

Objective and subjective socioeconomic status and health symptoms in patients following hematopoietic stem cell transplantation

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Abstract

Objective: Recent research indicates that subjective socioeconomic status (SES) – the perception of one's own SES compared with other people – is an important predictor of cancer-related health outcomes. Subjective SES may function as a psychosocial mechanism by which objective SES affects health, well-being, and, more broadly, quality of life among cancer survivors. This study tested whether the association between objective SES and indicators of quality of life was mediated by subjective SES in a sample of cancer survivors who had undergone hematopoietic stem cell transplantation.

Methods: Hematopoietic stem cell transplantation survivors ($N = 268$) completed measures of objective and subjective SES, along with four measures related to quality of life (depressive symptoms, health-related quality of life, symptoms of generalized distress, and posttraumatic stress disorder symptoms).

Results: Higher objective SES was associated with greater quality of life across all four measures. Subjective SES mediated the relationship between objective SES and depressive symptoms (total indirect effect $b = -0.09$, 95% confidence interval [CI] $[-0.15, -0.05]$), generalized distress (total indirect effect $b = -0.08$, 95% CI $[-0.13, -0.04]$), health-related quality of life (total indirect effect $b = 0.10$, 95% CI $[0.06, 0.17]$), and posttraumatic stress disorder (total indirect effect $b = -0.08$, 95% CI $[-0.14, -0.04]$).

Conclusions: Findings extend work on subjective SES to cancer and suggest that SES gradients in patient outcomes after cancer may reflect not only material resources but also psychosocial factors related to rank within social hierarchies. Further research may provide insights useful for reducing disparities in this population.

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Introduction

Wealth, poverty, and social class are intertwined with physical and mental health. Early research by Marmot, Shipley, Rose [1] among British Civil Servants found that health improved and mortality decreased in a linear fashion as occupational status increased. Numerous studies in the United States and other countries have replicated this association between SES and mental and physical health outcomes, such that it has become widely known as the *SES gradient*. SES gradients have been documented for many conditions including depression, obesity, diabetes, cardiovascular disease, and other chronic diseases [2]. In the context of cancer, the SES gradient affected a wide range of different types of cancer and cancer-related outcomes. Compared with higher socioeconomic status, lower socioeconomic status has been consistently associated with poorer survival rates [3]. The widest differences in survivorship

were found for cancers of good prognosis and specifically breast, bladder, uterus, and colon cancer [3].

Although the SES gradient is robust for cancer and many other health conditions, many of the mechanisms underlying this effect remain poorly understood. One seemingly obvious reason for the gradient is that poor individuals may lack basic resources such as healthy food, clean living conditions, or access to health care. However, the importance of factors beyond material resources was foreshadowed in the Marmot [1] study in which all participants in this study were employed and had similar access to health care. Moreover, each successive increase in job status was associated with increasingly better health outcomes: even movement from the second highest to the highest status jobs was associated with improved health. This study suggests that both income and job status are still important resources associated with health outcomes. In addition, numerous studies have found that the SES

gradient is associated with improvements in mental health such as reduced rates of depression, hostility, and psychological stress (for a review see [4]). These findings suggest that improvements in physical and mental health were not solely driven by material resources but also were associated with successive increases in status. Extending this research to cancer survivors suggests that beneficial mental and physical health outcomes could be driven both by increases in status and material resources across all SES levels.

Recently, subjective SES, how a person views his or her status in relation to others, has been suggested as a potential mechanism behind the SES gradient [5]. Subjective SES is assessed by asking respondents to place themselves on a ladder in which the wealthiest people are at the top and the poorest people are at the bottom. Subjective SES is a good predictor of health, and in some cases, it better predicts health outcomes than do the more objective measures of income, education, and job status [5].

Why might subjective SES play such a powerful role in physical and mental health? Subjective SES is believed to reflect relative rank within a hierarchy. Studies of both nonhuman animals [6] and humans [1] suggest that low rank in social hierarchies evokes stress responses with attendant long-term risks for cardiovascular, endocrine, and immune functioning. In fact, childhood subjective SES has been associated with telomere length, which has emerged as a biological mechanism associated with stress and aging diseases [7]. Low subjective SES may also contribute to unhealthy behaviors, distrust of others, a lack of perceived control, and less effective coping strategies [8]. Chronic stress and maladaptive coping strategies can develop into more serious mental illnesses such as generalized stress and anxiety or depression [9].

The importance of subjective SES suggests that stress related to socioeconomic status can result in poor mental health outcomes for cancer survivors. Research has found that among breast cancer survivors, health-related quality of life (HRQOL) was positively associated with SES, and this association was mediated by socioecologic stress, which is a measure of environmental or neighborhood stress (e.g., neighborhood crime and violence and relationships with the police) [10]. Similarly, lower SES prostate cancer survivors compared with higher SES prostate cancer survivors reported worse mental HRQOL [11]. In addition, among patients currently seeking treatment for lung cancer, lower subjective SES patients reported more health problems, less physical mobility and energy, and lower quality of life compared with higher SES patients [12]. Finally, objective SES, as measured by income and home value, was negatively associated with depressive symptoms and anxiety and positively associated with generalized mental functioning [13].

Some evidence suggests subjective SES may be a mediating mechanism for the effects of objective SES on physical and mental health. In one study using data from the

Whitehall II study of British civil servants, the effect of objective SES (measured by occupational status) on self-rated health was eliminated when controlling for subjective SES, suggesting that the effects of variation in objective SES on self-rated health could be traced to corresponding variation in subjective SES [5]. The effects of subjective SES are striking because they suggest that two individuals with identical material wealth may have different health outcomes if one of the two feels higher in subjective SES than the other. Moreover, mediation of effects of objective SES by subjective SES suggests that material resources may influence health only to the extent that they contribute to perceptions of one's place in a social hierarchy.

The present study examined effects of objective and subjective SES in a sample of cancer survivors treated with hematopoietic stem cell transplantation (HSCT). HSCT is a treatment for hematologic and lymphoid cancers and certain nonmalignant diseases [14]. Patients who receive this aggressive but potentially life-saving treatment are typically given high doses of chemotherapy (and sometimes total body radiation) with the goal of eliminating cancerous or diseased cells (e.g., in the bone marrow). However, this therapy also destroys immune functioning. Patients then receive an infusion of hematopoietic cells to replenish destroyed cells and to restore immune functioning.

Hematopoietic stem cell transplantation survivors are an important population in which to study the health consequences of SES for several reasons. First, this treatment itself poses significant medical and emotional risks. Approximately 40% of patients die from complications of treatment [14], persistent physical symptoms are common [15], and up to 40% of survivors experience persistent distress including symptoms of posttraumatic stress disorder (PTSD), depressed mood, and/or anxiety [16,17]. Poor physical and mental health contribute to lower HRQOL in this and other cancer populations. Second, the treatment imposes a large financial burden because the cost of HSCT generally exceeds \$150,000 [14]. This financial burden not only affects HSCT survivors but may also affect family members and caregivers because they often have to reduce their workload in order to help with care [18]. It has already been shown that financial stress among HSCT survivors is associated with lower HRQOL [19].

On the basis of the literature reviewed in the previous texts, we expected higher objective SES to be associated with lower distress and higher HRQOL among HSCT survivors. Specifically, we hypothesize that subjective SES mediates the association between objective SES and quality of life. This result would suggest that material resources are important to the extent that they contribute to subjective status, but subjective status is the more proximal influence on distress and HRQOL after HSCT. If so, this relationship would provide evidence for an important psychosocial pathway by which SES may affect health.

Method

Data for the study came from a larger parent study investigating a telephone-delivered cognitive behavioral intervention for distressed HSCT survivors [20]. Participants were survivors who completed screening for the parent study. They had not begun the intervention at the time of data collection nor were they required to meet the trial's distress-related criteria to be included in these analyses. This sample only included data from participants who completed the scales of interest. Ninety-six percent of this sample underwent HSCT for a malignant disease such as leukemia, lymphoma, or multiple myeloma.

Participants

Participants were recruited from the Memorial Sloan-Kettering Cancer Center, the Mount Sinai Medical Center, and Hackensack University Medical Center. All participants had HSCT performed in the last 12–36 months, spoke English fluently, and were at least 18 years of age. Survivors were excluded from participation in the study if they were currently awaiting another transplant, currently receiving treatment, had severe cognitive impairment assessed by the 6-item Mini-mental State Exam [21], or experienced active psychosis as assessed with six items from the psychotic symptoms module of the Structured Clinical Interview for the DSM fourth edition text revision [22].

As reported in Duhamel *et al.* [20], 452 of the 498 potential participants who were qualified for screening consented to complete it (91%; 29 refused and 17 were lost to contact). Of those potential participants, 408 completed screening (90%; 6 withdrew consent, 3 were no longer eligible for medical reasons, 25 were lost to follow up, and 10 did not complete screening because of the end of the study). No sociodemographic or medical variables that had a sufficient number of nonmissing responses to enable analyses (e.g., age, race/ethnicity, sex, time since treatment) predicted screening completion in a logistic regression. Because of missing data and fluctuations in sample size across different analyses, we only used a subset of participants who had completed all the measures of interest. This sample was similar to the subset of participants with missing data on demographic variables including gender, transplant type, number of rehospitalizations, time since transplant, race, and objective and subjective SES. Our final sample was $N=268$.

Procedures

Potential participants were identified through oncologists and patient databases, mailed a recruitment letter and study materials (including an informed consent form), then telephoned to verify their interest in completing a screening assessment for the parent study. Survivors who agreed to participate completed a mailed questionnaire and a telephone

interview conducted by a trained research assistant. Consent was obtained at the beginning of the interview. The questionnaire and interview each took about 60 min to complete and included measures for the present study and other psychosocial measures not reported here.

Objective socioeconomic status

We measured objective SES by combining self-reported household income and education [4]. Income was measured on a 9-point scale listing categories from 1 (\$0–\$9999) to 9 (greater than \$80,000). Education was measured as the participant's highest level attained, ranging from 1 (less than seventh grade) to 7 (graduate degree). The correlation between the two measures was significant, $r=0.36$, $p<0.0001$. Ratings were standardized and then averaged to form a composite.

Subjective socioeconomic status

Subjective SES was measured using two items based on the MacArthur Ladder [23]. This measure presents participants with a picture of a ladder with 10 rungs. One item told participants to 'think of the ladder as representing where people stand in the United States. At the top of the ladder are the people who are the best off—those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off—who have the least money, least education, and the least respected jobs or no job'. Then participants were asked to place an 'X' on the rung where they stand relative to other people in the United States. The second item was identical except that the comparison group was 'your community' rather than 'other people in the United States'. The correlation between the two measures was significant, $r=0.50$, $p<0.0001$. Responses on the two ladders were averaged to and then standardized to create a measure of subjective SES.

Depressive symptoms

Depressive symptoms were assessed with the Beck Depression Inventory [24]. This 21-item measure assesses the degree to which individuals self-report symptoms of depression (Cronbach's $\alpha=0.87$).

Generalized distress

The Brief Symptom Inventory's [25] Global Severity Index was used as a measure of generalized distress. This measure consists of 53 self-report items assessing symptoms of depression, anxiety, somatization, hostility, paranoid ideation, interpersonal sensitivity, obsession-compulsion, psychoticism, and phobic anxiety. Responses are made using a 5-point Likert-type scale (Cronbach's $\alpha=0.95$).

Health-related quality of life

Cancer-specific HRQOL was assessed using the Functional Assessment of Cancer Therapy Scale–General [26]. All of the questions were measured on a 5-point Likert-type scale (Cronbach's $\alpha = 0.79$).

Posttraumatic stress disorder symptoms

Posttraumatic stress disorder symptoms were measured using the 17-item PTSD Civilian Check List [27]. This self-report measure assessed the extent to which people were 'reliving' or ruminating on traumatic events using a 5-point Likert-type scale (Cronbach's $\alpha = 0.86$).

Medical and sociodemographic variables

We also collected medical information, including whether the transplant was allogeneic (i.e., using stem cells from a donor) or autologous (i.e., using survivors' own stem cells), and the number of post-HSCT rehospitalizations, from chart review. Sociodemographic characteristics were self-reported by participants.

Results

Descriptive statistics

Our sample was 53% female and consisted of a majority of Caucasian Americans (85.8%), as well as African Americans (5.6%), Hispanics (3.4%), individuals who reported other races (4.9%), and one individual who declined to report race. The mean subjective SES rating was 6.9 (standard deviation [SD]=1.64), with a range from 2 to 10. The majority of the sample had a college degree (39.18%), with a range from less than a high school degree (16.79%) to a graduate degree (24.63%). The income range included the entire scale from 1 to 9, with an average income category of 7.2, corresponding to the \$60,000–\$69,000 range. Education and income were moderately correlated, $r = 0.36$, $p < 0.001$. The resulting objective SES index had good variability, ranging from -3.01 to $+1.46$ in z -score (standardized) units (refer to Table 1 for demographic variables).

Associations between socioeconomic status variables and psychological outcomes

Correlational analyses summarized in Table 2 showed that higher objective SES was associated with significantly lower depressive symptoms and generalized distress, and better HRQOL, but not PTSD symptoms. The associations were in the same direction but somewhat stronger for subjective SES. Higher subjective SES was associated with lower depressive symptoms and generalized distress, better HRQOL, and fewer PTSD symptoms. In addition, objective and subjective SES were moderately correlated

Table 1. Sample demographic information

Characteristic	Number of participants (N = 268)	%
Sex		
Female	143	53.36
Male	125	46.64
Ethnicity		
White	230	85.82
African American	15	5.6
Hispanic	9	3.36
Other	13	4.85
Missing	1	0.37
Education		
High school or less	45	16.79
Some college	52	19.4
College degree	105	39.18
Graduate degree	66	24.63
Income, (\$) annually		
Less than 19,000	22	8.21
20,000–39,999	20	7.46
40,000–59,999	41	15.3
60,000–79,999	44	16.42
Greater than 80,000	126	47.01
Missing	15	5.6
Subjective socioeconomic status		
Mean	6.69	
Standard deviation	1.64	
Range	2–10	
Transplantation type		
Allogeneic	93	34.7
Autologous	175	65.3
Number of hospitalizations		
0	156	58.21
1–2	81	30.22
3–4	19	7.09
More than 4	12	4.48
Time since transplant (in months)		
Mean	20.64	
Standard deviation	5.991	
Range	6–39	

with each other ($r = 0.32$, $p < 0.001$) suggesting these two variables assess different latent constructs.

To investigate the unique effects of objective and subjective SES, we estimated the parameters of simultaneous multiple regression models predicting each outcome from objective and subjective SES and control variables. Objective SES, subjective SES, and the dependent variables were standardized using z -scores before being entered into the regression equation. We report the unstandardized regression coefficients that can be interpreted as the amount of change in the dependent variable (in SD units) associated with a change of one SD in the independent variable. In addition, the analyses controlled for transplant type (allogeneic = 1, autologous = 0), number of rehospitalizations after HSCT (an indicator of a more medically complicated recovery), time since transplant, and gender (female = 1, male = 0). As displayed in Table 3, subjective

Table 2. Associations between key variables

	1	2	3	4	5	6	7	8	9
1. Objective socioeconomic status									
2. Subjective socioeconomic status	0.322**								
3. Depressive symptoms	-0.147**	-0.332**							
4. Generalized distress	-0.166**	-0.301**	0.784**						
5. Health-related quality of life	0.139*	0.370**	-0.739**	-0.694**					
6. Posttraumatic stress disorder symptoms	-0.109	-0.285**	0.805**	0.844**	-0.688**				
7. Transplant type (allogeneic)	-0.025	-0.139*	0.155*	0.137*	-0.119	0.057			
8. Gender (female)	-0.081	-0.056	0.038	0.148*	0.02	0.097	0.053		
9. Number of rehospitalizations	-0.064	-0.039	0.199**	0.147*	-0.190**	0.112	0.257**	0.012	
10. Time since transplant	0.008	-0.041	-0.001	0.007	0.059	-0.035	-0.012	-0.024	0.111

* $p < 0.05$.** $p < 0.01$.**Table 3.** Multiple regression analyses predicting psychological outcomes from subjective and objective socioeconomic status and control variables

	b	SE	t	p	ΔR^2
Outcome variable is depressive symptoms					
Transplant type (allogeneic)	0.13	0.12	1.13	0.26	
Number of rehospitalization	0.16	0.06	2.87	0.005	
Gender (female)	0.02	0.11	0.20	0.828	
Time since transplant	-0.03	0.05	-0.54	0.59	
Objective SES	-0.04	0.07	-0.57	0.57	0.07
Subjective SES	-0.27	0.05	5.01	<0.001	0.08
Outcome variable is generalized distress					
Transplant type (allogeneic)	0.11	0.11	1.03	0.30	
Number of rehospitalization	0.1	0.015	1.94	0.05	
Gender (female)	0.22	0.1	2.13	0.03	
Time since transplant	-0.01	0.05	-0.21	0.84	
Objective SES	-0.07	0.07	-1.02	0.31	0.07
Subjective SES	-0.22	0.05	-4.25	<0.001	0.06
Outcome variable is HRQOL					
Transplant type (allogeneic)	-0.04	0.11	-0.4	0.69	
Number of rehospitalizations	-0.16	0.05	-3.080	0.002	
Gender (female)	0.09	0.1	0.83	0.41	
Time since transplant	0.09	0.05	1.66	0.10	
Objective SES	0.01	0.07	0.22	0.83	0.06
Subjective SES	0.32	0.05	6.05	<0.001	0.12
Outcome variable is PTSD					
Transplant type (allogeneic)	-0.03	0.12	-0.3	0.80	
Number of rehospitalizations	0.1	0.06	1.79	0.07	
Gender (female)	0.14	0.11	1.35	0.18	
Time since transplant	-0.05	0.06	-0.95	0.34	
Objective SES	-0.01	0.07	-0.08	0.94	0.03
Subjective SES	-0.24	0.06	-4.46	<0.001	0.07

SES, socioeconomic status; HRQOL, health-related quality of life; PTSD, posttraumatic stress disorder.

Objective SES, SES, and the dependent variables were standardized before being entered into the regression equation. We report and interpret the unstandardized estimates.

SES was a significant predictor in each analysis, whereas objective SES was nonsignificant in each case. The results are consistent with the hypothesis that subjective SES may serve as a mediator of the effects of objective SES on quality of life and well-being. To test the mediation hypothesis more directly, we conducted analyses of statistical mediation.

Primary analyses: mediation of objective socioeconomic status effects by subjective socioeconomic status

We tested whether the effect of objective SES on our dependent variables of interest was mediated by subjective SES. To test this mediational pattern, we used the bootstrapping method recommended by Preacher and Hayes [28]. This method estimates the regression coefficient and the 95% confidence interval for the indirect effect of the independent variable on the dependent variable via the mediator. In all analyses, the independent, dependent, and mediator variables were standardized before being entered into the analyses. We report the unstandardized regression coefficients for the mediational analyses. In addition, all mediational analyses controlled for transplant type (allogeneic = 1, autologous = 0), number of rehospitalizations after HSCT (an indicator of a more medically complicated recovery), time since transplant, and gender (female = 1, male = 0).

Results of the mediation analysis for each dependent variable are displayed in Figure 1. The indirect effect is significant when the confidence interval does not include zero. In every case, the association between objective SES and quality of life outcomes were mediated by subjective SES.¹ As displayed in Figure 1, in each analysis the total effect of objective SES was no longer significant after accounting for the effects of subjective SES. This indicates that objective SES did not have a significant independent effect on the health outcomes after accounting for the mediating effect of subjective SES.

Supplemental analyses: mediational analyses when breaking apart the objective and subjective socioeconomic status indices

We investigated whether the mediation patterns were driven by the local ladder, which is when people determine their social status relative to others in their community, or the US ladder, which is when which is when people determine their social status relative to others in the United States. This is important because previous

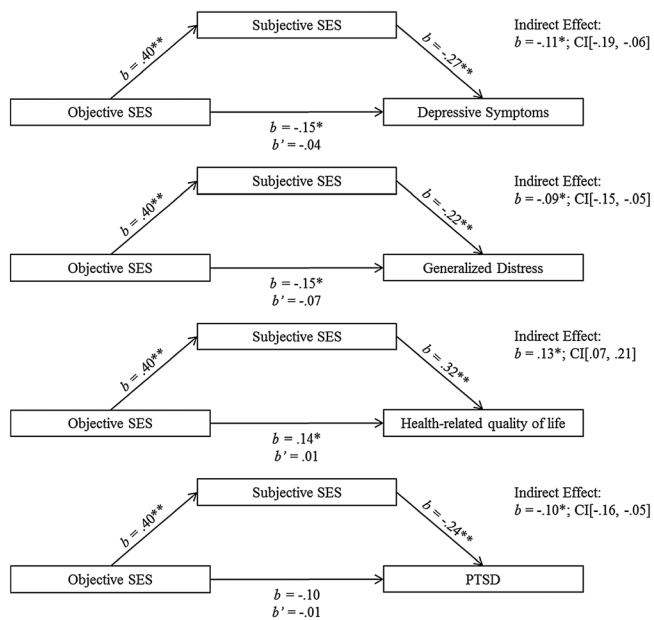


Figure 1. Mediation analyses showing that subjective SES mediated the association between objective SES and quality of life measures. Coefficients (b) are unstandardized regression coefficients based on standardized variables. The direct effect of objective SES on psychological health when accounting for the indirect effect is represented by b' . All analyses controlled for transplant type (allogeneic or autologous), number of hospital visits after hematopoietic stem cell transplantation treatment, time since transplant, and gender. * $p < 0.05$, ** $p < 0.01$, + $p < 0.10$

research has shown that the local ladder may be a better predictor of psychological outcomes than is the US ladder [29]. We also tested whether the effects of objective SES were driven primarily by income or education. Analyses included the same controls as in the primary analyses described in the previous texts.

Results of the mediation analysis between objective SES and our dependent variables of interest as mediated by the local ladder and US ladder are displayed in Figure 2A and B, respectively. This figure also displays the indirect effects for each dependent variable. In every case, the association between objective SES and quality of life outcomes were mediated by the local ladder and the US ladder. As displayed in Figure 2, in majority of the analyses, the total effect of objective SES was no longer significant after accounting for the effects of the local or US ladder. Results of the mediational analyses between education and income and our dependent variables of interest as mediated by subjective SES are also displayed in Figure 2C and D, respectively. In every case, the total effects between education and our dependent variables of interest were marginal or significant, but these effects were reduced to nonsignificance when subjective SES was entered into the model. In addition, education was significantly associated with subjective SES. For income, the majority of the total effects was nonsignificant and

remained nonsignificant when subjective SES was entered into the model. Income, however, was significantly associated with subjective SES, and the indirect effects were significant. The lack of total direct effects between income and our dependent variables of interest may be due to the restricted range in the income variable. Nonetheless, the results indicate that whatever relationship existed between objective SES (either defined by education or income) and health outcomes was mediated by subjective SES.

Discussion

In a sample of HSCT survivors, we found that higher objective SES was associated with fewer depressive symptoms, greater HRQOL, less severe symptoms of generalized distress, and fewer symptoms of PTSD. In every case, these effects were mediated by subjective SES. These findings are consistent with the hypothesis that income and education contributed to survivors' subjective perception of their status in relation to others, and this feeling of relative status in turn affected outcomes related to several kinds of psychological distress and HRQOL, which is affected by both physical and mental health. The present study extends a growing body of evidence that a person's relative rank in a social hierarchy has important health consequences, demonstrating that these effects apply to people treated for cancer. These findings are consistent with other research demonstrating that subjective SES may account for a significant portion of the SES gradient that is typically measured using only objective measures of SES [5]. The SES gradient that characterizes many chronic illnesses may in part reflect psychosocial processes related to hierarchy rather than (or in addition to) direct economic effects. It may be that subjective inequality leads to subjective SES. Thus, low subjective SES individuals may experience more stress because they are continually comparing themselves to individuals who seem better off, and this may explain the relationship between subjective SES and poor mental health outcomes.

The current research also has implications for clinical practice. Among populations such as HSCT patients, who are coping with disease and side effects from treatment, low subjective SES may present a risk factor for adverse survivorship outcomes. In addition to other psychosocial risk factors examined prior to HSCT [30], it may be important for clinicians to assess subjective SES in order to determine whether a patient may need additional social services or assistance coping with the treatment process. This could help prevent some of the negative mental health outcomes associated with low subjective SES patients recovering from HSCT.

Future research should investigate potential psychological mechanisms that underlie the relationship between subjective SES and psychosocial outcomes. This research

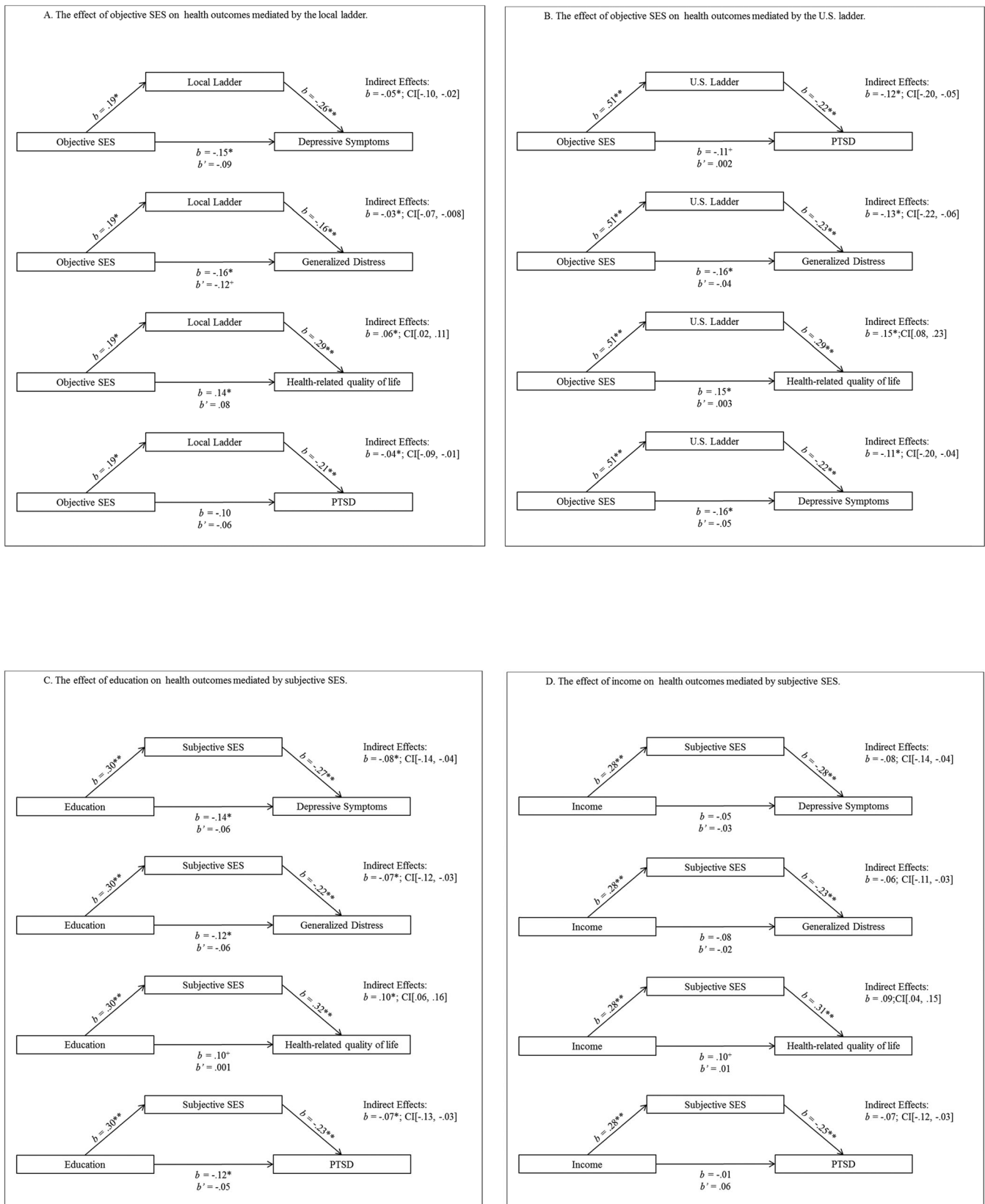


Figure 2. education and income as predictors (C and D, respectively). Coefficient (b) are unstandardized regression coefficients based on standardized variables. The direct effect of objective SES on psychological health when accounting for the indirect effect is represented by b' . All analyses controlled for transplant type (allogeneic or autologous), number of hospital visits after hematopoietic stem cell transplantation treatment, time since transplant, and gender. * $p < 0.05$, ** $p < 0.01$, + $p < 0.10$

could lead to uncovering effective coping strategies that might mitigate the relationship between subjective SES and psychosocial outcomes. In addition, research could test whether altering subjective SES could lead to improved mental health outcomes. Recent research has found that changing how people compare themselves with the social hierarchy leads to feeling relatively richer or poorer and these changes in subjective status lead to changes in attitudes and behavior (e.g., [31]). However, we are hesitant to suggest this strategy as it may be an oversimplification of the psychological process at hand. We think that it may be more beneficial for society to address the circumstances that leads to perceptions of SES instead of simply altering people's perceptions.

A limitation of this study is its cross-sectional design. Future research should examine the effects of subjective SES longitudinally. Another limitation is the restricted range of income that was collected in this relatively affluent sample. Material resources may have greater impact among lower income ranges, when basic needs are less likely to be met. The high cost of this treatment may have limited inclusion of survivors at the lowest levels of objective SES. Because of this expense, a relatively high range of income may be representative of the population of

patients receiving HSCT. Although income and education are among the most widely used measures of objective SES, they are only a proxy for the complex and multifaceted construct. Other indicators, such as insurance and access to medical care, may have important effects also but were not assessed in this research. Future research may consider additional indicators of SES. Despite these limitations, our findings add to the handful of recent studies suggesting that SES gradients may reflect not only material resources but also psychosocial factors related to rank within social hierarchies.

Note

1. Each subscale of health-related quality of life (FACT-G) also followed a similar mediation pattern. Objective SES was marginally associated with the FACT-Physical and significantly associated with the FACT-Social, and FACT-Functional subscales. Objective SES was not significantly associated with the FACT-Emotional subscale. In every case, the associations between Objective SES and the FACT-G subscales were significantly mediated by subjective SES.

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