

# Unequal Effects of Educational Attainment on Reducing Poverty and Welfare Reliance; Diminished Returns of American Indian and Alaska Native Populations

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## Article Info

### Article Notes

Received: May 14, 2024

Accepted: June 19, 2024

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### Keywords:

American Indian and Alaska Native (AIAN)

White

Race

Ethnicity

Class

Socioeconomic Status

Disability Benefits

Population Groups

## Abstract

**Background:** American Indian and Alaska Native (AIAN) communities face pronounced economic and health disparities compared to White Americans, a situation rooted in long-standing historical injustices and segregation. The theory of Minorities' Diminished Returns (MDR) provides insight beyond the traditional focus on socioeconomic status (SES) disparities, such as educational attainment. It suggests that the beneficial outcomes of educational achievements on health and economic status are less substantial for marginalized and racially non-White groups compared to White Americans.

**Aims:** This study investigates the applicability of the MDR theory to AIAN populations by examining whether the positive effects of education on poverty reduction and the decreased risk of disability benefit dependency are weaker for AIAN adults relative to their White counterparts.

**Methods:** Utilizing data from the 2022 National Health Interview Survey (NHIS), this cross-sectional study analyzed a cohort of 20,743 adults, comprising 20,474 White and 269 AIAN individuals. We assessed the relationships between educational attainment, poverty level, and the likelihood of receiving disability benefits. A structural equation model was employed, with receipt of disability benefits as a latent factor influenced by racial background (AIAN) as a potential moderator, education as the main predictor, and poverty level and self-rated health as mediators. Gender, age, employment status, marital status, and Hispanic ethnicity served as additional covariates.

**Results:** Findings indicate that higher educational levels are generally associated with a lower likelihood of receiving disability benefits, mediated by improved health and economic status. Nonetheless, the interaction between race (AIAN) and education significantly influenced economic outcomes, subsequently affecting the risk of receiving disability benefits. This suggests that Whites benefit more economically from education than AIAN individuals do.

**Conclusion:** The study underscores the MDR theory's relevance to the disparities in educational outcomes related to poverty risk and receiving disability benefits among AIAN populations. The challenges AIAN individuals face in leveraging their educational achievements for economic gain relative to Whites may be attributed to pervasive racism and discrimination within various sectors, including employment and education. Addressing these disparities necessitates policy interventions that ensure educational returns are equitable across racial groups, with a focus on equal access to resources and opportunities.

## Background

Despite the notable disparities in economic and health outcomes between American Indian and Alaska Native (AIAN) populations and

their White counterparts<sup>1-4</sup>, research specifically focused on understanding the mechanisms behind these persistent differences remains scarce<sup>5,6</sup>. This gap in scholarly attention is particularly concerning given that such research is needed to inform policy-making and tailored solutions<sup>7</sup>.

Due to the unique cultural, historical, and socioeconomic contexts of AIAN communities, findings and solutions related to other racial and ethnic minority groups may not be easily generalized to them<sup>8-10</sup>. Scarcity of research with this population not only perpetuates a lack of targeted interventions but also underscores a critical need for the engagement of collaborative research that engages AIAN populations in all research efforts<sup>6,11</sup>. By deepening our understanding of the specific challenges affecting AIAN populations, we can move toward more equitable and effective health policies that recognize and address the diversity within these communities<sup>12</sup>. In this regard, we should focus on the role of economic and health determinants such as educational attainment as a solution to AIAN-White inequalities.

Shepherd and colleagues have discussed the health of AIAN in detail [13]. They have mentioned “scant attention has been paid to the potential moderating effect (i.e., effect modification) of Indigenous status on the SES-health relationship.” They argue that AIAN people’s health is “behind everyone, everywhere”<sup>13</sup>. Research indicates that the relationship between SES and health outcomes for AIAN populations is not as significant as it might be for others, a finding that has been met with skepticism by some scholars within the AIAN community. Despite varying perspectives, it’s noted that Indigenous cultures across both Mexico and the United States have historically faced derogatory classifications as “primitive” and seen as obstacles to modernization initiatives. This has driven both countries to attempt to integrate Indigenous groups into mainstream society. Today, Indigenous communities in these regions continue to deal with the ongoing effects of structural racism and the legacy of colonialism and racial/ethnic nation-building projects. Additionally, the embrace of neoliberal principles by these nations has introduced policies that undermine traditional Indigenous communal values, imposing additional layers of disadvantage and introducing a modern variant of paternalism that echoes the colonial era<sup>14</sup>.

Globally, indigenous populations encounter notable health challenges when compared to their countries’ majority groups, though the extent and nature of these health issues differ internationally. A recent analysis compared the health outcomes of AIAN and majority in Mexico and US. They found that health disparities affecting AIAN people were more pronounced in the US compared to Mexico. Secondly, in Mexico, the educational gap largely explained the health differences between AIAN and non-

Indigenous groups, whereas in the US, it accounted for less than half of the health disparities. Thirdly, in both nations, there were diminished returns of education on health, suggesting that the disparity between groups widens with higher educational achievement. This investigation questions the effectiveness of conventional socioeconomic status measures in AIAN settings<sup>15</sup>.

Most existing research and scholarly discussions have largely attributed the economic and health disparities between AIAN and White populations to differences in education, marital status, and employment<sup>16</sup>. This focus stems from the close overlap between SES indicators and race, with AIAN communities often experiencing lower education and employment compared to their White counterparts<sup>17,18</sup>. Educational attainment is recognized as a major determinant of economic wellbeing and health<sup>19-22</sup>, living conditions, exposure to stress, and a range of other factors that are critical to economic well-being. Given this backdrop, the lower educational attainment level of AIAN individuals is frequently highlighted as a key contributor to their poorer economic and health outcomes compared to Whites<sup>16</sup>. However, while educational attainment is undeniably important<sup>23-27</sup>, attribution of economic and health disparities merely to education and employment differences may oversimplify the complex web of societal and historical determinants affecting AIAN health. This lens results in potentially overlooking critical environmental, historical, and systemic factors that have uniquely contributed to economic and health disparities among AIAN communities for centuries.

Recent research on Minorities’ Diminished Returns (MDR) has introduced a pivotal shift in our understanding of the mechanisms of economic and health disparities among minoritized populations<sup>28</sup>. This framework suggests that the benefits of socioeconomic status (SES) assets, such as education and employment, are not uniformly experienced across racial groups<sup>29</sup>. For minoritized individuals, systemic barriers often hinder the translation of attained education into equivalent health and economic outcomes observed in White populations. For example, the same level of education may yield less favorable job prospects and income for minoritized groups compared to their White counterparts<sup>30</sup>. Despite the relevance of this concept, its application and evidence among AIAN populations has remained limited<sup>31,32</sup>, with the bulk of MDRs research focusing on Black individuals<sup>33-39</sup>. This gap highlights a critical need for expanding MDR-related studies to include AIAN communities, which could offer deeper insights into the unique challenges they face and inform more effective, culturally sensitive policy interventions<sup>31,32</sup>.

The aim of this study is to explore the application of the Minorities’ Diminished Returns theory<sup>28</sup> within the context of education’s impact on poverty status, health,

and associated disability benefit acquisition among AIAN individuals. Specifically, we aim to investigate whether the inverse correlations between educational attainment and poverty status, health, and associated disability benefit acquisition, widely recognized in the general population, similarly hold true for AIAN individuals and how it compares to that of their White counterparts. Our first hypothesis is that overall, education is generally protective against risk of poverty, poor health, and associated disability benefit acquisition. Our second hypothesis is that the magnitude of these protective effects will be less pronounced for AIAN individuals than for Whites. Our second hypothesis is grounded in the understanding that systemic barriers, unique environmental factors, and the experiences of marginalization may moderate the benefits of educational attainment for AIAN populations, leading to diminished protective effects of educational attainment on reducing the risk of poverty, poor health, and associated disability benefit acquisition. Through this research, we seek to contribute to a more nuanced understanding of how educational achievement translates into economic and health outcomes across different racial groups, with a particular focus on AIAN communities.

## Methods

### Design and Setting

In this cross-sectional study, we analyzed data from 2022 National Health Interview Survey (NHIS)<sup>40</sup>. The NHIS study was conducted by CDC.

### Analytical Sample

The study exclusively focused on AIAN and White adults, aiming to investigate racial differences between these groups. In this study, the inclusion criteria included AIAN or White participants with complete data on education, race, ethnicity, age, gender, marital status, employment status, as well as self-rated health. The final analytical sample comprised 20,743 US adults aged 18 years or older. We included everyone in the database who fulfill the inclusion criteria.

### Study Measures

**Independent Variable:** Educational attainment served as the study's independent variable, treated as an interval variable (0-10). Levels included 0) Never attended school or kindergarten only 1), Grade 1 to 11, 2) 12th grade without high school diploma, 3) GED or equivalent, 4) High School graduate, 5) Some college education without a degree, 6) Associate degree (occupational, technical, or vocational program), 7) Associate degree (academic program), 8) Bachelor's degree including BA, AB, BS, BBA, 9) Master's degree including MA, MS, MEng, MEd, MBA, 10) Professional School or Doctoral degree including MD, DDS, DVM, JD, PhD, EdD.

**Dependent Variable:** Outcome was a latent factor that was composed of the following observed variables: Supplemental Security Income (SSI), Social Security Disability Income (SSDI), and income received from SSI due to disability.

**Moderator:** Race served as the moderating variable (effect modifier= 0=White, 1=AIAN) and was treated as a categorical / binary variable in this study. This variable was determined based on self-identified race.

### Mediators

**Income to Poverty Ratio as an SES Indicator:** The income-to-poverty ratio, calculated by dividing household income by the federal poverty line, serves as a continuous measure of SES ranging from 0 to 11. This ratio not only quantifies income adequacy but also encapsulates the relative economic positioning of individuals within a wider social and fiscal context. A higher score on this scale is indicative of a higher SES, signaling lesser degrees of poverty and, presumably, greater access to resources conducive to health and well-being.

**Self-Rated Health:** Health, a multi-dimensional and subjective experience, is herein measured using the conventional single-item self-rated health. Participants in this study were asked to rate their health on a scale from "excellent" to "poor." This measure, despite its simplicity, is widely recognized for its strong predictive validity regarding morbidity and mortality outcomes, serving as a valuable tool for capturing individuals' perceptions of their health status<sup>41-43</sup>.

**Covariates:** Covariates in the study included age (years), gender (men vs women), employment status (employed/not employed or not in labor market), marital status (married/ any other condition), and ethnicity (Latino vs non-Latino).

### Statistical Analyses

Data analysis was conducted using Stata 18.0 (StataCorp LLC, College Station, TX). Univariate analysis results were presented as frequencies and percentages. Bivariate analyses included Chi square or independent sample t test for comparison of AIAN and White populations for all study variables. We also used Pearson correlation to explore correlations between study variables overall. Two sets of structural equation models (SEMs) were estimated in the pooled sample. Model 1 did not include any interaction term between educational attainment and race (AIAN). Model 2 included an education by race (AIAN) interaction term. Poverty status and health were mediators of the effects of education on disability acquisition. Both these models used a latent factor as the outcome with higher score indicating higher acquisition of disability benefits. A negative and significant path coefficient between

educational attainment and our latent factor was indicative of protective effect of educational attainment against receipt of disability benefits. A positive and significant statistical interaction between AIAN race and education would indicate that the protective effect of education on reducing welfare need is smaller for AIAN than White population. Results were presented with the standardized coefficient (Beta), standard error (SE), 95% confidence intervals (CIs), and P-value, with significance levels set at  $P \leq 0.05$ .

**Ethics**

The study protocol received approval from an Institutional Review Board (IRB). All survey participants had provided informed consent (specified in the data and were not collected by the author). The present study utilized publicly available, fully de-identified NHIS data and did not involve human-subject research.

**Results**

This study analyzed a cohort of 20,743 adults, comprising 20,474 White and 269 AIAN individuals. As Table 1 shows, AIAN people had lower education ( $p < 0.05$ ) and lower income to poverty rate ( $p < 0.05$ ). AIAN participants were much younger than White people ( $p < 0.05$ ). AIAN people had higher prevalence of receiving SSI ( $p < 0.05$ ) and SSDI ( $p < 0.05$ ).

As Table 2 shows, AIAN race was associated with lower education ( $r = -0.07$ ;  $p < 0.05$ ) and lower SES (income to need ratio) ( $r = -0.07$ ;  $p < 0.05$ ). Receipt of SSI and SSDI were positively correlated ( $r = -0.18$ ;  $p < 0.05$ ). Receipt of SSI were correlated with education ( $r = -0.13$ ;  $p < 0.05$ ), Self-Rated Health (SRH) ( $r = 0.15$ ;  $p < 0.05$ ) and Poverty to Need ( $r = -0.15$ ;  $p < 0.05$ ). Receipt of SSDI were correlated with education ( $r = -0.13$ ;  $p < 0.05$ ), Self-Rated Health (SRH) ( $r = 0.21$ ;  $p < 0.05$ ) and Poverty to Need ( $r = -0.15$ ;  $p < 0.05$ ).

**Table 1.** Descriptive data overall and by race

	All (n = 20,743)				White (n = 20,474)				AIAN (n = 269)			
	Mean	Std. err.	[95% conf. interval]		Mean	Std. err.	[95% conf. interval]		Mean	Std. err.	[95% conf. interval]	
Age*	54.60	0.13	54.35	54.85	54.68	0.13	54.43	54.93	48.27	1.14	46.03	50.51
Education*	6.08	0.02	6.05	6.11	6.10	0.02	6.07	6.13	4.72	0.14	4.44	5.00
Poverty to need*	4.47	0.02	4.43	4.51	4.49	0.02	4.45	4.53	2.73	0.15	2.43	3.03
Self-Rated Health (SRH)	2.42	0.01	2.40	2.43	2.42	0.01	2.40	2.43	2.68	0.06	2.56	2.81
	<b>n</b>	<b>%</b>			<b>n</b>	<b>%</b>			<b>n</b>	<b>%</b>		
SSI due to disability*												
No	19,171	93.51			18,943	93.59				228	87.36	
Yes	1,331	6.49			1,298	6.41				33	12.64	
SSI *												
No	20,235	97.55			19,983	97.60				252	93.68	
Yes	508	2.45			491	2.40				17	6.32	
SSDI*												
No	19,902	95.95			19,652	95.99				250	92.94	
Yes	841	4.05			822	4.01				19	7.06	

\* $p < 0.05$  SSI: Supplemental Security Income SSDI: Social Security Disability Insurance (SSDI) AIAN: American Indian and Alaska Native (AIAN)

**Table 2.** Correlation coefficient between study variables

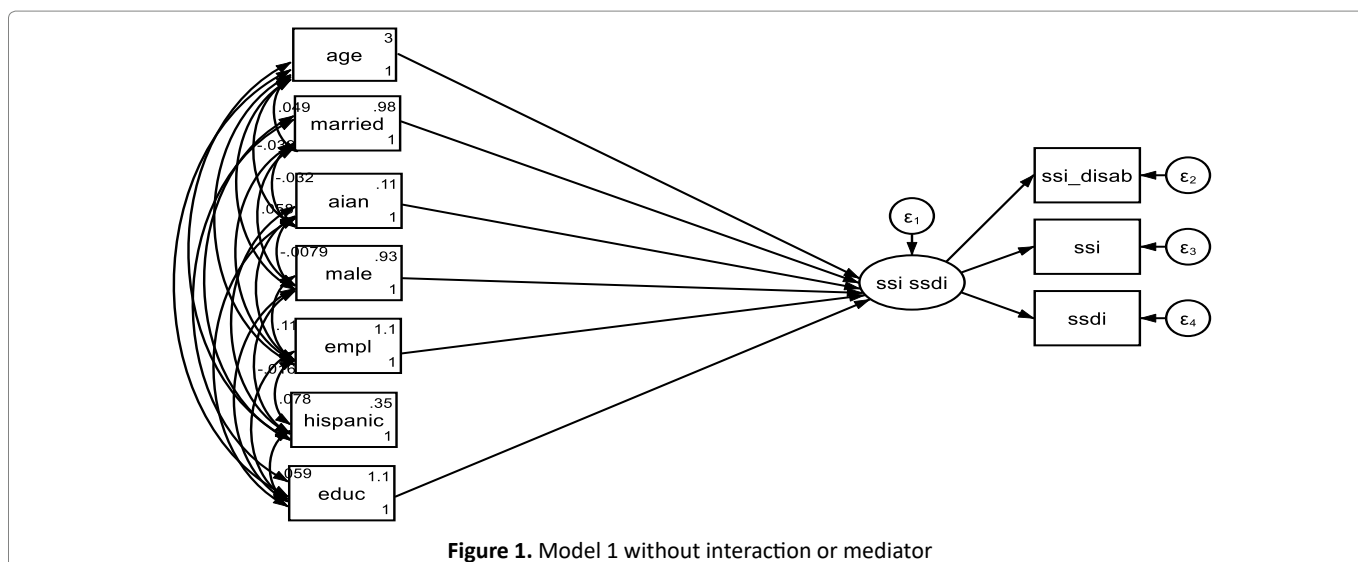
	1	2	3	4	5	6	7	8	9	10	11
1 Race (AIAN)	1.00										
2 Age (Years)	-0.04	1.00									
3 Sex (Male)	-0.01	-0.05	1.00								
4 Marital Status (Married)	-0.03	0.05	0.06	1.00							
5 Employment Status (Employed)	-0.01	-0.51*	0.11*	0.06	1.00						
6 Education	-0.07*	-0.05	-0.01	0.14*	0.19	1.00					
7 Self-Rated Health (SRH)	0.03	0.22*	0.01	-0.08*	-0.26	-0.26*	1.00				
8 Poverty to Need	-0.07*	-0.01	0.08*	0.28*	0.25	0.46*	-0.28*	1.00			
9 Income SSI due to Disability	0.03	0.01	-0.02	-0.07*	-0.18	-0.17*	0.24*	-0.19*	1.00		
10 Income SSI	0.03	0.04	-0.02	-0.07*	-0.13	-0.13*	0.15*	-0.15*	0.59*	1.00	
11 Income SSDI	0.02	0.02	-0.01	-0.04	-0.15	-0.13*	0.21*	-0.15*	0.86*	0.18*	1.00

\* $p < 0.05$  SSI: Supplemental Security Income SSDI: Social Security Disability Insurance (SSDI) AIAN: American Indian and Alaska Native (AIAN)

**Table 3.** Summary of the path coefficients in Model 1

	Standardized Coefficient	std. err.	[95% conf. interval]	P>z
<b>Structural</b>				
Gaining Disability Benefits				
Age (Year)	-0.06	0.01	-0.07 -0.04	< 0.001
Marital Status (Married)	-0.02	0.01	-0.03 -0.01	0.006
Race (AIAN)	0.01	0.01	0.00 0.03	0.053
Sex (Male)	0.01	0.01	-0.01 0.02	0.426
Education	-0.10	0.01	-0.11 -0.08	< 0.001
Employed	-0.15	0.01	-0.16 -0.13	< 0.001
<b>Measurement</b>				
Outcome: Income SSI due to disability				
Gaining Disability Benefits	1.00	0.00	1.00 1.00	< 0.001
Intercept	0.19	0.03	0.13 0.26	< 0.001
Outcome: Income SSI				
Gaining Disability Benefits	0.38	0.04	0.29 0.47	< 0.001
Intercept	0.18	0.01	0.16 0.21	< 0.001
Outcome: Income SSDI				
Gaining Disability Benefits	0.55	0.00	0.54 0.56	< 0.001
Intercept	0.23	0.02	0.19 0.27	< 0.001

SSI: Supplemental Security Income AIAN: American Indian and Alaska Native (AIAN)



**Figure 1.** Model 1 without interaction or mediator

As Table 3 and Figure 1 show, higher education was associated with lower risk of receipt of SSI/SSDI (Beta = -0.10; p < 0.001) net of all covariates.

As Table 4 and Figure 2 show, higher education was associated with lower risk of receipt of SSI/SSDI net of all covariates. This associated was not different for AIAN and White people (p > 0.05).

As Table 5 and Figure 3 show, although higher education was associated with higher SES (income to poverty rate) and better health and lower risk of receipt of SSI/SSDI net of all covariates, the association between education and SES (income to poverty) was weaker for AIAN than White people (beta = -0.06 < 0.001).

## Discussion

This study set out to investigate the applicability of the MDRs theory to the relationships between educational attainment and poverty status (income to needs ratio), health, and associated disability benefit acquisition among AIAN populations, in comparison to White Americans. Our findings corroborate the hypothesis that educational attainment is protective against risk of poverty, poor health, and associated disability benefit acquisition across the population, but significantly, the protective association between education and poverty level is weaker for AIAN than for White populations. This supports the MDRs theory's assertion that the benefit of education in terms of poverty prevention is not equally accessible to all racial groups due to systemic barriers.

**Table 4.** Summary of the path coefficients in Model 2

	Standardized Coefficient	std. err.	[95% conf. interval]	P>z
<b>Structural</b>				
Gaining Disability Benefits				
Age (Year)	-0.06	0.01	-0.07 -0.04	0.000
Marital Status (Married)	-0.02	0.01	-0.03 -0.01	0.006
Race (AIAN)	0.02	0.02	-0.01 0.05	0.186
Sex (Male)	0.01	0.01	-0.01 0.02	0.429
Education	-0.10	0.01	-0.11 -0.08	0.000
Education x Race (AIAN)	-0.01	0.02	-0.04 0.02	0.638
Employed	-0.15	0.01	-0.16 -0.13	0.000
<b>Measurement</b>				
Outcome: Income SSI due to Disability				
Gaining Disability Benefits	1.00	0.00	1.00 1.00	< 0.001
Intercept	0.19	0.03	0.13 0.26	< 0.001
Outcome: Income SSI				
Gaining Disability Benefits	0.38	0.04	0.29 0.47	< 0.001
Intercept	0.18	0.01	0.16 0.21	< 0.001
Outcome: Income SSDI				
Gaining Disability Benefits	0.55	0.00	0.54 0.56	< 0.001
Intercept	0.23	0.02	0.19 0.27	< 0.001

SSI: Supplemental Security Income AIAN: American Indian and Alaska Native (AIAN)

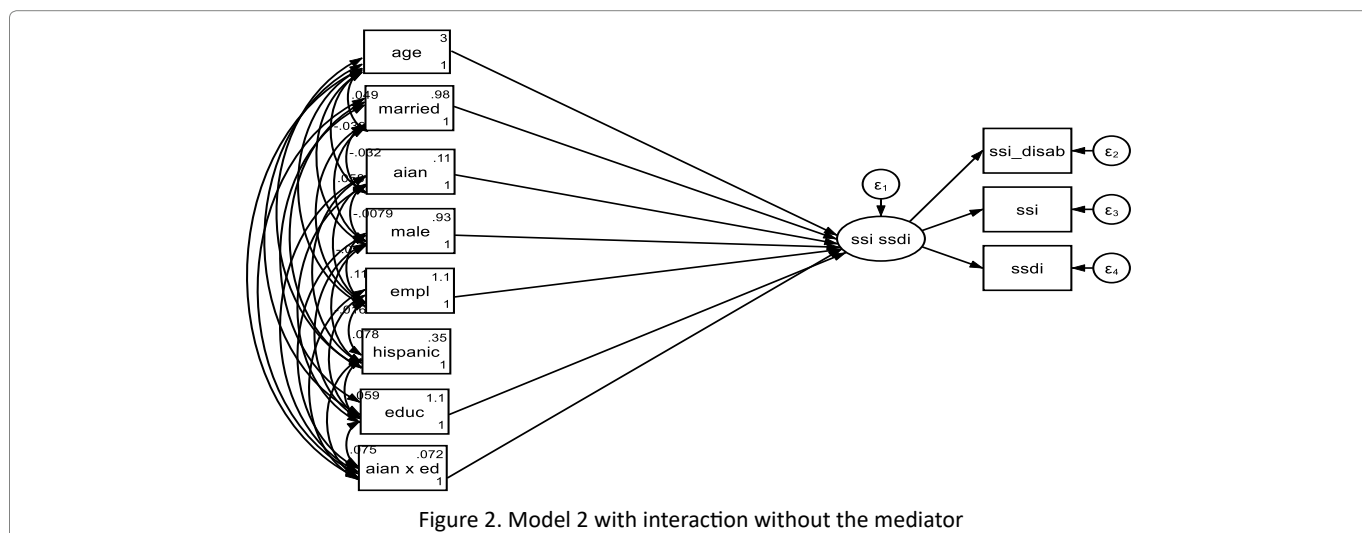


Figure 2. Model 2 with interaction without the mediator

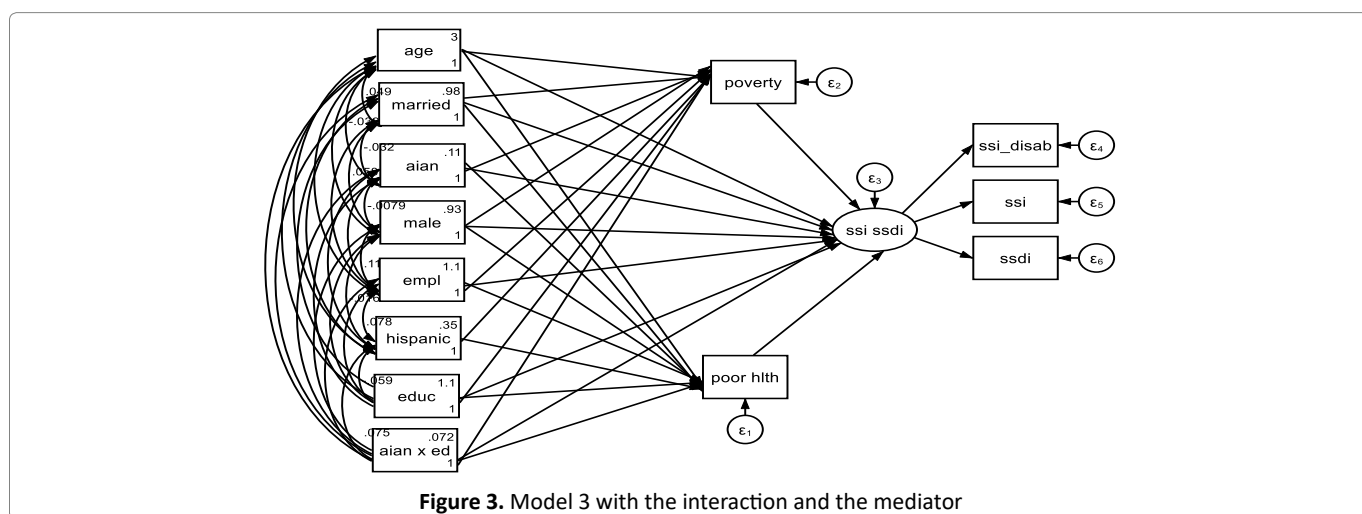


Figure 3. Model 3 with the interaction and the mediator

**Table 5.** Summary of the path coefficients in Model 3

	Standardized Coefficient	std. err.	[95% conf.	interval]	P>z
<b>Structural</b>					
SRH poor/fair					
Age (Year)	0.07	0.01	0.05	0.08	< 0.001
Marital Status (Married)	-0.05	0.01	-0.06	-0.03	< 0.001
Race (AIAN)	0.01	0.02	-0.02	0.04	0.384
Sex (Male)	0.02	0.01	0.01	0.03	0.002
Education	-0.16	0.01	-0.17	-0.14	0.000
Education x Race (AIAN)	0.00	0.02	-0.03	0.03	0.860
Employed	-0.16	0.01	-0.18	-0.15	0.000
Hispanic	-0.01	0.01	-0.02	0.01	0.279
Intercept	0.80	0.03	0.73	0.87	0.000
<b>Income to Need</b>					
Age (Year)	-0.12	0.01	-0.13	-0.10	< 0.001
Marital Status (Married)	-0.12	0.01	-0.13	-0.10	< 0.001
Race (AIAN)	0.10	0.02	0.07	0.13	< 0.001
Sex (Male)	-0.02	0.01	-0.03	0.00	0.022
Education	-0.17	0.01	-0.19	-0.16	< 0.001
Education x Race (AIAN)	-0.06	0.02	-0.09	-0.03	< 0.001
Employed	-0.17	0.01	-0.19	-0.16	< 0.001
Hispanic	0.05	0.01	0.04	0.06	< 0.001
Intercept	1.37	0.03	1.31	1.44	< 0.001
<b>Gaining Disability Benefits</b>					
SRH poor/fair	0.17	0.01	0.15	0.18	< 0.001
Poverty to Need	0.13	0.01	0.12	0.15	< 0.001
Age (Year)	-0.06	0.01	-0.07	-0.04	< 0.001
Marital Status (Married)	0.00	0.01	-0.01	0.02	0.741
Race (AIAN)	0.01	0.02	-0.02	0.04	0.575
Sex (Male)	0.01	0.01	-0.01	0.02	0.402
Education	-0.06	0.01	-0.07	-0.05	0.000
Education x Race (AIAN)	0.00	0.02	-0.03	0.03	0.925
Employed	-0.11	0.01	-0.13	-0.10	0.000
<b>Measurement</b>					
Outcome: Income SSI Due to Disability					
Gaining Disability Benefits	1.00	0.00	1.00	1.00	< 0.001
Intercept	0.23	0.04	0.16	0.30	< 0.001
Outcome: Income SSI					
Gaining Disability Benefits	0.38	0.02	0.34	0.41	< 0.001
Intercept	0.18	0.01	0.15	0.21	< 0.001
Outcome: Income SSDI					
Gaining Disability Benefits	0.56	0.00	0.56	0.57	< 0.001
Intercept	0.23	0.02	0.19	0.27	< 0.001

SSI: Supplemental Security Income SSDI: Social Security Disability Insurance (SSDI) AIAN: American Indian and Alaska Native (AIAN)

We found that education predicts lower risk of poverty, poor health, and need to disability benefits overall. Ross<sup>44</sup> and Mirowsky<sup>24</sup> have shown that education is one of the strongest and most consistent social determinants of health. Marmot<sup>45</sup> has proposed the social gradient and social determinants frameworks<sup>46</sup> that suggests economic status health outcomes improve as educational attainment improves. Using long-term follow up longitudinal data from Americans' Changing Lives (ACL) study, Lantz<sup>47</sup> and House<sup>48</sup> have shown that people with highest education have highest level of health. Link<sup>49</sup> and Phelan<sup>50</sup>

fundamental cause theory explains why individuals with highest education have the best health<sup>22,51,52</sup>. All of this work refers to the existence of a social gradient of health by education<sup>53</sup>. All these findings highlight that individuals with higher education tend to have better health and economic wellbeing. The positive associations between education and health and economic wellbeing are robust<sup>54</sup> as they are replicated across various settings, populations, and outcomes<sup>55,56</sup>.

The adversities faced by AIAN populations are well-

documented<sup>6,57,58</sup>, including historic trauma, ongoing discrimination, and systemic inequalities. These factors contribute to a range of negative health outcomes and lower overall well-being compared to White populations. Previous literature has extensively discussed how lower SES can exacerbate disparities in economic wellbeing and health. However, the MDRs theory further complicates this narrative by suggesting that even when educational attainment is improved, the expected gains in economic and well-being may not fully materialize for marginalized groups.

Research on MDRs has predominantly focused on Black<sup>59</sup>, Latino<sup>60-62</sup>, and Asian<sup>63</sup> populations, highlighting a consistent pattern where increased educational attainment does not equate to proportional improvements in health and happiness as observed in White populations. This body of work underscores a systemic issue affecting multiple minority groups, although studies specifically examining MDRs among AIAN populations remain scarce<sup>31,32</sup>. Our study contributes to this gap by providing evidence that the diminished returns of educational attainment on disability benefit acquisition can be observed among AIAN populations.

The mechanisms behind the reduced protective effects of education on the risk of disability benefit acquisition for AIAN and other marginalized populations can be attributed to multiple societal and structural factors. Systemic racism, ongoing discrimination, and the devaluation of educational qualifications from minority individuals in the job market are significant contributors. These systemic barriers prevent the full translation of educational achievements into improved socioeconomic positions and, subsequently, into higher levels of happiness and well-being. This suggests that policies aimed at merely increasing access to education or improving SES indicators may not be sufficient to close the happiness gap between AIAN and White populations.

The boarding school era represents a significant method of traumatization for AIAN populations. During this period, Indigenous children were forcibly removed from their families and communities and placed into boarding schools with the explicit intent of integrating them into mainstream culture through cultural genocide. This practice aimed to eradicate Indigenous languages, traditions, and identities, replacing them with those of the dominant culture. The forced assimilation through boarding schools inflicted profound and lasting harm on Indigenous children and their communities. The separation from their families and the suppression of their cultural heritage led to widespread emotional, psychological, and social distress, contributing to intergenerational trauma. This intergenerational trauma has had a detrimental impact on the educational outcomes for subsequent generations of AIAN individuals. The boarding school experience disrupted the transmission

of cultural knowledge and practices, weakening the social and familial support systems essential for educational success. Moreover, the negative experiences and the lasting stigma associated with these schools have contributed to a mistrust of educational institutions among many AIAN communities. As a result, the return on education for AIAN populations is diminished. The educational system, which once served as a tool of cultural oppression, continues to be perceived as untrustworthy or alienating by some Indigenous families. This perception can lead to lower levels of engagement and participation in formal education, further exacerbating educational disparities. Additionally, the historical trauma and ongoing challenges related to cultural identity and community cohesion continue to affect the academic performance and mental health of AIAN students, hindering their ability to fully benefit from educational opportunities<sup>64</sup>.

To address AIAN-White economic and health disparities, there is a need for targeted interventions that consider the unique barriers faced by AIAN populations and other marginalized groups. Policies must go beyond equalizing SES and aim to dismantle the structural barriers that inhibit the full realization of SES benefits. This includes addressing racism and discrimination in education and employment, supporting culturally sensitive mental health services, and fostering community-led initiatives that address the specific needs of AIAN populations.

While racism and discrimination were not directly measured in our study, racism and discrimination could play significant roles in limiting the health benefits of education and opportunities for upward social mobility among AIAN individuals<sup>65</sup>. Notably, 23% of AIAN people reported encountering discrimination during clinical interactions, and 15% of AIAN participants refrained from seeking healthcare for themselves or their family members due to anticipated discrimination. Furthermore, a considerable percentage of AIAN participants disclosed that they or their family members had experienced violence (38%) or been threatened or harassed (34%). Compared to Whites, AIAN populations reported higher levels of discrimination in various areas, including healthcare and encounters with police and the judicial system. The researchers determined that discrimination, violence, and harassment are prevalent issues for Native Americans in multiple facets of life, transcending geographic or neighborhood boundaries. The findings indicate that AIAN populations face significant disparities in receiving fair treatment from various societal institutions, encompassing but not limited to healthcare and law enforcement. This discrimination and harassment against AIAN populations represent systemic and unresolved issues<sup>65</sup>.

As discussed by Solomon and colleagues<sup>66</sup>, structural racism against AIAN populations permeates almost every



policy and action directed at this population since the initial encounters between Indigenous peoples and non-Natives in the United States. Successive generations of AIAN populations have endured the effects of policies designed for their eradication and others aimed at their forced assimilation and domination—echoed in Richard Henry Pratt’s infamous phrase, “kill the Indian... save the man.” The cumulative impact of these actions has consistently marginalized AIAN people in terms of health and access to healthcare. This historical trauma has profound psychological repercussions, undermining a value system deeply rooted in community and reverence for all of life <sup>66</sup>.

## Implications

The implications of this study are multiple and highlight the urgent need for policy and intervention strategies that are finely tuned to the complexities of racial and socioeconomic disparities in economic wellbeing. First and foremost, the findings suggest that initiatives aimed at improving the educational attainment of AIAN communities should be paired with efforts to dismantle the systemic barriers that hinder the translation of their educational gains into real-life economic benefits. This approach requires a multi-faceted strategy that includes enhancing employment opportunities, ensuring fair wages, and promoting workplace environments that are free from discrimination for AIAN individuals. Such efforts need multisectoral policy interventions across various US institutions such as the education system, labor market, and banking system. Moreover, there is a critical need for mental health and well-being programs that are culturally sensitive and accessible to AIAN populations, addressing both the historical and contemporary sources of stress and trauma.

## Limitations

This study is not without its limitations. We did not have data on wealth. The use of self-reported use of disability benefits as the sole measure of well-being does not capture the multifaceted nature of disability benefits and its determinants. Additionally, the NHIS, while comprehensive, may not fully represent the diversity within the AIAN population, including those living in tribal lands or rural areas. In addition, the cross-sectional design of the study limits our ability to infer causality between education and disability benefit acquisition, highlighting the need for longitudinal studies to better understand these dynamics over time.

## Future Research

Future research should aim to address these limitations by employing a longitudinal design and incorporating a broader range of economic and health indicators to capture the complex interplay between education,

educational attainment, and disability benefit acquisition. Studies should also strive to include a more diverse and representative sample of AIAN individuals, potentially through partnerships with tribal communities and organizations. Further, exploring the specific mechanisms through which educational attainment influences disability benefit acquisition among AIAN people, such as the role of financial and health literacy, health trajectories, unemployment, wealth, education quality, cultural identity, and community support, would provide deeper insights into targeted interventions. Additionally, comparative studies involving other minoritized populations would enrich our understanding of the universal versus specific aspects of the MDRs theory’s applicability. Ultimately, future research should guide the development of policies and programs that not only aim to equalize educational opportunities but also ensure that these opportunities lead to tangible improvements in the lives of AIAN and other marginalized populations.

## Conclusion

Our study highlighted an interaction between race and educational attainment on poverty status and associated disability benefit acquisition of US populations. Consistent with the MDRs theory, we found that the protective effect of educational attainment on poverty and associated risk of disability benefit acquisition is less pronounced in AIAN populations compared to White populations. By applying the MDRs theory to AIAN groups, we underscore the importance of further research and policy efforts aimed at ensuring that the advantages of attaining education are equally distributed among all societal members. This finding points to a significant need for tailored policy interventions that address the unique barriers faced by different AIAN communities in benefiting economic and employment opportunities from their educational achievements.

## Funding

The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement and Disability Research Consortium through the Michigan Retirement and Disability Research Center Award RDR23000008. The opinions and conclusions expressed are solely those of the author(s) and do not represent the opinions or policy of SSA or any agency of the Federal Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute

or imply endorsement, recommendation or favoring by the United States Government or any agency thereof. Zare received funding from the following National Institute of Health grant NIMHD U54MD000214.

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