



Household Income and Children's Depressive Symptoms: Immigrants' Diminished Returns



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Abstract

Introduction: Relative to socially privileged groups, socially marginalized people experience weaker health effects of household income and other economic resources, a pattern known as Minorities' Diminished Returns (MDRs). These MDRs are frequently seen in racial and ethnic minorities, but less is known about the relevance of such MDRs in immigrant families. To investigate the MDRs of household income on children's depression as a function of immigration, we compared non-immigrant and immigrant children for the effect of household income on children's depressive symptoms.

Methods: This cross-sectional study was conducted across multiple cities in the United States. Baseline data from the Adolescent Brain Cognitive Development (ABCD) study collected in 2018 was used. A total of 6,412 children between the ages of 9-10 years old were included. The predictor variable was household income. The primary outcome was children's depression measured by the Child Behavior Checklist (CBCL). Race, ethnicity, age, sex, parental marital status, parental employment, and financial difficulties were the covariates. Immigration status was the effect modifier.

Results: Overall, high household income was associated with lower children's depressive symptoms. Immigration status showed a statistically significant interaction with household income on children's depression. This interaction term suggested that high household income has a smaller protective effect against depression for immigrant children than non-immigrant children.

Conclusion: The protective effect of household income against children's depression is diminished for immigrant than non-immigrant children.

Keywords: Emigration and Immigration, Socioeconomic Status, Depression, Health Equity

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Introduction

Children from marginalized families, including Hispanics, Blacks, and immigrants, are at an increased risk of undesired developmental outcomes, such as depression.¹⁻⁶ As early outcomes influence future economic and health consequences,⁷⁻¹⁰ it is imperative to close such children's inequalities if we wish to eliminate subsequent disparities later in life.⁷⁻¹⁰

There is a close association between social marginalization and household income.¹¹⁻¹³ Social marginalization, immigration status, and household income all have separate, combined, and multiplicative effects on children's developmental outcomes.¹¹⁻¹³ This is mainly because both low household income and marginalized social identities are commonly associated with economic adversities, stress,

trauma, stigma, and prejudice.¹⁴⁻¹⁷

Among the strongest social determinants of children's developmental outcomes is household income, a major family economic indicator.¹⁸⁻²¹ Regardless of the domain, many studies have documented a link between low household income and associated poverty and financial distress as major risk factors of behavioral problems and poor health.²²⁻²⁴ High household income, commonly measured by parental educational attainment, is linked to a variety of family economic indicators, such as employment, wealth, and marital status, all of which positively influence children's mental health.¹⁸⁻²¹ Parents with large economic resources can afford to put in higher investment and greater involvement in the lives of their children.²⁵⁻²⁷ In addition, children from high socioeconomic status (SES) families are sent to better

schools with greater opportunities.²⁸⁻³⁰ High SES children also have access to a wide range of educational and stimulating resources in their home.³¹ Finally, high SES children are raised in families with lower stress.³²⁻³⁶ All of these factors have strong positive effects on children's developmental outcomes.³⁷⁻⁴¹

According to the Minorities' Diminished Returns (MDRs) theory,^{42,43} we can observe weaker health effects of economic resources for members of marginalized groups (e.g. immigrants) relative to socially privileged groups (non-immigrants). This view is supported by an extensive body of evidence suggesting that economic resources, like parental education,⁴⁴ family income,^{45,46} and marital status,⁴⁷ generate far more desired outcomes for socially privileged members of society (non-Hispanic Whites) than socially marginalized groups such as Hispanics, Native Americans, or Blacks.

Although MDRs are shown for racial and ethnic groups,⁴⁸⁻⁵⁰ less is known about the relevance of MDRs in those who become marginalized in a new society as a function of their immigration. We argue that any marginalization, including that due to immigration, may generate unequal and unfair processes, diminished access to resources, and increased level of stress. As a result, immigrants may differ from non-immigrants in their opportunities to mobilize resources, navigate systems, and secure tangible outcomes, even when they have similar economic means.^{43,45,49,51-53} In line with these MDRs, high-income immigrant children may demonstrate worse than expected outcomes despite their economic resources.^{42,43,45,46,54} This is, however, frequently shown for racial and ethnic minorities.

To extend the literature on the MDRs phenomenon,⁵⁵⁻⁵⁹ we compared immigrant and non-immigrant families for the effects of household income on children's depression. We expected an inverse association between family income and children's depression. However, we anticipated this association to be weaker for immigrant than non-immigrant children.

Methods

Design and Settings

This was a cross-sectional study conducted across multiple cities in the United States. We performed a secondary analysis of the Adolescent Brain Cognitive Development (ABCD) wave 1 data.⁶⁰⁻⁶⁴ The methodology and rationale of the ABCD study is available elsewhere.^{60,65}

Participants and Sampling

The ABCD data collection for the study baseline data (wave 1) was performed between 9/1/2016 and 11/1/2018. Participants of the ABCD study were 9 and 10-year-old children, most of whom were recruited through school systems. School selection was mainly informed by gender, race and ethnicity, SES, and urbanicity. The ABCD study implemented quality control and procedures for school selection to minimize selection biases. This included dynamic monitoring of the accumulating sample and frequently correcting any possible deviation of the sampling from recruitment targets. A detailed description of the ABCD sampling is available here.⁶⁶ The ABCD study sample is national; however, given the non-random nature of the sampling, the results are not entirely

applicable to the broader US adolescent population.

Analytical Sample

Our analytical sample was comprised of non-Latino, Latino White, or Black children. We selected families who had only one child in the study. Thus, inclusion criteria were non-twin and having valid data on immigration status and the outcome (adolescent depressive symptoms). Exclusion criteria included having a sibling in the study or having any race other than Black or White. A total sample of 6,412 children entered our analysis.

Sample Size and Statistical Power

For sample size calculation, we used comparison of means across two groups. An overall sample size of 5,254 would be enough to generate a 90% statistical power to detect significant difference between two groups with a p value of 0.05 (two-sided). Our assumptions for power calculation was a population variance of 1000 and a hypothesized difference of only 2 across immigrant and non-immigrant groups.

Study Variables

The study variables included immigration status, demographic factors (age, sex, race, ethnicity), household income, family marital status, parental employment, financial difficulties, and depression.

Confounders

Race. In the ABCD study, race was a self-identified, categorical variable: Blacks vs. Whites (reference category).

Ethnicity. In the ABCD study, ethnicity was self-identified. Ethnicity was a 1 for Hispanics and 0 for non-Hispanics (reference category).

Age. Parents were asked to report the age of their children. Age was a continuous measure in months.

Sex. Sex was a dichotomous variable: male = 1, female = 0.

Parental marital status. Parental marital status was dichotomous: married = 1, other = 0.

Parental employment. Parental employment was a dichotomous variable: at least one parent employed in the household = 1, no employed parent in the household = 0.

Financial difficulties. This study measured household income using the following seven items. Participants were asked, "In the past 12 months, has there been a time when you and your immediate family experienced any of the following: 1) Needed food but couldn't afford to buy it or couldn't afford to go out to get it? 2) Were without telephone service because you could not afford it? 3) Didn't pay the full amount of the rent or mortgage because you could not afford it? 4) Were evicted from your home for not paying the rent or mortgage? 5) Had services turned off by the gas or electric company, or the oil company wouldn't deliver oil because payments were not made? 6) Had someone who needed to see a doctor or go to the hospital but didn't go because you could not afford it? 7) Had someone who needed a dentist but couldn't go because you could not afford it?" Responses were no = 0 or yes = 1. We calculated a sum score (a continuous measure) that ranged between 0 and 1, with a higher score indicating

greater financial difficulties. Financial difficulty is an accepted SES indicator, as it reflects some aspects of SES that are not captured by objective SES indicators like education and income.⁶⁷⁻⁷³ Financial difficulties may have some health effects that are not seen by objective SES.^{67,69,70,74-76}

Primary Outcome

Depressive Symptoms. Using the Child Behavior Checklist (CBCL), we measured children's symptoms of depression.⁷⁷ The CBCL depression sub-score predicts psychiatric disorders based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR), particularly depression.⁷⁸ The CBCL is derived from parents' reports and is a strong screening tool for emotional health problems in children. The CBCL is widely used across age groups, cultures, and settings and is well adapted in schools, medical settings, and mental health facilities.⁷⁹⁻⁸⁴ The CBCL measure has high reliability and validity when compared to the diagnoses based on DSM.⁸⁵⁻⁸⁸

Independent Variable

Household income. Household income during the last 12 months was an interval variable ranging from 1 to 10. This variable was treated as a continuous measure. Responses were 1 = less than \$5000; 2 = \$5000; 3 = \$12,000; 4 = \$16,000; 5 = \$25,000; 6 = \$35,000; 7 = \$50,000; 8 = \$75,000; 9 = \$100,000; 10 = \$200,000.

Moderator

Immigration status. Nativity (immigration status) was self-identified by the parents. Immigration status was calculated based on the child's country of birth. This variable was treated as a categorical variable and coded as 1 for immigrants and 0 for non-immigrants (reference category).

Data Analysis

We used the statistical package SPSS (version 22.0) for data analysis. We first performed a Spearman bivariate test to rule out multi-collinearity between the study variables (results not shown here). After we tested the normal distribution of the error terms, we applied linear regression models to analyze the data. Our *Models 1* and *2* were performed in the overall sample. *Model 1* was performed without the immigration by household income interaction term. *Model 2* added the interaction term between immigration status and household income (parental educational attainment). Our last two models were performed across our sub-groups based on immigration. *Model 3* was performed in non-immigrants, and *Model 4* was performed in immigrants. We did not impute the missing data. However, missing data were minimal.

Results

Descriptive Data

As shown in [Table 1](#), a total of 6,412 children between 9 and 10 years-old entered this analysis. From this sample, most were non-immigrants (98.4%), and the rest were immigrants (1.6%). The mean income was 6.93 (1-10), which

Table 1. Data Overall and by Immigration Status (n = 6412)

	All		Non-Immigrant		Immigrant	
	n	%	n	%	n	%
Immigrant						
No	6197	96.6	6197	100.0	-	-
Yes	215	3.4	-	-	215	100.0
Race						
White	4101	71.2	3986	71.1	115	74.7
Black	1656	28.8	1617	28.9	39	25.3
Ethnicity*						
Non-Latino	5019	78.3	4891	78.9	128	59.5
Latino	1393	21.7	1306	21.1	87	40.5
Sex						
Female	3064	47.8	2959	47.8	105	49.1
Male	3345	52.2	3236	52.2	109	50.9
Parents employed*						
No	2337	36.4	2276	36.7	61	28.4
Yes	4075	63.6	3921	63.3	154	71.6
Marital status*						
Not Married	2119	33.0	2017	32.5	102	47.4
Married	4293	67.0	4180	67.5	113	52.6
	Mean	SD	Mean	SD	Mean	SD
Age (months)	118.19	7.52	118.21	7.51	117.69	7.64
Financial difficulties*	0.54	1.17	0.55	1.18	0.41	0.94
Household income*	6.93	2.58	6.95	2.57	6.47	2.82
CBCL-based depressive symptoms	1.06	1.76	1.06	1.76	1.04	1.79

* $P < 0.05$ for comparison of immigrants and non-immigrants. SD, standard deviation.

was between \$35,000 and \$50,000 (SD = 2.58). CBCL-based depressive symptoms of the overall sample was 1.06 (SD = 1.76). [Table 1](#) presents a description of the sample overall and based on immigration status. Immigrants were less likely to be married compared to non-immigrants. Immigrants also had higher average income than non-immigrants. Immigrants and non-immigrants did not differ in their CBCL-based depressive symptoms.

Multivariate Analysis (Pooled Sample)

[Table 2](#) shows the results of two linear regression models in the overall (total) sample. *Model 1* (Main Effect Model) showed the protective effect of high family income against children's depressive symptoms ($b = -0.06$, $P < 0.001$). *Model 2* (Interaction Model) showed a statistically significant interaction between immigration status and household income on children's depressive symptoms ($b = 0.12$, $P < 0.024$), suggesting that the protective effect of high household income on children's depressive symptoms is weaker for immigrants relative to non-immigrant children.

Multivariate Analysis (Group-stratified models)

[Table 3](#) shows the results of two linear regressions by immigration status. *Model 3* displayed the protective effect

Table 2. Summary of Linear Regressions Overall (n = 6412)

	Model 1 Main Effects				Model 2 Interaction Effects			
	B	SE	95% CI	P	B	SE	95% CI	P
Immigrants	-0.13	0.15	-0.42 - 0.17	0.405	-0.93	0.39	-1.69 - -0.17	0.016
Race (Black)	-0.18	0.06	-0.30 - -0.05	0.005	-0.18	0.06	-0.31 - -0.06	0.004
Ethnicity (Hispanic)	0.03	0.07	-0.10 - 0.16	0.646	0.04	0.07	-0.09 - 0.16	0.589
Sex (male)	0.18	0.05	0.09 - 0.27	< 0.001	0.18	0.05	0.09 - 0.27	< 0.001
Age (months)	0.01	0.00	0.00 - 0.02	0.001	0.01	0.00	0.00 - 0.02	0.001
Married household	-0.07	0.06	-0.19 - 0.05	0.269	-0.07	0.06	-0.19 - 0.06	0.299
Employed parents	-0.27	0.05	-0.38 - -0.17	< 0.001	-0.27	0.05	-0.37 - -0.16	<0.001
Financial difficulties	0.28	0.02	0.24 - 0.32	< 0.001	0.28	0.02	0.24 - 0.32	<0.001
Household income	-0.06	0.01	-0.08 - -0.03	< 0.001	-0.06	0.01	-0.09 - -0.04	<0.001
Household income x Immigrants					0.12	0.05	0.02 - 0.23	0.024

b= Regression coefficient; SE, standard error; CI, confidence interval.

Table 3. Summary of Linear Regressions by Immigration Status (n = 6412)

	Model 3 Non-immigrants				Model 4 Immigrants			
	B	SE	95% CI	P	B	SE	95% CI	P
Race (Black)	-0.19	0.06	-0.31 - -0.06	0.004	-0.13	0.40	-0.92 - 0.67	0.755
Ethnicity (Hispanic)	0.06	0.07	-0.07 - 0.19	0.391	-0.56	0.36	-1.28 - 0.15	0.121
Sex (male)	0.19	0.05	0.09 - 0.28	< 0.001	0.13	0.30	-0.46 - 0.73	0.661
Age (months)	0.01	0.00	0.00 - 0.02	0.004	0.07	0.02	0.03 - 0.10	0.001
Married household	-0.06	0.06	-0.19 - 0.06	0.318	-0.35	0.40	-1.14 - 0.43	0.374
Employed parents	-0.28	0.05	-0.39 - -0.18	< 0.001	0.32	0.31	-0.30 - 0.93	0.306
Financial difficulties	0.28	0.02	0.24 - 0.32	< 0.001	0.36	0.16	0.04 - 0.68	0.028
Household income	-0.06	0.01	-0.09 - -0.04	< 0.001	0.06	0.08	-0.09 - 0.21	0.406

b= Regression coefficient; SE, standard error; CI, confidence interval.

of high household income on depressive symptoms of non-immigrant children (b = -0.06, $P < 0.001$). *Model 4*, however, did not show any effect of high household income on children's depressive symptoms for immigrants (b = 0.06, $P > 0.05$).

Discussion

Overall, high household income was associated with fewer depressive symptoms in American children. However, the protective effect of high household income on children's depressive symptoms was diminished in immigrant families compared to non-immigrant families.

The observed diminished return of household income on children's depressive symptoms for immigrant children is similar to previous MDR-research findings.^{51,56,89,90} MDRs are well established within and between families and individuals. These MDRs are found to be robust for a wide range of economic resources, health outcomes, and marginalizing identities.^{42,43} Recent research has documented MDRs based on immigration.⁴⁶ This implies that if an individual or a family is immigrant, their general SES indicators and particular high human capital will generate fewer outcomes when compared to non-immigrants with similar statistics.⁴⁶

Previous MDRs studies have predominantly focused on race and ethnicity rather than immigration status. Most

of the MDRs are established for African Americans,⁹¹⁻⁹⁴ Hispanics,^{56,95-97} Asian Americans,⁹⁸ Native Americans,⁹⁹ and LGBTQs.⁸⁹ These MDRs apply to human capital of the parent^{45,46,54} as well as income,⁴⁵ education,⁵⁶ employment,¹⁰⁰ and marital status.⁵² Economic resources of the families generate less health for children,^{45,46,54} adults,⁵¹ and older adults.¹⁰¹ Emerging evidence suggests that MDRs also apply to immigrants.^{46,57,102,103}

Many mechanisms may be responsible for the MDRs of family economic resources in immigrant families. Immigrant families across all SES levels regularly face disproportionately higher levels of stigma, stress, trauma, and financial difficulties. According to the social reproduction theory, human capital generates different outcomes across social groups.¹⁰⁴ In the US, ease of upward social mobility is not the same for all social groups.¹⁰⁵

Marginalized groups are not well integrated with the mainstream American society. Many immigrants are even pushed to ethnic enclaves.¹⁰⁶⁻¹⁰⁹ Residential segregation may result in diminished returns of human capital in immigrant communities. Due to segregation, school options are limited for high SES immigrant families. As a result, children of high SES immigrant families attend highly segregated schools with low resources.^{92,110,111} This demonstrates the differential effect

of SES on education and schooling of non-immigrant and immigrant. That is, while high SES non-immigrant children attend affluent, high-quality schools with excellent teachers, high SES immigrant children likely attend lower-quality schools.²⁹

We argue that, due to existing MDRs, immigrants are at a relative disadvantage regarding the degree by which their economic resources generate health. For immigrants, an increased family income would generate less than expected health effects.^{42,112} However, this should not discourage us from investing in them. Moreover, instead of merely focusing on high SES, we should target inequalities that have emerged across all SES levels.

Implications of the current findings on existing MDRs are that societal inequalities may not arise simply because of unequal access to SES resources. As a result of unequal processes, the same SES resource can generate different outcomes for different social groups. Therefore, unfair societal processes should be addressed to achieve equality and equity. Interventions should target the very societal, social, environmental, and structural processes that cause MDRs for marginalized people. We propose that the solution to addressing inequalities both enhance SES resources and eliminate MDRs-related disparities. It is important to develop, design, implement, and evaluate policies that serve each class. If we want to achieve true equality and equity between immigrants and non-immigrants, we need to equalize the living conditions of various social groups. Then, immigrants and non-immigrants can similarly utilize and mobilize their income and other SES resources to secure desired outcomes.

Limitation

With our cross-sectional data, this study cannot draw any causal links between immigration status, household income, and children's depressive symptoms. This study only tested the MDRs of household income. Other SES indicators, such as parental education, wealth, employment, and neighborhood income, may also show MDRs. In addition, this study only described the existing MDRs without exploring the contextual mechanisms and factors that explain the observed MDRs. Finally, we did not adjust for parental depression nor genetic predisposing factors, both of which increase the likelihood of depression.

Conclusion

Compared to non-immigrant children, immigrant children display higher depressive symptoms across all household incomes. Our stratified models suggested that high household income shows an inverse association with children's depressive symptoms in non-immigrant families only. As such, immigrant children's depressive symptoms may remain high even when they belong to a high-income household. These weaker than expected protective effects of household income and other SES indicators on the lives of marginalized people, including but not limited to immigrants, are systematically ignored in the political debate on how to achieve health equity. It is still unknown why marginalized children with high-income remain at risk of depression and other undesired outcomes.

Research Highlights

What Is Already Known?

High household income protects populations against depression and depressive symptoms.

What This Study Adds?

High household income has a stronger protective effect against depressive symptoms for children from non-immigrant than immigrant families.

Conflict of Interest Disclosures

The author declares no conflict of interest.

Ethical Approval

Our analysis was exempt from a full IRB review; IRB code not available, however, the exemption letter is available upon request. As we used fully de-identified data, our paper was found to be non-human subject research. However, the ABCD study has received Institutional Review Board (IRB) approval from the University of California, San Diego (UCSD). For more information on the IRB, assents, and consent, please refer to the associated citation.⁶⁵

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