



Education Level and Self-rated Health in the United States: Immigrants' Diminished Returns



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Abstract

Introduction: Although education is among the major socioeconomic status (SES) resources that influence populations' and individuals' health, social marginalization may reduce the health gain that follows access to SES indicators such as education, a pattern called marginalization-related diminished return (MDR). The literature on MDRs, however, has been mainly derived from studies that have defined marginalization based on race, ethnicity, and sexual orientation. Thus, more research is needed on MDRs that may follow as a result of immigration. To extend what is known on immigration status related MDRs, this study compared a national sample of immigrants and non-immigrants for the effect of education on the poor self-rated health (SRH) of adults in the United States.

Methods: With a cross-sectional design, this study employed data from the 2015 National Health Interview Survey (NHIS), a survey that had enrolled 33,654 adults who were either immigrants (n=6225; 18.5%) or non-immigrants (n=27429; 81.5%). The independent variable was education level, treated as a categorical variable. The dependent variable was SRH treated as a dichotomous variable. Race, ethnicity, age, gender, marital status, and region were the confounders. Immigration (nativity) was the moderator. Logistic regression was used for data analysis.

Results: Higher education credentials were associated with better SRH in the pooled sample; however, immigration showed a significant statistical interaction with education level (college graduation) on the outcome. This interaction was indicative of a smaller protective effect of college graduation on poor SRH among immigrants than non-immigrant adults.

Conclusion: In line with the MDRs framework, the effect of education on SRH is weaker for immigrants than for non-immigrant adults. There is a need to help highly educated immigrants to mobilize their human capital to secure their best health outcomes, similar to non-immigrants. Such strategies may require bold and innovative policy solutions to reduce discrimination against immigrants, so they can more effectively translate their education and human capital into tangible outcomes such as health.

Keywords: Population Groups, Immigration, Immigrants, Nativity, Socioeconomic Status, Self-rated Health

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Introduction

A growing body of theoretical and empirical work has established the strong effect of SES indicators such as education level¹⁻³ and immigration status^{4,5} on the health status of populations and individuals. High education predicts self-rated health (SRH),⁶ happiness,⁷ affect,⁸ mental health,⁹ and health behaviors.^{10,11} At the same time, immigration and nativity status are also among the social determinants of health.^{4,5}

Marginalized and non-marginalized groups, however, show an unequal impact of socioeconomic status (SES) indicators such as education on health,¹²⁻¹⁶ a pattern called

Marginalization-related Diminished Returns (MDRs). As a result of these MDRs, the effects of SES indicators such as education level on mental health,^{17,18} physical health,¹⁹⁻²² and health behaviors²³⁻²⁵ are weaker for marginalized people than for the majority group. These MDRs, however, are shown not only for education,²⁵ but also income,²⁶⁻³⁰ employment,^{31,32} and marital status.^{33,34} Similarly, MDRs^{35,36} are shown for Blacks,^{12,13} Hispanics,^{26,37} Asian Americans,³⁸ Native Americans,¹⁰ lesbian, gay, bisexual, and transgender (LGBT),³⁹⁻⁴¹ and even marginalized Whites.⁴² For example, highly educated LGBT people remain at high risk for poor mental well-being,³⁹ obesity,⁴¹ and smoking.⁴⁰

While according to the MDRs literature^{35,36} minority status may reduce the health returns of education,¹⁹ income,²⁶⁻³⁰ occupation,^{31,32} and marital status,³³ it is yet unknown if the same MDRs can be seen for immigrants. That is, it is unclear if immigrants and non-immigrants similarly gain health from their SES resources such as education level. Similar to other sources of marginalization, namely race,¹⁷ ethnicity,^{24,26} and sexual orientation,³⁹⁻⁴¹ immigrants are pushed to the margins of the host society. Given the rules and regulations combined with structural racism (ethnicism), xenophobia, and prejudice, immigrants are commonly discriminated against and treated as second-class citizens.⁴³⁻⁴⁷

We are only aware of a single recent study on MDRs of SES indicators such as income among immigrants.⁴⁸ According to that single study that was published in 2020,⁴⁸ the effect of income on mental well-being was found to be smaller for immigrants than for non-immigrants. A cross-sectional study borrowed data from the 2015 National Health Interview Survey (NHIS) and enrolled 14 149 middle-aged and older individuals who were either immigrants (n = 1977) or non-immigrants (n = 12 166). The independent variable was income, and the dependent variable was mental well-being. Race, ethnicity, age, gender, education level, marital status, employment, SRH, obesity, and region were the confounders. Immigration, defined based on nativity status, was the moderator. The authors applied logistic regression and showed that high income is associated with better mental well-being in middle-aged and older adults. They, however, documented a significant statistical interaction between immigration and income. The interaction was suggestive of a smaller boosting effect of high income on the mental well-being of immigrant than non-immigrant individuals. In other words, middle-aged and older adults who were immigrants experienced poor mental well-being even when they have a high income.⁴⁸

This study used data from the NHIS study, a nationally representative study, to compare immigrants and non-immigrants for the effect of education on the poor SRH status of adults in the US. As suggested by the literature on MDRs^{35,36} and shown by the recent study explained above,⁴⁸ it was expected that weaker effects of education level on poor SRH of immigrants than non-immigrant people would be seen. Immigration was considered as a source of marginalization,⁴⁸ similar to the experiences of Blacks,^{34,49-51} Hispanics,⁴⁹⁻⁵¹ Asian Americans,³⁸ Native Americans,¹⁰ LGBT people,³⁹⁻⁴¹ and marginalized Whites.⁴²

Methods

This cross-sectional study examined data from the 2015 NHIS.^{49,52} The NHIS is one of the main sources of information for surveillance of the physical and mental health status of adults (18+ years) in the United States.

Participants and Sampling

The NHIS sample is composed of US residents who are civilians and non-institutionalized people. The current analysis included all adult participants of the 2015 NHIS. The NHIS used a multi-stage clustered/stratified random

sampling; 428 primary sampling units (PSUs) drawn from 1900 geographically defined PSUs were sampled. All the 50 US states and the District of Columbia which have representatives had PSUs in the sample. The PSUs were a single county, a small group of contiguous counties, or a metropolitan statistical area.

Process

Data is collected by the U.S. Census Bureau and the National Center for Health Statistics (NCHS), which is a part of the Centers for Disease Control and Prevention (CDC), through face-to-face interviews in participants' households. On some occasions, a telephone interview is used for follow-up or in place of a face-to-face interview.

Participants

The total sample in this study was 33,654 adults who were either immigrants (n = 6225; 18.5%) or non-immigrants (n = 27 429; 81.5%). People could belong to or identify with any race or ethnicity to be a part of the current analysis. This study did not have any exclusion criteria.

Measures

Predictor

Education level. Educational level, a self-reported variable, was operationalized as a nominal variable ranging from 1 to 4: less than high school, high school, some college, and college graduate.

Moderator

Immigration status. Nativity was self-reported. All participants were asked if they were born in the US. The responses were coded 1 for immigrants and 0 for non-immigrants.

Covariates

Demographic factors included race, ethnicity, age, gender, marital status, and region. Participants self-identified (self-reported) their race and ethnicity, which were operationalized as multiple categorical variables. Race was (a) race group not releasable (masked or missing), (b) multiple races, (c) Asian only, (d) Native American/Alaska Native only, (e) Black/African American only, or f) White only (reference category). Ethnicity was Hispanics = 1, Non-Hispanics = 0 (reference category). Age (years) was a continuous variable. Gender was a dichotomous measure (male = 1, female = 0). The region was either a) Northeast, b) Midwest, c) South, or d) West. Participants were asked about the number of years of schooling. Marital status was a dichotomous variable with married as 1.

Dependent Variable

Self-Rated Health (SRH). Participants reported their SRH using the conventional single-item measure. The item was, "Would you say your health, in general, is excellent, very good, good, fair, or poor?" Responses included excellent, very good, good, fair, or poor. A dichotomized (collapsed) outcome was used with fair/poor as 1 and excellent/very good health as 0. Idler and others have shown that subjective health is a valid

predictor of mortality risk in the general population.^{53,54}

Statistical Analyses

Given the NHIS's multi-stage sampling design, it was necessary to apply SPSS 23.0 (IBM Inc., NY, USA) for data analysis. Using SPSS, adjustments were made for the NHIS survey weights due to the design variables (strata, clusters, and non-response). Taylor series linearization was applied for the re-estimation of the standard errors (SE). For descriptive statistics, weighted means and frequencies were used. Independent sample *t* test and chi-square test were used for bivariate analyses. For multivariable analyses, four logistic regression models were applied. In these models, education level was the independent variable; poor SRH status was the dependent variable; age, gender, race, ethnicity, and region were the control variables; and immigration status was the moderator. *Models 1* and *2* were both estimated in the pooled sample that was composed of both immigrants and non-immigrants. *Model 1* did not include immigration by education interaction terms, but only calculated the main effects. *Model 2*, however, included immigration by education interaction

terms. This is the main model to test our hypothesis on the differential effect of education on SRH based on nativity status. *Models 3* and *4* were performed in non-immigrants and immigrants, respectively. The adjusted odds ratio (OR), 95% confidence intervals (CI), and *P* values were reported. A *P* value of equal or less than 0.05 was considered significant.

Results

Descriptive Statistics

The total sample in this study was 33 654 immigrant and non-immigrant American adults 18+ years old. [Table 1](#) provides the descriptive statistics of the study sample both overall and based on nativity status (immigration). This table also compares immigrants and non-immigrants for the study variables.

Pooled Sample Logistic Regressions

[Table 2](#) provides the summary of the results of two logistic regression models in the pooled sample with education level as the predictor and poor SRH status as the outcome (dependent variable). *Model 1* only included the main effects

Table 1. Descriptive data overall and based on immigration (nativity) (n = 33 654)

	All		Non-Immigrant		Immigrant	
	n	%	n	%	n	%
Immigrants						
No	27429	81.5	25128	91.6	2942	47.3
Yes	6225	18.5	2301	8.4	3283	52.7
Ethnicity*						
Non-Hispanic	28070	83.4	25128	91.6	2942	47.3
Hispanic	5584	16.6	2301	8.4	3283	52.7
Race*						
White only	25818	76.7	21937	80.0	3881	62.3
Black/African American only	4670	13.9	4033	14.7	637	10.2
AIAN only	392	1.2	311	1.1	81	1.3
Asian only	1981	5.9	492	1.8	1489	23.9
Multiple races	94	0.3	47	0.2	47	0.8
Race group not releasable	699	2.1	609	2.2	90	1.4
Gender						
Female	18592	55.2	15152	55.2	3440	55.3
Male	15062	44.8	12277	44.8	2785	44.7
Region*						
Northeast	5578	16.6	4346	15.8	1232	19.8
Midwest	7100	21.1	6395	23.3	705	11.3
South	11640	34.6	9579	34.9	2061	33.1
West	9336	27.7	7109	25.9	2227	35.8
Marital status*						
Non-married	18878	56.1	15936	58.1	2942	47.3
Married	14776	43.9	11493	41.9	3283	52.7
Education*						
Less than 12 years	4678	14.0	2852	10.4	1826	29.6
12 years	8358	24.9	7045	25.8	1313	21.3
13-15 years	9047	27.0	7990	29.2	1057	17.1
16+ years	11427	34.1	9457	34.6	1970	31.9
Self-rated health (SRH)*						
Good	28614	85.0	23272	84.9	5328	85.6
Poor	5046	15.0	4147	15.1	896	14.4
	Mean	SD	Mean	SD	Mean	SD
Age*	49.95	18.38	50.57	18.678	47.19	16.713

**P* < 0.05 for bivariate comparisons of immigrant and non-immigrant adults.

Table 2. Logistic Regressions in the Overall (Pooled) Sample (n = 33 654)

	Model 1 Main Effects Model				Model 2 Interaction Model			
	OR	95% CI		P	OR	95% CI		P
Immigrant	0.81	0.73	0.91	<0.001	0.72	0.62	0.85	<0.001
Ethnicity (Hispanic)	1.17	1.05	1.30	0.005	1.19	1.07	1.33	0.002
Race				<0.001				<0.001
White only								
Black/African American only	1.55	1.42	1.69	<0.001	1.55	1.42	1.69	<0.001
AIAN only	1.61	1.25	2.09	<0.001	1.61	1.25	2.08	<0.001
Asian only	1.04	0.87	1.24	0.668	1.01	0.84	1.21	0.911
Multiple races	0.36	0.13	1.00	0.050	0.36	0.13	1.00	0.051
Race group not releasable	1.71	1.40	2.09	<0.001	1.71	1.40	2.09	<0.001
Male	1.02	0.96	1.09	0.561	1.02	0.95	1.08	0.610
Age	1.03	1.03	1.03	<0.001	1.03	1.03	1.03	<0.001
Region								
West								
Northeast	0.96	0.87	1.06	0.435	0.96	0.87	1.06	0.408
Midwest	0.90	0.82	1.00	0.043	0.90	0.82	0.99	0.037
South	1.12	1.03	1.21	0.010	1.11	1.02	1.21	0.014
Married	0.73	0.68	0.78	<0.001	0.73	0.68	0.78	<0.001
Education				<0.001				<0.001
Less than 12 years								
12 years	0.52	0.47	0.57	<0.001	0.50	0.45	0.55	<0.001
13-15 years	0.44	0.40	0.48	<0.001	0.42	0.38	0.47	<0.001
16+ years	0.20	0.18	0.22	<0.001	0.19	0.17	0.21	<0.001
Education x immigrant								0.148
12 Years x immigrant					1.14	0.92	1.42	0.242
13-15 Years x immigrant					1.18	0.92	1.50	0.185
16+ Years x immigrant					1.33	1.03	1.71	0.027
Constant	0.09			<0.001	0.10			<0.001

of education level; however, *Model 2* added three interaction terms between immigration status and education levels. Based on *Model 1*, high education level was linked to lower odds of poor SRH. The observed ORs were 0.52 (95% CI = 0.47-0.57) for 12 years of education, 0.44 (95% CI = 0.40-0.48) for 13-15 years of education, and 0.20 (95% CI = 0.18-0.22) for 16+ years of education.

Model 2, however, revealed statistically significant interactions between education levels and immigration status on the poor SRH status of adults. The model suggested that the protective effects of education level 16+ years (OR = 1.33; 95% = 1.03- 1.71) against poor SRH status were smaller for immigrant than for non-immigrant adults (*Table 2*).

Stratified Logistic Regressions

Table 3 shows the results of one logistic regression on non-immigrants (*Model 3*) and one logistic regression on immigrants (*Model 4*). In these models, education and income were the predictors, and poor SRH status was the dependent variable. Based on *Model 3*, any incremental increase in education level was associated with lower odds of poor SRH for non-immigrant adults. *Model 4* did show the protective effects of all education levels on poor SRH for immigrant adults; however, the ORs were closer to 1.00 (*Table 3*).

Discussion

Higher education levels were associated with lower odds of poor SRH status of American adults. This effect, however, was larger for non-immigrants than immigrants. In other words, diminishing returns of education on the health of immigrants in the US were observed.

Marginalization types such as race, ethnicity, and sexual minority status are shown to generate MDRs. That is, MDRs are shown for Blacks,¹⁷ Hispanics,^{24,26} Asian Americans,³⁸ Native Americans,¹⁰ LGBTs,⁴¹ and marginalized Whites.⁴² The current study showed that immigration also causes MDRs. That means, marginalization in its broadest definition reduces the health return of education and other SES indicators¹⁹ such as income,²⁶⁻³⁰ occupation,^{31,32} and marital status³³ on a wide range of physical health outcomes such as SRH,^{18,26} obesity,^{19,20} chronic diseases,^{28,29} disability,⁵⁵ and mortality.²²

SRH, however, is not the only outcome that has been shown to be relevant for MDRs. MDRs are also shown for mental health outcomes such as psychological distress,⁵⁶ depression,²⁷ suicide,¹⁷ and anxiety³³ as well as behaviors such as smoking,^{10,40,57} vaping,²³ drinking,^{24,58} diet,⁵⁹ and exercise.⁵ Thus, not only are MDRs seen broadly across marginalizing identities, but they are also robust and seen for all types of outcomes and SES resources.

Table 3. Logistic Regressions in Non-immigrants and Immigrants (n = 33 654)

	Model 3 Non-Immigrants				Model 4 Immigrants			
	OR	95% CI		P	OR	95% CI		P
Ethnicity (Hispanic)	1.06	0.93	1.21	0.369	1.64	1.30	2.06	0.000
Race				0.000				0.064
White only	1.00				1.00			
Black/African American only	1.56	1.42	1.71	0.000	1.10	0.81	1.49	0.551
AIAN only	1.42	1.06	1.92	0.020	2.40	1.40	4.11	0.001
Asian only	1.02	0.75	1.39	0.880	1.01	0.77	1.32	0.933
Multiple races	0.00	0.00		0.997	1.01	0.35	2.93	0.981
Race group not releasable	1.80	1.46	2.23	0.000	1.06	0.56	2.02	0.861
Male	1.07	0.99	1.14	0.079	0.81	0.69	0.95	0.010
Age	1.02	1.02	1.03	0.000	1.05	1.05	1.06	0.000
Region				0.000				0.020
West	1.00				1.00			
Northeast	0.87	0.78	0.98	0.026	1.28	1.04	1.58	0.022
Midwest	0.94	0.85	1.05	0.259	0.68	0.50	0.93	0.017
South	1.18	1.07	1.30	0.001	0.80	0.66	0.97	0.023
Married	0.72	0.67	0.77	0.000	0.88	0.75	1.03	0.115
Education				0.000				0.000
Less than 12 Years	1.00				1.00			
12 Years	0.50	0.45	0.55	0.000	0.63	0.52	0.78	0.000
13-15 years	0.41	0.37	0.46	0.000	0.59	0.47	0.75	0.000
16+ Years	0.18	0.16	0.21	0.000	0.31	0.25	0.40	0.000
Constant	0.12			0.000	0.02			0.000

As educational attainment,¹⁸ income,²⁸ occupation,²² and marital status³³ generate less health for all marginalized people, regardless of the type of social marginalization, interventions to equalize populations using the redistribution of SES resources are very challenging and probably less effective than expected. This may be why it is difficult to close the health gaps based on race,⁶⁰ ethnicity,^{24,26} sexual orientation,³⁹⁻⁴¹ and immigration.⁴⁸ As this paper shows, eliminating the SES gap is not enough to eliminate health inequalities, as immigrants and other marginalized groups always gain less health from attempts to increase their access to education, income, and other SES resources.⁶⁰

The robust, universal, ubiquitous, and consistent nature of the observed MDRs advocates for higher-level policies as a remedy to health inequalities. MDRs may help society better recognize the role of social stratification in generating health inequalities. They also help reduce the bias and stigma around marginalized people. The results, as well as the framework, shift the blame from marginalized people to society. The results suggest that all marginalized groups lose the effects of their SES and human capital, meaning that it is not them but society that is responsible for causing and maintaining these inequalities.

MDRs blame the hierarchical, judgmental, and unequal aspects of society for the diminished returns of SES in historically marginalized groups. Thus, these patterns suggest that they are due to the function and structure of society. The US society in general and its societal institutions differentially treat people of a different color, race, ethnicity, class, heritage,

or nativity, resulting in the systemic marginalization of any group that deviates from the privileged, native, majority group. Such marginalization reduces people's chances of full participation and full benefit from the resources that are available to them. The racism, xenophobia, and nationalism embedded in the social fabric of the US society reduce the ability of immigrants, LGBTs, and racial and ethnic minorities to mobilize and leverage their full potential (e.g., human capital) and turn it into actual and tangible outcomes (e.g., health). As a result, they show less than expected benefits in the presence of education, income, and other SES resources.^{35,36}

Implications

To undo MDRs, there is a need for bold policies that can equalize the health return of education and human capital as well as other SES indicators across various and diverse social groups. Such policies should go beyond equal access to education to equality in the returns of SES indicators across social groups. Specific policies and programs should help immigrants to more effectively mobilize and leverage their education to gain tangible outcomes. Ways by which the purchasing power of highly educated immigrants is minimized and solutions to enhance such purchasing power should be the subject of future research.

A society is fair only when all groups can similarly gain from their potential, ambitions, investments, and human capital. In such a society, all groups should be treated similarly and should similarly access the opportunity structure. In reality, however, the US society does not treat all social groups

equally. Marginalized people are held behind, stigmatized, discriminated against, and pushed into ethnic enclaves. Such marginalization interferes with the ability of such populations to integrate into the mainstream society and societal institutions to secure their highest potential.

Limitations

The current findings should only be interpreted while considering the methodological limitations of this study. First, any cross-sectional study is limited in drawing causal inferences. It cannot be ruled out that excessive health problems would influence social mobility and the ability to generate educational mobility and income. Thus, reverse causality cannot be ruled out in this study. Thus, the results should not be interpreted as causation, but association. Second, the mechanisms by which the MDRs of education level emerge were not studied. The lower purchasing power of income for immigrants may be the mechanism. Moreover, access to the country of origin was not available. Immigrants are a very heterogeneous group. There is a need to compare immigrants from Asia, Africa, and Latino countries as each culture may adopt US culture differently. Third, this study did not control for income, occupation, wealth, assets, or parental education. Future research should attempt to test the replicability and validity of the current findings using longitudinal data that includes multiple observations of health and SES, a more comprehensive list of confounders and measures, detailed data on nativity status, country of origin, detailed information on education level, and other SES indicators. Future research may also include contextual factors such as neighborhood ethnic composition, SES, or density of resources as factors that may cause MDRs. It is likely that highly educated immigrants report poor health because their education is achieved in their home country, which is under-valued in the host society. There is a need to study how much time immigrants and non-immigrants with the same education need to spend on jobs, how much they adhere to pro-health behaviors, how much they engage in health-risk behaviors, and how much they experience stress, particularly for social mobility. It is possible that at each level of education, immigrants experience an additional level of stress (extra costs of social mobility for immigrants).

Conclusion

While education reduces the odds of the poor SRH status of American adults, this influence is weaker for immigrants than for non-immigrants. Thus, health disparities in immigrants are beyond SES inequalities (particularly education) and are shaped by the existing diminishing marginal returns of existing SES indicators such as education in immigrant populations. To undo and eliminate health inequalities that affect immigrant populations, it is essential to equalize SES and also address specific MDR-related causes of inequalities that are sustained across all SES levels. As a result of such MDRs, health inequality shows spill-over effects in all SES levels of U.S. immigrants. There is an additional need for future research.

Research Highlights

What Is Already Known?

High education levels are associated with better self-rated health; however, this effect may vary across population subgroups.

What This Study Adds?

In line with Marginalization-related Diminished Returns, education generates weaker health effects for immigrants than for non-immigrants in the United States. As a result, highly educated immigrants report a worse than expected health status.

Authors' Contributions

SA: conceptualization, data analysis, preparation of the first draft, and revision. MP, NAJ, NW, EC, LG, XH, and SC: conceptualization, literature review, contribution to the draft, and revision. All authors approved the final draft.

Conflict of Interest Disclosures

The authors declare no conflicts of interest.

Ethical Approval

All participants signed written consent. The NHIS protocol was approved by the CDC Instructional Review Board (IRB). According to NIH guidelines as well as the decision tool regarding human subject research, secondary analyses of publicly available fully de-identified existing data are "Non-Human Subject Research." The definition of "Non-Human Subject Research" as well as the decision tool are available at: <https://grants.nih.gov/policy/humansubjects/hs-decision.htm>. Non-human subject research is exempt from the IRB review.

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