive themselves as being disadvantaged. Taken together, studies using the relative deprivation theory contend that perceived disadvantage is negatively related to many outcomes.

While these findings provide insight to the subjective meanings of relative disadvantage and its consequences on inequality, one concern is that the comparison group is typically vaguely defined. In these studies, individuals who self-perceive to be at relative disadvantage against others often draw on comparison groups of whom they have little information. Groups who believe themselves to be unfairly experiencing deprivation compare themselves with an imagined rival group, with whom they may have no contact. These possibilities render the perceived socioeconomic gap somewhat of a guess. To better examine how relative deprivation shapes individual expectations and outcomes, it is necessary to examine a group in which members share a common social network and have accurate information of each other, such as students sharing the same classroom.

Peers in the same classrooms are one of the most clearly-defined reference groups, especially when studying educational outcomes. By interacting with each other on a daily basis, classmates are able to assess each other's socioeconomic background as well as obtain detailed information on each other's family resources (Chiang and Lareau 2018). Whereas schoolmates are a form of weak tie and might remain an imagined reference group, classmates are a form strong social tie and an instinctive comparison group (McVicar and Polanski 2014; Pham-Kanter 2009). Importantly, tightly formed networks, such as those in classrooms, would magnify the importance of student subjectivity. For example, regardless of one's absolute socioeconomic background, an adolescent coming from a relatively poor family compared to one's classmates likely develops feelings of relative deprivation. Studies find that, across societies, student surrounded by richer and high-status peers in the classroom become aware of and are constantly reminded of his/her inability to live a similar life-style as their peers on a daily basis (Lan 2018; Mijs and Nieuwenhuis 2018; Milner 2004). However, despite that classroom settings offer arguably the most fitting group to test the relative deprivation theory, few studies take advantage of this opportunity.

Another small body of research that examines relative deprivation in educational settings point to the negative relationship between relative deprivation and educational outcomes. Relative deprivation is negatively related to students' academic motivations, academic

expectations, aspirations, and academic achievement in secondary education (Destin and Oyserman 2009; Destin et al. 2012; Esposito and Villaseñor 2019; Verkuyten 2016; Wilkinson and Pickett 2007; Zimmerman, Bandura, and Martinez-Pons 1992). These results highlight the importance of subjective comparisons and affirm the hypothesis of the relative deprivation theory. However, they overlook how absolute levels of differences simultaneously shape student aspirations and expectations. Another concern is that some of these studies examine society-level relative deprivation, which potentially suffers from respondents having limited information of the comparison group. Finally, studies that employ measures of relative deprivation often do not reflect on how they measure relative deprivation. As we discuss below, the ways through which different types of relative deprivation are constructed could lead to different outcomes.

In short, research agrees that relative deprivation has a detrimental impact on individual outcomes, but often neglects to reflect on the measurements of relative deprivation and the comparison groups. To address these issues, this article employs multiple measurements of relative deprivation and draws on data with detailed information on peer groups. We test the relative deprivation theory by examining how relative and absolute levels of deprivation shapes student educational outcomes. Following the theory's emphasis on relative levels of socioeconomic differences over absolute differences, we hypothesize that relative deprivation within the classroom context is negatively related to adolescents' educational expectations, aspirations, university plans, and university attendance.

Measures of relative deprivation

Scholars constructed three types of measurement for relative deprivation: (1) The classic Yitzhaki Index (Yitzhaki 1979); (2) the log-normal formulation (Eibner and Evans 2005); and (3) Deaton's formulation (Deaton 2001). All three share a common foundation, but each emphasizes a different comparison group. To test whether and how these variations might yield different results, we adopt all three measures in this study. The first approach, the Yitzhaki Index, is also the most common one. The Yitzhaki Index is defined as a function of the cumulative differences between an individual's income and that of everyone with a greater income in a reference group. The cumulative differences are then divided by the total number of individuals in the reference group. Yet, studies point out that the Yitzhaki Index is sensitive to the number of comparisons and changes in the income scale, making between-group and over-time comparisons potentially problematic (Adjaye-Gbewonyo and Kawachi 2012). Attempting to overcome the comparison, scholars developed the second approach, which is the log-normal formulation (Eibner and Evans 2005). The log-normal formulation replaces absolute income in the Yitzhaki formulation with a natural log of income. This results in a measure of relative differences instead of absolute differences, where comparisons are proportional and thus is no longer sensitive to absolute income changes in the reference group (Adjaye-Gbewonyo and Kawachi 2012).

An issue with both the Yitzhaki Index and the log-normal formulation is that the comparison group excludes those who are relatively disadvantaged compared to the individual. This assumption is problematic, as individuals not only compare themselves with others who are above one's own standing, but also those below. The exclusion of those below one's standing could exaggerate the negative effect of relative deprivation. The third measurement, Deaton's formulation (Deaton 2001), addresses this issue by taking into account both

relatively advantaged and disadvantaged reference groups. This is done by dividing the Yitzhaki Index with the average income of the full reference group. In doing so, Deaton's formulation assumes proportional comparisons (like the log-normal formulation), but additionally assumes that the comparisons are influenced by income changes among both those with lower as well as higher income (Adjaye-Gbewonyo and Kawachi 2012).

To summarize, scholars often use three formulations of relative deprivation. The Yitzhaki Index, which measures the absolute difference between individuals and his/her reference group; the log-normal formulation, which emphasizes the relative differences; and Deaton's formulation, which includes disadvantaged peers into the reference group. Because each examines relative deprivation in a different way, research findings may differ by the formulation employed. Scholars have yet to arrive at a consensus on the optimal formulation, and few provide empirical evidence to examine the extent to which these differences affect the analytical results. Thus, this study tests whether the different formulations of relative deprivation yield different results for the four different educational outcomes.

The Taiwanese context

To the authors' knowledge, this study is among the first that examines the relationship between relative deprivation and educational outcomes in a non-western society. While a few studies test the theory using the case of Taiwan, they focus on self-rated health, depression, smoking behavior, labor productivity, and quality of life (Chuang et al. 2007; Kuo and Chiang 2013; Liao, Fu, and Yi 2005; Liu and Sakamoto 2005). We choose to examine the case of Taiwan because it offers a context in which students hold detailed information about their reference group, namely, their classmates. In Taiwan, schools share a standard curriculum and there is no tracking system at the transition to middle school (seventh–ninth grades). The government requires middle schools to randomly sort incoming students into classrooms (Ministry of Education 2009). Schools implement the policy using a 'systematic normal grouping' method, which purposefully equalizes student GPA across classrooms.¹ Because students are randomly assigned into classrooms by their GPA, classroom assignments are determined at the school level. This practice leaves little to no room for socioeconomically privileged parents to negotiate for children's classroom assignments.

After students receive their classroom assignment, students stay in the same classroom with the same group of classmates throughout three years of middle school. Classmates interact with each other on a daily basis. They have lunch and dinner at their desks, and sit through the same courses every day. Students acquire information on each other's family background by spending time together, between 9 and 15 h each day. Since students demonstrate class-based taste in daily activities, classmates have ample opportunities to estimate and compare each other's socioeconomic resources. Furthermore, at the beginning of a school year, students in each classroom often must fill out a form that lists each student's parental occupation. Because students typically pass along these forms in the classroom, they can see the information that classmates put down. This procedure provides students with accurate information on the reference group early on and throughout middle school. In such a context, classmates share the same activities and space, and form tight networks that become strong ties. Simultaneously, information spreads quickly in these tight-knit networks, including those regarding each other's family background.

Another context to be highlighted is that Taiwan has gone through rapid educational expansion, which shapes students' educational expectations and aspirations. The government implemented nine-year compulsory education in 1968, which included three years of middle school. Since then, expansion at the secondary and higher educational levels took place rapidly. Between 1950 and 2006, high school enrollment rates increased from 51% to 96%. As of 2006, 91% of the academic high school graduates and 70% of the vocational high school graduates enrolled in tertiary education (Ministry of Education 2013). In other words, the majority of Taiwanese students attend high school and tertiary education, suggesting that even higher education has become mass education. Growing up during rapid higher educational expansion, students from disadvantaged backgrounds might have high levels of optimism regardless of the perceived relative deprivation between themselves and their advantaged classmates. In such a context, the observed relationship between relative deprivation and student self-expectations, aspirations, and university plans could be underestimated. Observing a negative association, as the relative deprivation theory hypothesizes, would, thus, highlight the significance of the theory in understanding educational inequality.

In short, Taiwan provides an opportunity to examine relative deprivation and educational outcomes because the classroom settings allow students to share information on each other's socioeconomic background and the rapid educational expansion leads to high levels of tertiary education for teenagers from different levels of family resources. It should be noted that keeping classmates in the same classrooms is also common practice in the Netherlands, Japan, and Singapore. Many other countries, such as Korean and mainland China, also experienced or are undergoing rapid educational expansion (Sandefur and Park 2007; Wu 2010). In other words, while this study uses the case of Taiwan, our investigation points to a general phenomenon that can be observed in other societies.

Data and methods

The Taiwan Youth Project

We use data from the Taiwan Youth Project (TYP), a longitudinal panel dataset of students and parents from northern Taiwan since 2000. The original sample in the TYP was 5541 students in two cohorts: The seventh grade cohort, who were in the first year of middle school (51.5%); and the ninth grade cohort, who were in the third and last year of middle school (48.5%). Students were sampled from 162 classrooms, within 40 schools, within three regions (Taipei city, Taipei county, and Yilan county). Because both students and parents were surveyed, the data provide information on students' attitudinal questions as well as parent-reported household income. We use the survey waves administered when the students were in ninth grade, twelfth grade, and one year after high school graduation. Additionally, we include information available in wave 1 for the seventh grade cohort.²

The data are suitable for the purpose of this study because of their longitudinal design. Tracking students from middle school through high school, and then, to university allows researchers to trace the development of adolescents' expectations and aspirations. It also provides information on students' higher educational attainment. Importantly, the data provide household income for all students in 162 classrooms, with no missing information. This is necessary because calculations of relative deprivation should be based on an observed reference group. Classmates thus serve as ideal comparison group. Because questions on

educational expectations, aspirations, university plans, and household income are asked repeatedly, we are able to assess how changes in one's level of relative deprivation in the classroom might be related to changes in one's educational expectations, aspirations, and plans to attend university. Finally, the detailed information in this dataset provides the opportunity to test whether the effect of relative deprivation is stronger for adolescents from low- or high-income families.

Measurements

The four education measures examined in this article are educational expectations, educational aspirations, plans to attend university, and university attendance one year after high school. Because the first three measures are repeatedly surveyed in multiple waves, each analysis has a different number of observation. As detailed below, the number of observations in the analysis for each outcome are different because the questions were not all asked in the same waves of data collection. Like many longitudinal surveys, TYP suffers from attrition and non-response. Where individuals did not have responses to all needed questions on a certain wave, they were removed using listwise deletion.

Educational expectations comes from the question: 'Considering your current academic and financial ability, what level of education do you think you can attain?' Student responses are coded into a categorical variable (0 = junior high school; 1 = academic/vocational high school; 2 = junior college; 3 = university; 4 = master's degree; 5 = PhD). This question was asked three times for the seventh grade cohort (in seventh, ninth, and twelfth grades), and twice for the ninth grade cohort (in ninth and twelfth grade). Educational expectation was asked more frequently than other educational outcome measures, and has a total of 10,291 valid observation counts. A second outcome is educational aspirations. This measurement is operationalized with the following question: 'What level of education would you like to attain if there were no restrictions?' The responses are coded identically as that of educational expectations. The data asked about student's educational aspirations twice for the seventh grade cohort (in seventh and twelfth grades), and twice for the ninth grade cohort (in ninth and twelfth grades). In total, educational aspirations has 8013 observations.

University plans, the third outcome measurement, is a dummy variable created by the question: 'Do you plan to attend university?' (1 = yes; 0 = no/undecided/does not matter/other).³ This question was asked twice for each cohort. The young cohort answered this in seventh and ninth grades; and the older cohort answered this in ninth and twelfth grades. Plans to attend university has a total of 9075 observations. The fourth and final outcome is students' university attendance. This was asked in the year following high school graduation. The sample for university attendance consists of 3308 adolescents.

The key independent variable in the relative deprivation theory is household income, and relative deprivation variables are generated from absolute deprivation, which is operationalized as household income. In this study, we use household income reported by the parents, and substitute the missing information with student-reported household income. Household income is a continuous variable (0 to 155 in NT\$1000).⁴ We then formulate the Yitzhaki Index with this information. For an adolescent i from a family with household income y_p , who is a member of a classroom j of N individuals, the Yitzhaki Index for relative deprivation (RD) can be written as the following:

$$RD_i = \frac{1}{N} \sum_j (y_j - y_i), \forall (y_j > y_i)$$

where relative deprivation is defined as the average difference in household income between the adolescent i and the other adolescents in the classroom j who have greater household income (Subramanyam et al. 2009). Classroom sizes range from 14 to 54, with a mean of 34.28 and a standard deviation of 5.80.

The log-normal formulation and Deaton's formulation are developed from the original Yitzhaki index. In the log-normal formulation, we replace household income with the natural log of household income. This results in a measure of relative differences instead of absolute differences, where comparisons are proportional and thus not sensitive to absolute income changes in the reference group. Deaton's formulation takes the outcome value of the Yitzhaki Index and divides it by the average income of the reference group, which is the average household income in a student's classroom. Deaton's formulation is also influenced by income changes in individuals with lower income, suggesting that people compare themselves to others not only upwards, but also downwards. Considering that each measure emphasizes a different type of relative deprivation, we use all three formulations to test whether the findings are robust to measuring absolute or relative income differences, and to using only an upward or an upward and downward reference group. In all three formulations, greater values mean higher levels of relative deprivation.

We include various controls variables. These include students' average family income in the classroom, gender, cohort, and residential location (1 = Taipei city; 2 = Taipei county; 3 = Yilan county). We also control for parents' highest level of education, coded into seven categories (1 = elementary school, 2 = middle school, 3 = vocational high school, 4 = academic high school, 5 = junior college, 6 = university, and 7 = graduate school). Student's ethnicity is measured by fathers' ethnic background (1 = Minnan; 2 = Hakka; 3 = Mainlander; 4 = Aboriginal/Other). In the few cases where father's ethnicity is not reported, we substitute the information with mother's ethnic background. Importantly, we also consider students' self-rated relative GPA at the first wave to control for their perceived academic ability. This comes from the question, 'What was your GPA ranking in your class last semester?' We code the responses into five categories (0 = ranked lower than 30th; 1 = ranked 21st–30th; 2 = ranked 11th–20th; 3 = ranked 6th–10th; 4 = top 5). Table 1 presents the descriptive statistics for the variables used in the analyses.

Analyses

We run several multilevel models to test the relationship between relative deprivation and the four educational outcomes. We run linear models to examine educational expectations and aspirations, and logistic regression models to examine university plans and attendance. Additionally, we use longitudinal models for educational expectations, aspirations, and plans to attend university because each has multiple over-time answers. For all repeated measures, we fit four-level multilevel models, with waves nested in individuals, nested in classrooms, nested in schools. University attendance is measured only once, and the cross-sectional nature of university attendance does not allow us to use repeated measures

Table 1. Descriptive statistics of student characteristics.

	<i>N</i>	Mean/ prop.	<i>SD</i>	Min	Max
Educational expectations	5014	2.29	1.21	0	5
Educational aspirations	5046	3.14	1.31	0	5
University plans	5098	.44	–	0	1
Attended university	3308	.36	–	0	1
Relative deprivation measures					
Yitzhaki Index	5098	17.06	14.05	0	81.03
Log-normal formulation	5098	.34	.44	0	4.01
Deaton's formulation	5098	.30	.24	0	1.03
Income measures (unit: NT\$1000)					
Household income	5098	58.53	34.19	0	155
Average income in classroom	5098	58.30	13.70	28.71	94.89
Female	5098	.49	–	0	1
Ninth grade cohort	5098	.52	–	0	1
GPA (wave 1)	5098	2.01	1.21	0	4
Location					
Taipei city	1924	.38	–	0	1
Taipei county	2050	.40	–	0	1
Yilan county	1124	.22	–	0	1
Highest parental education	5098	3.37	1.62	1	7
Ethnicity					
Minnan	3913	.77	–	0	1
Hakka	377	.07	–	0	1
Mainland	682	.13	–	0	1
Aboriginal/Other	126	.02	–	0	1

Note: Attended university was measured once, at waves 5 and 7 for the young and old cohorts, respectively.

for relative deprivation. We, thus, use relative deprivation as measured in wave 1 and fit three-level models with individuals nested in classrooms. All models are estimated using MLwiN 2.35 through Stata 15.1 using the user written `runmlwin` command (Leckie and Charlton 2013).

We fit several models to test our hypothesis. First, absolute affluence (household income) and the relative deprivation measures are tested separately for all four outcome variables. This provides a general idea about the importance of absolute and relative deprivation. Then, each educational measure is tested with three models while adjusting for household income. Model 1 uses the Yitzhaki Index for relative deprivation; Model 2 uses the log-normal formulation for relative deprivation; Model 3 uses Deaton's formulation. In supplementary analysis, we run all the models using schoolmates instead of classmates as reference group. The results are similar to using classmates as the reference group (results not presented).

Results

The descriptive statistics in Table 1 show that there is a considerable amount of variation in relative deprivation in Taiwanese schools. This is clear in the Yitzhaki Index, which measures absolute differences, and in the log-normal formulation, which measures relative differences. Deaton's formulation, which includes downward oriented peers in the reference group, also has considerable variation. Average classroom income varies in the sample.

We first separately analyze the relationship between relative deprivation, absolute deprivation, and the four educational outcomes. Table 2 presents the results of each model that independently regresses on household income and each type of relative deprivation measure, while controlling for student characteristics. Absolute affluence and all relative deprivation formulations are significantly related to educational expectations and aspirations. Students with higher household incomes have higher educational expectations and aspirations. Regardless of the formulation, the higher the relative deprivation a student experiences, the lower the educational expectations and aspirations he/she has. However, absolute household income is not significantly related to student's plans to attend university, nor is it related to university attendance. By comparison, the three relative deprivation measures are significantly associated with plans to attend university, but not university attendance.

In sum, Table 2 shows that household income is significantly and positively associated with two of the educational measures, whereas all three formulations of relatively deprivation are negatively related to three of the four educational measures. This result confirms literature findings that students from comparatively wealthier family backgrounds enjoy educational advantages. Importantly, it also supports the relative deprivation hypothesis that subjective relative disadvantages are key to understanding educational outcomes.

To further delineate the importance of relative deprivation for adolescent educational expectations, aspirations, university plans, and university attendance, we test whether relative deprivation is significantly associated with the outcomes when controlling for absolute levels of economic deprivation, which is household income. We first discuss the results for educational expectations. Model 1a in Table 3 shows that, controlling for background characteristics, the Yitzhaki Index is negatively associated with educational expectations, but household income is not associated with educational expectations. In Model 2a, the log-normal formulation is negatively related to educational expectation. When using the log-normal formulation, household income is positively related to educational expectations. Model 3a shows that Deaton's formulation is negatively associated with educational expectations. Like Model 1a, household income is not significantly related to educational expectations when using this formulation.

Table 2. Multilevel models of absolute and relative deprivation separately for four education measurements.

	Educational expectations	Educational aspirations	University plans	University attendance
Absolute affluence	.002***	.001**	.002	.003
M0: Household income	(.000)	(.000)	(.001)	(.002)
Relative deprivation				
M1: Yitzhaki Index	-.005***	-.003**	-.005**	-.004
	(.001)	(.001)	(.002)	(.004)
M2: Log-normal formulation	-.149***	-.092**	-.137*	-.068
	(.021)	(.027)	(.058)	(.129)
M3: Deaton's formulation	-.441***	-.164**	-.345**	-.274
	(.043)	(.054)	(.114)	(.224)
Observations	10,291	8013	9075	3308
Modeling method	Multilevel models	Multilevel models	Logistic multilevel models	Logistic multilevel models

Note: All models control for average classroom income, wave 1 GPA, gender, cohort, location, parents' highest education, and ethnicity. M = model.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Other variables that are significant (results available upon request) include average classroom income, GPA at wave 1, gender, highest level of parental education, and ethnicity. Average classroom income is not significantly associated with educational expectations. However, being in a classroom with high income average is positively related to students' educational aspirations, university plans, and university attendance. These results suggest that expectations and aspirations are indeed shaped by different factors. Students with affluent peers have high aspirations, and their expectations remain high when considering their immediate surroundings. Students with high academic ability (as measured with their wave 1 GPA) score high on all four educational outcomes. Furthermore, girls report higher levels of educational expectations, aspirations, university plans, and are more likely to attend university within one year after high school compared to boys. Students with high educated parents are more optimistic in their educational expectations, aspirations, university plans, and are more likely to attend university than students with low educated parents. Compared to Minnan students, students who come from Aboriginal/other ethnic minority groups are at a disadvantage in educational expectations, aspirations, university plans, and are less likely to go to university.

Altogether, the results for educational expectations shows that students who experience high levels of relative deprivation have lower educational expectations. Although household income is significantly related to educational expectations when using the log-normal formulation, it is not significant when using other formulations in Models 1a and 3a. The change in whether absolute differences in economic resources are significantly related to students' educational expectations underline the impact of formulation choice on analytical outcomes. It also highlights the importance of reference groups, against whom adolescents set their educational expectations.

We also examine the school-level, classroom-level, individual-level, and wave-level variances in Table 3. The variances at different levels do not differ much between models, indicating that the three formulations of relative deprivation do not differ in terms of explained variance. We then use goodness of fit statistics across all three measures of relative deprivation by comparing the BIC values. Model 3a has the lowest BIC value, indicating that Deaton's formulation appears to be the best fit. However, the difference in BIC values between Models 1a, 2a, and 3a, is small (Δ BIC is 8 and 2, respectively). Thus, it appears that despite the differences in formulation, the three models are comparable in examining the relation between relative deprivation and educational expectations.

Turning attention to educational aspirations, Model 1b and Model 3b show that the Yitzhaki Index and Deaton's formulation are not significantly related to educational aspirations. However, the log-normal formulation in Model 2b is significantly and negatively related to adolescents' educational aspirations. The variances on different levels do not vary significantly between the three models, indicating that the models have comparable explained variance. In addition to being the only significant predictor of relative deprivation, Model 2b has the lowest BIC value among the three and the only significant predictor of relative deprivation. While this suggests that the log-normal formulation might be the best fit, the difference between BIC values is small (Δ BIC is less than 4). In other words, the three models of relative deprivation remain comparable (Raftery 1995).

We then examine the relationship between relative deprivation and adolescents' university plans. In Model 1c, relative deprivation in the form of the Yitzhaki Index is negatively related to university plans. Model 3c, which uses Deaton's formulation, shows the

Table 3. Multilevel models of relative deprivation and educational measurements, controlled for household income.

	Educational expectations (N=10,291)			Educational aspirations (N=8013)		
	Model 1a	Model 2a	Model 3a	Model 1b	Model 2b	Model 3b
Yitzhaki Index	-.003* (.001)			-.002 (.002)		
Log-normal formulation		-.091** (.027)			-.076* (.036)	
Deaton's formulation			-.284*** (.079)			-.143 (.102)
Household income	.001 (.001)	.001** (.000)	.001 (.001)	.000 (.001)	.000 (.001)	.000 (.001)
Constant	1.267*** (.132)	1.298*** (.133)	1.351*** (.134)	1.498*** (.140)	1.526*** (.141)	1.541*** (.144)
School-level variance	.068 (.018)	.068 (.018)	.068 (.018)	.028 (.010)	.028 (.010)	.028 (.010)
Classroom-level variance	.026 (.006)	.026 (.006)	.025 (.006)	.030 (.007)	.030 (.007)	.030 (.007)
Individual-level variance	.219 (.013)	.219 (.013)	.218 (.013)	.219 (.021)	.219 (.021)	.218 (.021)
Wave-level variance	.655 (.013)	.665 (.013)	.655 (.013)	.896 (.023)	.896 (.023)	.897 (.023)
BIC	27,819.92	27,813.08	27,811.71	23,824.60	23,821.01	23,823.50
	University plans (N=9075)			University attendance (N=3308)		
	Model 1c	Model 2c	Model 3c	Model 1d	Model 2d	Model 3d
Yitzhaki Index	-.008* (.004)			.005 (.008)		
Log-normal formulation		-.111 (.077)			.151 (.175)	
Deaton's formulation			-.571** (.218)			.167 (.437)
Household income	-.002 (.002)	.001 (.001)	-.002 (.002)	.004 (.003)	.004 (.002)	.004 (.003)
Constant	-4.623*** (.268)	-4.600*** (.270)	-4.454*** (.277)	-7.254*** (.586)	-7.297*** (.589)	-7.290*** (.605)
School-level variance	.039 (.020)	.039 (.020)	.040 (.020)	.067 (.067)	.069 (.069)	.069 (.069)
Classroom-level variance	.082 (.024)	.083 (.024)	.081 (.024)	.514 (.111)	.513 (.111)	.514 (.111)
Individual-level variance	.282 (.063)	.281 (.063)	.282 (.063)	3.29	3.29	3.29
Wave-level variance	3.29	3.29	3.29			
BIC	9764.69	9892.43	9770.47			

Note: All models include the following control variables: average income in classroom, wave 1 GPA, gender, cohort, location, parents' highest education, and ethnicity. In logistic multilevel models, the lowest level always has a fixed variance of 3.29. * $p < .05$. ** $p < .01$. *** $p < .001$.

same result. By comparison, Model 2c shows that the log-normal formulation is not significantly related to university plans. Importantly, household income is not significantly related to university plans in any formulation. This indicates the importance of focusing on students' differences from their peers in addition to family income. Examining the fit of each model, Model 1c has the lowest value of BIC, and the difference from the other two models are over 5. The BIC value difference between Model 1c and 2c is 127, which

is strongly in favor of the Yitzhaki Index over the log-normal formulation. Taken together, the results suggest that adolescents who have high levels of perceived disadvantages compared to their peers are less likely to plan to go to university.

Finally, we examine the relationship between relative deprivation and university attendance one year after high school. Recall in [Table 2](#) that all of the formulations are not significantly related to university attendance when examined individually. Similarly, when examined altogether, none are significantly related to university attendance. Furthermore, household income is not significantly related to university attendance. This finding is inconsistent with literature that finds a negative relationship between students' educational attainment and relative deprivation (Destin et al. 2012). Considering that we find classroom-level variance, there is some classroom effect on students' university attendance. However, this classroom effect is not related to relative deprivation. We do not compare the model fit with regard to university attendance due to the lack of significance. In supplementary analysis, we control for educational aspirations and expectations at wave 1 (available upon request). We find a positive relationship between both measures and university attainment. This suggests that relative deprivation is indirectly related to university attendance, and there may be different pathways through which relative deprivation is associated with educational attainment.

Discussion

This study examines the importance of relative deprivation in shaping individual educational outcomes. We examined four types of educational outcomes: Educational expectations, educational aspirations, plans to attend university, and actual university attendance. We also differentiate between three iterations of relative deprivation, which were informed by different definitions of relative deprivation. Following the relative deprivation theory, we hypothesized that adolescents who perceive themselves as relatively disadvantaged would have disadvantaged educational outcomes. Drawing on longitudinal data that followed Taiwanese adolescents over seven years, from middle school to university, the findings support the relative deprivation hypothesis. Coming from relatively poorer families than one's classmates is associated with lower educational expectations, lower educational aspirations, and lower probabilities of planning to attend university. Conversely, relative deprivation was not significantly related to university attendance.

The results show that relative deprivation is a more robust predictor for educational expectations than for educational aspirations. All three relative deprivation formulations are negatively related to educational expectations, but only one is significantly related to educational aspirations. This suggests that, irrespective of being relatively poorer than their classmates, students aspire for high levels of educational attainment. However, being relatively poorer than classmates affects students' realistic estimations about their future. Scholars suggest that relative deprivation may be related to a behavioral poverty trap, which results in students' failure to fulfill their aspirations (Dalton, Ghosal, and Mani 2016). Our findings regarding educational expectations and aspirations provide some support for this possibility.

While relative deprivation is related to plans for university, it is not significantly related to actual university attendance. We suspect that this is because of the rapid educational

expansion in Taiwan, where tertiary education is available for most students. Rapid educational expansion, a shared phenomenon across societies, also might explain why household income was not significantly related to university attendance. We caution that the lack of significance between relative and absolute measures does not mean that there is no educational inequality in terms of economic resources in Taiwan. In Taiwan and elsewhere, family income is strongly related to students' educational outcomes (Shavit and Blossfeld 1993). Adolescents' expectations, aspirations, and plans for university likely shape their educational attainment in ways that are not examined in this study (Verkuuyten 2016). For example, it is likely that educational expansion led to the divergence in tracks within the educational system (Lucas 2001). Universities in Taiwan are highly divergent in status and quality. We did not distinguish tiers of universities in our analyses, but future studies could more carefully examine the relationship between relative and absolute levels of economic deprivation and higher educational attainment.

The findings suggest that relative deprivation is an important predictor of adolescents' ideas about the future, and possibly even more so than absolute levels of deprivation. By examining three different formulations of relative deprivation, this article provides a more comprehensive and robust picture of the importance of relative deprivation on educational inequality. These formulations allowed us to consider absolute differences in income (Yitzhaki Index), differences in log income (the log-normal formulation), and a full comparison between peers with higher and lower levels of affluence (Deaton's formulation). Despite the conceptual differences underlying the three formulations, students' perceived educational chances and educational outcomes are robust and not highly sensitive to the varying assumptions for relative deprivation. Importantly, we did not find a clear pattern favoring a certain formulation over others. This suggests that the three, when applied to examining educational outcomes, could yield similar results despite the formulaic differences. Considering that the outcomes might not differ greatly, scholars could focus on the theoretical assumptions and choose the type of formulation for relative deprivation with confidence.

One limitation of this study is that, by focusing on students' ideas and plans for the future, we pay less attention to their academic achievement. While university attendance is an important form of educational attainment, longitudinal indicators such as grades or academic career paths could further current understanding of relative deprivation. Future research examining academic performance and educational inequality would benefit from a longitudinal perspective. We do not explain why relative deprivation is related to educational outcomes. It is likely that other factors, such as emotional well-being or psychological health, mitigate the relationship between the two. If this were the case, the measures of relative deprivation adopted in this study would underestimate the effect of relative deprivation on educational outcomes, and the mathematical formulations would serve as a proxy for students' subjective relative deprivation. For example, adolescents who perceive high levels of relative deprivation often develop negative emotions, loss of self-esteem, lower feelings of optimism, and greater likelihood of exhibiting depressive symptoms (Chen and Paterson 2006; Destin et al. 2012; Honneth 2007; Nieuwenhuis et al. 2017; Wolff et al. 2010). These factors, in turn, are associated with low degrees of effort on schoolwork (Crede and Kuncel 2008; Pomerantz, Altermatt, and Saxon 2002). There is some evidence that subjective relative deprivation measures often have larger effects and are more often

significant than objective relative deprivation measures (Smith et al. 2012). Examining how psychological and emotional mechanisms that shape educational outcomes remains an important topic in the field of relative deprivation and educational inequality.

This article argues that the relationship between family background and education is often conditional on the students' relative position in the income hierarchy in their classrooms. Students surrounded by relatively wealthier peers in the same classrooms fare worse than being surrounded by equally poor peers. Yet, we caution against classroom segregation by income or class background, as the average household income in a classroom is positively related to educational outcomes. High levels of income inequality within classrooms, and within society, contribute to sustaining and increasing existing levels of educational inequality. Our study is novel, as fairly little attention has gone to connecting relative deprivation and educational outcomes. Furthermore, because most work on relative deprivation uses data from Western contexts, testing the relative deprivation hypothesis in an East-Asian context contributes to the generalizability of the theory. By highlighting the importance of relative deprivation, this study calls for a nuanced understanding of its relationship with unequal educational outcomes. Addressing the mechanisms of this relationship, such as the pathways of effects, remains a challenge for future research.

Notes

1. Systematic normal grouping takes place as follows. Schools first rank incoming students by their elementary school GPA, and then sort students into each classroom through an S-shaped assignment. For example, if nine students (ranked by GPA) were sorted into three classrooms, the result would be like follows:

Classroom one	Classroom two	Classroom three
Student 1	Student 2	Student 3
Student 6	Student 5	Student 4
Student 7	Student 8	Student 9

2. This translates into waves 1, 3, 6, and 7 for the seventh grade cohort, and waves 1, 4, and 5 for the ninth grade cohort. For the longitudinal variables, we state which waves are used for the corresponding cohort.
3. The question was slightly different when asked the second time to the ninth grade cohort. The question was, "What do you plan to do after you graduate?" Despite the different wording, we used this measurement because it in fact asked the same thing, albeit with more specific response categories that were coded into 0. In the differently worded question, the "other" category includes answers such as get full-time job, learn a skill, go to junior college, go to military academy, do military service then work, do military service and then high school, go abroad, and other.
4. There were fluctuations on how household income was measured between waves. In wave 1, for both cohorts, parents have exact numbers of their household income. All other waves asked about household income as a categorical variable. We used the middle of all categories as our value.

Acknowledgement

The authors would like to thank Tom Kleinepier for his help with measuring relative deprivation.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

Yi-Lin Chiang acknowledges support from the Ministry of Science and Technology (MOST) in Taiwan (108-2410-H-004–194 -MY2).

ORCID

Jaap Nieuwenhuis  <https://orcid.org/0000-0002-6872-553X>

Yi-Lin Chiang  <https://orcid.org/0000-0002-7896-6791>

References

- Adjaye-Gbewonyo, K., and I. Kawachi. 2012. “Use of the Yitzhaki Index as a Test of Relative Deprivation for Health Outcomes: A Review of Recent Literature.” *Social Science & Medicine* (1982) 75 (1): 129–137. doi:10.1016/j.socscimed.2012.03.004.
- Alvaredo, F., L. Chancel, T. Piketty, E. Saez, and G. Zucman, eds. 2017. *World Inequality Report 2018*. Paris: World Inequality Lab.
- Beal, S. J., and L. J. Crockett. 2010. “Adolescents’ Occupational and Educational Aspirations and Expectations: Links to High School Activities and Adult Educational Attainment.” *Developmental Psychology* 46 (1): 258–265. doi:10.1037/a0017416.
- Browman, A. S., M. Destin, M. S. Kearney, and P. B. Levine. 2019. “How Economic Inequality Shapes Mobility Expectations and Behaviour in Disadvantaged Youth.” *Nature Human Behaviour* 3 (3): 214–220. doi:10.1038/s41562-018-0523-0.
- Chen, E., and L. Q. Paterson. 2006. “Neighborhood, Family, and Subjective Socioeconomic Status: How Do They Relate to Adolescent Health?” *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association* 25 (6): 704–714. doi:10.1037/0278-6133.25.6.704.
- Chiang, Y.-L. 2018. “When Things Don’t Go as Planned: Contingencies, Cultural Capital, and Parental Involvement for Elite University Admission in China.” *Comparative Education Review* 62 (4): 503–521. doi:10.1086/699566.
- Chiang, Y.-L., and A. Lareau. 2018. “Elite Education in China: Insights into the Transition from High School to College.” In *Elites in Education*, edited by A. van Zanten, 178–194. London and New York: Routledge.
- Chuang, Y.-C., Y.-S. Li, Y.-H. Wu, and H. J. Chao. 2007. “A Multilevel Analysis of Neighborhood and Individual Effects on Individual Smoking and Drinking in Taiwan.” *BMC Public Health* 7: 151. doi:10.1186/1471-2458-7-151.
- Crede, M., and N. R. Kuncel. 2008. “Study Habits, Skills, and Attitudes: The Third Pillar Supporting Collegiate Academic Performance.” *Perspectives on Psychological Science: A Journal of the Association for Psychological Science* 3 (6): 425–453. doi:10.1111/j.1745-6924.2008.00089.x.
- Dalton, P. S., S. Ghosal, and A. Mani. 2016. “Poverty and Aspirations Failure.” *The Economic Journal* 126 (590): 165–188. doi:10.1111/ecoj.12210.
- Deaton, A. 2001. “Relative Deprivation, Inequality, and Mortality.” *NBER Working Paper 8099*. Princeton NJ: Princeton University, Research Program in Development Studies and Center for Health and Wellbeing.
- Destin, M., and D. Oyserman. 2009. “From Assets to school outcomes: How finances shape children’s perceived possibilities and intentions.” *Psychological Science* 20 (4): 414–418. doi:10.1111/j.1467-9280.2009.02309.x.

- Destin, M., S. Richman, F. Varner, and J. Mandara. 2012. " 'Feeling' hierarchy: The pathway from subjective social status to achievement." *Journal of Adolescence* 35 (6): 1571–1579. doi:10.1016/j.adolescence.2012.06.006.
- Dietz, R. D. 2002. "The Estimation of Neighborhood Effects in the Social Sciences: An Interdisciplinary Approach." *Social Science Research* 31 (4): 539–575. doi:10.1016/S0049-089X(02)00005-4.
- Eibner, C., and W. N. Evans. 2005. "Relative Deprivation, Poor Health Habits, and Mortality." *The Journal of Human Resources* XL (3): 591–620. doi:10.3368/jhr.XL.3.591.
- Esposito, L., and A. Villaseñor. 2019. "Relative Deprivation and School Enrolment." *Review of Income and Wealth* 65 (1): 166–186. doi:10.1111/roiw.12344.
- Honneth, A. 2007. "Recognition as Ideology." In *Recognition and Power*, edited by B. van den Brink and D. Owen, 323–347. Cambridge: Cambridge University Press.
- Kuo, C.-T., and T.-L. Chiang. 2013. "The Association between Relative Deprivation and Self-Rated Health, Depressive Symptoms, and Smoking Behavior in Taiwan." *Social Science & Medicine* (1982) 89: 39–44. doi:10.1016/j.socscimed.2013.04.015.
- Lan, P.-C. 2018. *Raising Global Families*. Stanford, CA: Stanford University Press.
- Lareau, A. 2011. *Unequal Childhoods: Class, Race, and Family Life*. Berkeley, CA: University of California Press.
- Leckie, G., and C. Charlton. 2013. "runmlwin - A Program to Run the MLwiN Multilevel Modelling Software from within Stata." *Journal of Statistical Software* 52 (11): 1–40.
- Liao, P.-S., Y.-C. Fu, and C.-C. Yi. 2005. "Perceived Quality of Life in Taiwan and Hong Kong: An Intra-Culture Comparison." *Journal of Happiness Studies* 6 (1): 43–67. doi:10.1007/s10902-004-1753-6.
- Liu, J., and A. Sakamoto. 2005. "Relative Deprivation, Efficiency Wages, and Labor Productivity in Taiwanese Manufacturing Industries." *Research in Social Stratification and Mobility* 23: 303–341. doi:10.1016/S0276-5624(05)23010-X.
- Lucas, S. R. 2001. "Effectively Maintained Inequality: Education Transitions, Track Mobility, and Social Background Effects." *American Journal of Sociology* 106 (6): 1642–1690. doi:10.1086/321300.
- McVicar, D., and A. Polanski. 2014. "Peer Effects in UK Adolescent Substance Use: Never Mind the Classmates?" *Oxford Bulletin of Economics and Statistics* 76 (4): 589–604. doi:10.1111/obes.12030.
- Mijs, J. J. B., and J. Nieuwenhuis. 2018. "The Great British Sorting Machine: Adolescents' Future in the Balance of Family, School and the Neighbourhood." *LSE International Inequalities Institute Working Paper* 26. London: The London School of Economics and Political Studies.
- Milner, M. 2004. *Freaks, Geeks, and Cool Kids: American Teenagers, Schools, and the Culture of Consumption*. New York, NY: Routledge.
- Ministry of Education. 2009. "Guidelines for elementary and middle schools on normal classroom assignment and group-based learning." Republic of China (Taiwan). Accessed 05 May 2021. <https://edu.law.moe.gov.tw/LawContent.aspx?id=FL034836#lawmenu>
- Ministry of Education. 2013. "Main statistical tables." Republic of China (Taiwan). Accessed 07 April 2019. <https://depart.moe.edu.tw/ED4500/cp.aspx?n=1B58E0B736635285&s=D04C74553DB60CAD>
- Nieuwenhuis, J. 2018. "The Interaction between School Poverty and Agreeableness in Predicting Educational Attainment." *Personality and Individual Differences* 127: 85–88. doi:10.1016/j.paid.2018.02.002.
- Nieuwenhuis, J., and P. Hooimeijer. 2016. "The Association between Neighbourhoods and Educational Achievement, a Systematic Review and Meta-Analysis." *Journal of Housing and the Built Environment* 31 (2): 321–347. doi:10.1007/s10901-015-9460-7.
- Nieuwenhuis, J., M. van Ham, R. Yu, S. Branje, W. Meeus, and P. Hooimeijer. 2017. "Being Poorer than the Rest of the Neighborhood: Relative Deprivation and Problem Behavior of Youth." *Journal of Youth and Adolescence* 46 (9): 1891–1904. doi:10.1007/s10964-017-0668-6.
- Pham-Kanter, G. 2009. "Social Comparisons and Health: Can Having Richer Friends and Neighbors Make You Sick?" *Social Science & Medicine* (1982) 69 (3): 335–344. doi:10.1016/j.socscimed.2009.05.017.
- Piketty, T. 2014. *Capital in the Twenty-First Century*. Cambridge, MA: Belknap.
- Pomerantz, E. M., E. R. Altermatt, and J. L. Saxon. 2002. "Making the Grade but Feeling Distressed: Gender Differences in Academic Performance and Internal Distress." *Journal of Educational Psychology* 94 (2): 396–404. doi:10.1037/0022-0663.94.2.396.

- Portes, A., and D. MacLeod. 1996. "Educational Progress of Children of Immigrants: The Roles of Class, Ethnicity, and School Context." *Sociology of Education* 69 (4): 255–275. doi:10.2307/2112714.
- Raftery, A. E. 1995. "Bayesian Model Selection in Social Research." *Sociological Methodology* 25: 111–163. doi:10.2307/271063.
- Sandefur, G. D., and H. Park. 2007. "Educational Expansion and Changes in Occupational Returns to Education in Korea." *Research in Social Stratification and Mobility* 25 (4): 306–322. doi:10.1016/j.rssm.2007.10.001.
- Shavit, Y., and H. P. Blossfeld. 1993. *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*. Boulder, CO: Westview Press.
- Smith, H. J., T. F. Pettigrew, G. M. Pippin, and S. Bialosiewicz. 2012. "Relative Deprivation: A Theoretical and Meta-Analytic Review." *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc* 16 (3): 203–232. doi:10.1177/1088868311430825.
- Subramanyam, M., I. Kawachi, L. Berkman, and S. V. Subramanian. 2009. "Relative Deprivation in Income and Self-Rated Health in the United States." *Social Science & Medicine (1982)* 69 (3): 327–334. doi:10.1016/j.socscimed.2009.06.008.
- Verkuyten, M. 2016. "The Integration Paradox: Empiric Evidence from The Netherlands." *The American Behavioral Scientist* 60 (5–6): 583–596. doi:10.1177/0002764216632838.
- Walker, I., and T. F. Pettigrew. 1984. "Relative Deprivation Theory: An Overview and Conceptual Critique." *British Journal of Social Psychology* 23 (4): 301–310. doi:10.1111/j.2044-8309.1984.tb00645.x.
- Wilkinson, R. G., and K. E. Pickett. 2007. "The Problems of Relative Deprivation: Why Some Societies Do Better than Others." *Social Science & Medicine (1982)* 65 (9): 1965–1978. doi:10.1016/j.socscimed.2007.05.041.
- Wolff, L. S., S. V. Subramanian, D. Acevedo-Garcia, D. Weber, and I. Kawachi. 2010. "Compared to Whom? Subjective Social Status, Self-Rated Health, and Referent Group Sensitivity in a Diverse US Sample." *Social Science & Medicine* 70 (12): 2019–2028. doi:10.1016/j.socscimed.2010.02.033.
- Wu, X. 2010. "Economic Transition, School Expansion and Educational Inequality in China, 1990–2000." *Research in Social Stratification and Mobility* 28 (1): 91–108. doi:10.1016/j.rssm.2009.12.003.
- Yitzhaki, S. 1979. "Relative Deprivation and the Gini Coefficient." *The Quarterly Journal of Economics* 93 (2): 321–324. doi:10.2307/1883197.
- Zimmerman, B. J., A. Bandura, and M. Martinez-Pons. 1992. "Self-Motivation for Academic Attainment: The Role of Self-Efficacy Beliefs and Personal Goal Setting." *American Educational Research Journal* 29 (3): 663–676. doi:10.3102/00028312029003663.