

**WHAT DOES SUBJECTIVE SOCIOECONOMIC STATUS MEASURE AND WHY DOES IT  
PREDICT HEALTH SO WELL?**

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## **ABSTRACT**

Manuel J. Galvan: What Does Subjective Socioeconomic Status Measure and Why Does it Predict Health So Well?

(Under the direction of Keith Payne & Keely A Muscatell)

Socioeconomic status (SES) is robustly associated with myriad health outcomes. Each step up in SES is associated with improved health, a phenomenon known as the SES-health gradient (Adler et al., 2014). The SES-health gradient is found when SES is measured via objective indicators, or when SES is measured subjectively such as with the MacArthur Scale of Subjective Social Status (i.e., MacArthur ladder). Despite widespread usage of subjective measures of SES in health research, there are quite different interpretations of what these measures represent. In the present research we work from two competing interpretations to investigate how subjective SES and associated health measures are related to economic circumstances and non-economic social status. In a series of three correlational studies (N = 1,310) we investigated the associations between the MacArthur ladder, social status, and economic circumstances and their respective roles in the subjective SES-health gradient. We find evidence that economic circumstances and social status are distinct constructs that are both uniquely associated with the MacArthur ladder. Social status and economic circumstances also both explained the association between the MacArthur ladder and health and well-being measures. Our findings suggest that subjective SES (as measured by the MacArthur ladder) and the associated subSES-health gradient are explainable via both social status and economic circumstances.

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## **Introduction**

Socioeconomic status (SES) is robustly associated with myriad health outcomes. Each step up in SES is associated with improved health, a phenomenon known as the SES-health gradient (Adler et al., 2014). The SES-health gradient is found when SES is measured via objective indicators, such as reported income or education level, or when SES is measured subjectively such as with the MacArthur Scale of Subjective Social Status (i.e., MacArthur ladder). Despite widespread usage of subjective measures of SES in health research, there are quite different interpretations of what these measures represent. In the present research we work from two competing interpretations to investigate how subjective SES and associated health measures are related to economic circumstances and non-economic social status. In a series of three studies (N = 1,388) we investigated the measurement of the MacArthur ladder, social status, and economic circumstances and their role in the subjective SES-health gradient.

Socioeconomic status is a multifaceted concept. In general, researchers accept that socioeconomic status reflects at least two related but distinct concepts: a person's social status (socio-) and their material economic circumstances (-economic). This distinction can be traced to Weber (1944), who argued that social stratification can be separated into one component based on economic outcomes in the marketplace, and two other social components, power and prestige (Waters & Waters, 2016). Since then, theoretical considerations involving SES often combine these concepts. This is reasonable given that economic circumstances and social status often correlate, such that those who have the most expensive homes and impressive stock portfolios often wield the most influence and respect. However, when researchers want an "objective"



measure of SES, they often only measure the economic aspects of someone's life. Despite the "socio-" prefix in the naming convention, researchers measure objective SES primarily with indicators of one's economic circumstances, such as income, educational attainment, and wealth.

Another aspect of socioeconomic status can be measured subjectively. The MacArthur ladder is the most widely used of such subjective SES (subSES) measures, likely due to it being a single item measure with high predictive utility (Adler, Epel, Castellazzo and Ickovics, 2000). The MacArthur ladder displays an image of a ladder with rungs numbered in descending order. Participants in the US are told that the ladder represents "where people stand in the United States" and "at the top of the ladder are the people who are best off -- those who have the most money, the most education, and most respected jobs" while those "at the bottom... are the worst off -- those who have the least money, least education, and least respected jobs, or no jobs." Respondents indicate which rung best represents where they stand. With these instructions, participants' self-placement on the MacArthur ladder is ostensibly a subjective measure of economic circumstances that emerge from one's financial situation, educational background, and employment, relative to others.

However, despite the apparent overlap between the MacArthur ladder and objective SES indicators, there is a surprisingly low correlation between the two constructs ( $r \sim .4$ ; Adler et al., 2000). The MacArthur ladder also tends to predict health outcomes above and beyond objective indicators and is often a stronger predictor compared to objective SES (Singh-Manoux, Marmot & Adler, 2005). These findings raise two important questions: (1) What does the MacArthur ladder measure? And, (2) Why does it predict health outcomes independent of objective SES?

There is an ongoing debate about what the MacArthur ladder measures (Tan, Kraus, Carpenter, & Adler, 2020). There are two major non-mutually exclusive views considered here.

From one prominent view the MacArthur ladder is primarily a measure of perceived social status, a construct that is correlated with--but distinct from--economic circumstances. Social status reflects one's position within a social hierarchy within their community and society. From another point of view, the MacArthur ladder is a subjective measure of the same construct as objective SES: economic circumstances (Snibbe, Stewart and Adler, 2007). Economic circumstances are those measured by one's income, employment, bank account balance, and educational background. Importantly, researchers do not strictly adhere to either view to the exclusion of the other, but research often emphasizes one explanation over the other. Nevertheless, these different perspectives suggest differing interpretations of the subSES-health gradient. We consider the evidence for and implications of each view below.

**Is the MacArthur ladder and the associated health gradient primarily about economic circumstances?**

One interpretation of the MacArthur ladder is that, as a subjective SES measure, it measures primarily the same thing as objective measures of SES, namely, economic circumstances. To the extent that subSES is a better predictor of health, it may be because subSES is a better measure of economic circumstances. The aforementioned instructions of the MacArthur ladder specifically ask participants to place themselves on the ladder in reference to their income, jobs, and education--all aspects of their economic circumstances. Why, then, does the MacArthur ladder predict health measures better than objective indicators? The added value of the MacArthur ladder could be that it allows participants to mentally combine many economic factors (maybe even those beyond what is typically measured objectively) and weigh them differently (Snibbe, Stewart and Adler, 2007). This explanation is consistent with research showing that the correlation between the MacArthur ladder and a composite of objective SES

indicators increases as more objective indicators are used (Adler, et al., 2000; Hoebel, Maske, Seeb & Lampert, 2017).

Another added benefit to the MacArthur ladder is that it allows people to report their economic circumstances in light of the relevant context. For example, the economic circumstances of someone who graduated from a low-cost 4-year university may be different from an ivy-league graduate, even though both would indicate that they have a college degree on an objective SES measure. Similarly, the economic context of an annual income of 50K in Chapel Hill is remarkably different than the same income in San Francisco. A subjective measure of SES may better capture economic circumstances because it allows people to consider a wide variety of economic indicators that are reported based on contextual factors.

Thus, there is reason to interpret subjective SES as primarily a measure of the same construct measured by objective SES indicators: economic circumstances. Under this interpretation, the MacArthur ladder would predict health measures for the same reasons that income, education, and wealth do. That is, material resources can determine one's access to quality health care, healthier food, and exposure to harmful environmental conditions (Adler & Newman, 2002; Adler & Snibbe, 2003; Bernheim, Ross, Krumholz, and Bradley, 2008; Brailsford, Hill, Burdette & Jorgenson, 2018; Burstin, Lipsitz & Brennan, 1992; Hadley, Steinberg & Feder, 1991). In other words, the MacArthur ladder may predict health better than objective measures because it is a better measure of economic circumstances.

### **Is the MacArthur ladder and the associated health gradient primarily about social status?**

While the MacArthur ladder specifically instructs participants to consider their job, income, and education when deciding where to place themselves on the ladder, people may not have a firm grasp on where they stand in relation to others (Norton & Ariely, 2011). Thus,

participants may consider a variety of non-economic and social factors that shape their perception of where they are in the social hierarchy when determining how to respond to the MacArthur ladder. From this perspective, the MacArthur ladder is closely related to relative rank in a hierarchy, which we will refer to as social status.

Relative rank in a social hierarchy has a rich scientific history in the study of not just humans, but other social animals (Mason & Mendoza, 1993). One's position within a social hierarchy determines one's respect, recognition, and importance (Magee & Galinsky, 2008). It also carries additional benefits, such as wielding greater power over social resources by influencing others more easily (Fiske, 2010). On the other end of the spectrum, people low in social status often see themselves as having less control over their lives and the condition of society (Kraus, Piff, & Keltner, 2009). People's perception of their social influence, power, control, and standing in society may inform their responses to the MacArthur ladder, despite the instructions not explicitly mentioning these criteria.

Thus, subjective SES may be more than a subjective measure of economic circumstances which are objectively measured by education level, income, and job status. Under this interpretation, the MacArthur ladder predicts health outcomes for reasons other than those tied to economics. This interpretation is consistent with research demonstrating that the community status ladder (which asks people to place themselves on a ladder based on their "standing in the community" and is not explicitly economic in nature) is as predictive of health behavior, mental health, physical health, and self-rated health as the MacArthur ladder (Zell, Strickhouser, & Krizan, 2018). Higher subjective social status may predict better health for psychological reasons. This is consistent with non-human research findings that demonstrated that the psychological stress of social hierarchies can greatly influence health of primates (Sapolsky,

2005). For example, higher status might protect against the stress incurred by social isolation, lacking social capital, lack of control over one's life, and engaging in unhealthy coping behaviors that have all been associated with decrements in health outcomes (Boon & Farnsworth, 2011; Bosma, et al., 1997; Johnson & Krueger, 2005; Kuper & Marmot, 2003; Morgan, et al., 2007; Islam, Merlo, Kawachi, Lindstrom & Gerdtham, 2006). In this view, the MacArthur ladder may predict health outcomes independent of economic resources because it measures social status, a construct that is distinct from economic circumstances.

### **The Present Research**

Based on the previous literature, there are two ways of interpreting responses to the MacArthur ladder and two ways of understanding the associated subjective-SES health gradient. The MacArthur ladder may primarily measure either economic circumstances or social status. Of course, these two interpretations are not mutually exclusive so the MacArthur ladder may measure both. Similarly, the disparities in health found among people in different places on the MacArthur ladder (i.e. the subSES-health gradient) may be explainable through their differential economic circumstances, social status, or both.

To investigate these possibilities, we conducted three studies to address three research questions. First, do items that measure economic circumstances and items that measure social status reflect a single factor or two factors? Second, does self-placement on the MacArthur ladder reflect economic circumstances, social status, or both? And third, is the association between the MacArthur ladder and measures of health explained by economic circumstances, social status, or both? By addressing these questions, we shed light on the separable social and economic components of socioeconomic status, and how these distinct constructs uniquely explain the socioeconomic-health gradient.

In exploratory Studies 1 and 2, we developed methods and models needed to investigate the relationship between social status and economic circumstances and how these concepts relate to subjective SES and associated health outcomes.

As an initial step in Study 1, we had to develop an approach to measuring social status that would be distinct from the MacArthur ladder. We built on the compelling ladder imagery of the MacArthur scale because it matched the subjective and relative nature of the social status hierarchy. We repurposed the ladder design and allowed participants to indicate their rank on a variety of dimensions thought to confer social status. While some ladders were theoretically consistent with social status (e.g. control, power, standing in the community), our exploratory approach allowed us to investigate other possible sources of status (e.g., gender, sexual orientation, race, etc.). In Study 2, we explored how best to measure economic circumstances. Then, in pre-registered Study 3, we checked the robustness of our findings by replicating them in a more representative sample of the demographics in the United States of America. By replicating with a more representative sample, we tested our model using participants with wider variation in physical and mental health functioning and bolstered the generalizability of our findings.

Within each study we focused on important physical and mental health characteristics that have been found to be associated with socioeconomic status. Specifically, research has found that SES correlates with self-rated health of participants (Cundiff & Matthews, 2017). SES is also associated with a variety of chronic physical illnesses that can be reported in a more objective manner (Marmot, 2000), as well as experiences of pain (Dorner, et al., 2011). SES also correlates with mental health outcomes such as anxiety, depression, and satisfaction with life (Yu

& Williams, 1999). Therefore, we focused specifically on self-rated health, chronic illnesses, pain, anxiety, depression, and satisfaction with life.

## **Study 1: Method**

### **Participants**

We recruited 448 participants through Amazon Mechanical Turk to complete the study procedures. Participants were required to be living in the US and to be fluent English speakers to ensure they understood the questions. Because of concerns about automated (i.e. “bot”) and server farm (i.e. “farmer”) responses, participants were told that their inclusion in the study required a response to a short-answer prompt (i.e., “Discuss your status in the US”). Due to non-responsiveness or nonsense responses to this question, 163 participants were removed from the dataset. A single participant was also removed for being an outlier (Mahalanobis Distance  $p < .001$ ). Thus, the final sample size for Study 1 was 284, though this sample size fluctuates across the analyses since some participants did not respond to certain questions. Participants were 52% women with a mean age of 39 ( $SD_{age} = 12$ ,  $Min_{age} = 22$ ,  $Max_{age} = 78$ ). The sample included participants identifying as exclusively non-Hispanic White ( $n=214$ ), Black ( $n=25$ ), Hispanic ( $n=18$ ), Asian ( $n=22$ ), and “other” ( $n=5$ ). Forty-seven percent reported being “Very” or “Somewhat” liberal, 27% reported being “Very” or “Somewhat” conservative, and 26% reported being neither. See Table 1 for participant demographics across all studies.

**Table 1:** Demographics for Participants in Studies 1, 2 and 3.

	Study 1 N (%)	Study 2 N (%)	Study 3 N (%)
Demographic Characteristic			
	284 (100)	305 (100)	721 (100)
<b>Gender</b>			
men	137 (48.2)	139 (44.1)	361 (50.1)
women	147 (51.8)	174 (55.2)	354 (49.1)
Trans, Nonbinary, or other	0 (0)	2 (.6)	6 (.8)
<b>Race</b>			
exclusively non-hispanic White	214 (75.4)	241 (76.5)	475 (65.9)
Black	25 (8.8)	25 (7.9)	96 (13.3)
Hispanic	18 (6.3)	10 (3.2)	72 (10.0)
Asian	22 (7.7)	31 (9.8)	44 (6.1)
Other	5 (1.8)	8 (2.5)	34 (4.7)
<b>Age</b>			
Mean	39	44	47
SD	12	14	17
Min age	22	18	18
Max age	78	83	100

## Procedures

After providing consent, participants responded to the MacArthur ladder and a series of additional ladder measures (more details in the Measures section). Participants were randomly assigned to see the MacArthur ladder before the rest of the ladders, or after the other ladders (though order did not influence the results). Participants then responded to a set of physical and mental health measures, and demographic questions, all described below. Participants were paid \$0.65 for completing the study.

## Socioeconomic Measures

### *Economic circumstances*

As part of the demographic measures, participants reported their annual income and education level. Annual income was pre-binned with the bin size increasing with income level to



capture more variance at lower income levels. The modal bin selected was \$60,000 - \$74,999 (n = 40), and the median bin for the sample was \$50,000 to \$59,999 (Min = Less than \$5,000, Max = More than \$250,000). Participants reported education in 7 levels: less than high school degree (n = 2), high school degree (n = 28), some college (n = 65), 2-year college degree (n = 43), 4-year college degree (n = 122), master's degree (n = 21), doctoral level degree (n = 3). For Study 1, an estimate of participants' economic circumstances was derived from these two objective indicators.

### *Social status*

Using the MacArthur ladder as a template, we created a series of 19 different ladders for a variety of facets of life where people may perceive their subjective and relative position in a status hierarchy. Each ladder had instructions that asked participants to conceptualize the ladder as a representation of society in terms of a specific hierarchy (e.g., "Think of this ladder as representing where people stand in the United States, based on their happiness"), with some at the top of the hierarchy and some at the bottom. Participants were then asked to place themselves on the ladder relative to other people in society with each rung (bottom to top) of the ladder shown being a number from 1 to 10. There were ladders that represented economic-based hierarchies (i.e., income, jobs, and education), hierarchies based on social identity characteristics (i.e., race, gender, sexuality, religion, age), general, overall hierarchies (i.e., community, general standing), and hierarchies based on "other characteristics" known to relate to social status (i.e., power, control, social influence, competence). There were also exploratory items that were included, but separate from our hypotheses (i.e., physical attractiveness, happiness, self-esteem, mood, stress). The majority of the ladder measures (i.e., all of them except the social identity ladders) were written with specific criteria that determined what the top and bottom of the ladder

meant (e.g. “At the top/bottom of the ladder at those with the most/least power.”). The social identity ladders were written in a way that left this to participants to interpret (e.g. “At the top of the ladder are the people who are best off due to their age/race/gender”). The ladder measures used in each study can be found in Appendix 2 and descriptive statistics for the social status ladders across all studies can be found in Appendix 3.

### ***Subjective socioeconomic status***

We measured subjective socioeconomic status with the MacArthur ladder (Adler et al., 1994). Participants were told the ladder represented 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, and at the bottom of the ladder are the people who are the worst off -- those who have the least money, least education, and the least respected jobs or no job. They then indicated where they would place themselves on the ladder on a 10-point scale (10 being the highest rung of the ladder).

### **Health and Well-being measures**

*Satisfaction with life.* We measured satisfaction with life using the 5-item scale by Diener, Emmons, Larsen, and Griffin (1985), where higher scores indicator greater life satisfaction. Participants responded on a 7-point Likert scale from strongly agree to strongly disagree. Cronbach’s alpha for the sample was .92.

*Depression.* We measured depression using the 10-item Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), where higher scores indicate higher levels of depression. Participants responded on a 4-point scale that indicated how often this week they had the experiences described in the scale from “rarely or none of the time (less than 1 day)” to “All of the time (5-7 days)”. Cronbach’s alpha for the sample was .90.

*Anxiety.* We measured trait level anxiety using the 20 trait items from the State-Trait Anxiety Inventory (STAI; Spielberger, 1983), where high scores indicate higher levels of trait anxiety. We did not measure state anxiety. Participants responded to how often they had anxiety-related experiences on a 4-point Likert scale from “Almost never” to “Almost always”. Cronbach’s alpha for the sample was .94.

*Self-rated health.* We measured self-rated health with a single item where we asked participants their perceived health quality such that higher scores indicate better health (taken from Ware and Sherbourne, 1992). Participants responded on a 5-point Likert scale from “Poor” to “Excellent”.

*Chronic illness.* We also measured how much participants have dealt with illness with a checklist of illnesses (taken from Ryff, et al. 2018). Respondents responded to each question with yes, no, or unsure (treated as missing). We then coded each “yes” response on that list as a 1 and summed these illnesses to make a composite illness variable, where higher scores indicate more health issues.

*Pain.* We measured participant pain as a z-scored composite of a single item rating of average pain and a 6-item daily pain scale (Cook et al. 2013), where higher scores indicate more daily pain. Cronbach’s alpha for the 7 items was .96.

See Table 2 for descriptive statistics for each health and well-being measure across all studies.

**Table 2.** Descriptive Statistics for the MacArthur Ladder and Associated Health and Well-Being Variables

Variable	Study 1					Study 2					Study 3				
	N	Mean	SD	Median	Alpha	N	Mean	SD	Median	Alpha	N	Mean	SD	Median	Alpha
MacArthur Ladder	284	5.02	1.6	5	-	315	5.05	1.7	5	-	787	6.06	2.2	6	-
Satisfaction with Life	235	4.51	1.6	4.8	0.92	315	4.49	1.6	4.8	0.92	789	4.63	1.4	4.8	0.91
Depression	239	1.81	0.7	1.6	0.9	315	1.78	0.7	1.6	0.9	789	1.91	0.6	1.8	0.87
Anxiety	238	2	0.7	1.9	0.94	315	1.91	0.7	1.8	0.95	788	2.03	0.6	1.95	0.93
Self-rated Health	284	3.32	1	3	-	315	3.42	1	3	-	788	3.31	1	3	-
Chronic Illness	283	1.14	1.7	0	-	315	1.47	1.7	1	-	787	2.09	2.4	2	-
Z-Scored Pain	284	0	0.85	-0.06	0.96	315	0	0.91	-0.33	0.93	789	0	0.86	-0.09	0.96

### Study 1: Results

To address our research question, we first completed an exploratory factor analysis on a subset of the ladder items we gathered. While there are field norms around how to measure economic circumstances (income, education level), there are no such firm norms about how best to measure subjective social status. Thus, we completed an exploratory factor analysis with the data from the ladder questions to see which of the ladder measures would form a coherent factor structure. The factor analysis included all ladder items except the MacArthur ladder, the ladders that represent components of the MacArthur ladder (income, jobs, and education), and exploratory ladders.

The results of the factor analysis revealed 5 ladders that formed a factor we call “social status”: the control ladder, the general standing ladder, the social influence ladder, the power ladder, and the community ladder (see Table 3). A second factor composed of the sexuality and race ladder also emerged, but it was not associated with any of the health and well-being measures (above and beyond the social status and economic circumstances factors) so it was dropped from subsequent analyses (see the analyses that include sexuality and race as a third factor in Appendix 1). Together, the social status ladders measured participants' subjective judgments on where they stood relative to others in their perceived power, level of access to

socially influential people, general standing, standing in their community, and control over their lives. Thus, our exploratory data paints a picture of social status as a global sense of one’s standing in the immediate and broader social environment, one’s access to influential others, and how much one has control over their own life and power in society. We used these items, the objective SES data, and health and well-being measures in confirmatory factor analysis (CFA) structural equation models (SEM) to address each of the research questions.

**Table 3.** Social Status Ladder Items Exploratory Factor Analysis Results

	Factor	
	1	2
Item	Social status	Social identity status
Power Ladder	.89	
Social Influence Ladder	.86	
General Standing Ladder	.73	
Community Ladder	.69	
Control Ladder	.54	.33
Age Ladder	.36	.30
Sexuality Ladder		.64
Race Ladder		.52
Competence Ladder	.28	.44
Gender Ladder		.39
Religion Ladder		.35
Eigenvalues	4.296	1.554
Variance explained (%)	39.06	14.13

*Note.* Factor loadings < .2 are suppressed.

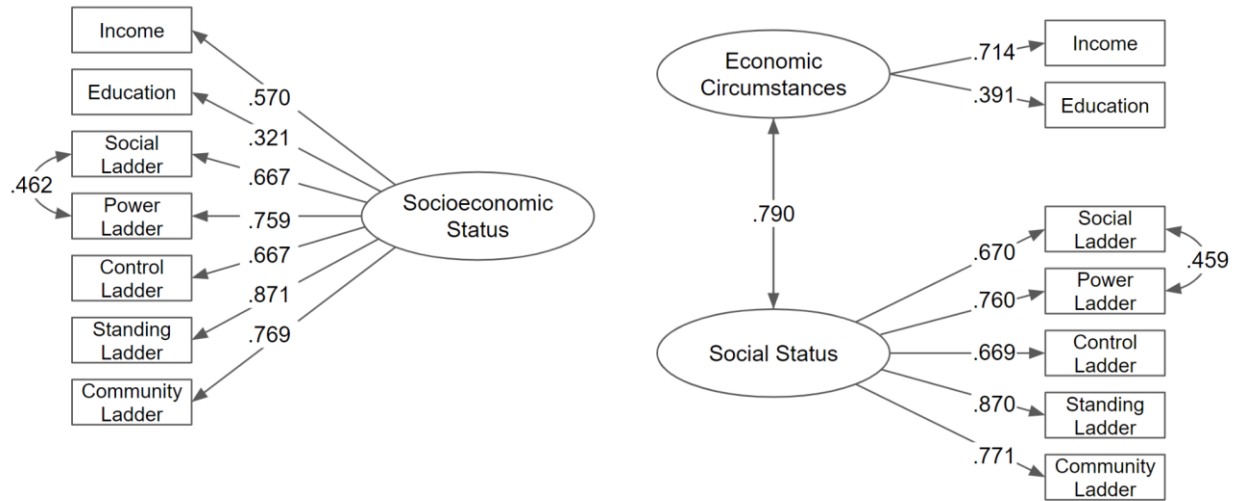
We addressed three research questions. The first question was whether economic circumstance items and social status items reflect a single factor or two factors. To answer this question, we conducted two separate SEM analyses (a single factor and a two-factor model) and compared their model fit. Our second question was whether self-placement on the MacArthur ladder reflects economic circumstances, social status, or both. To address this question, we

conducted an SEM analysis where we predicted the MacArthur ladder via two latent variables representing social status and economic circumstances. Our third question was whether the association between the MacArthur ladder and measures of health is best explained by economic circumstances, social status, or both. To address this question, we modeled the estimated association between the latent variables (social status and economic circumstances) and each health and well-being measure, both directly and indirectly as mediated by the MacArthur ladder in a simultaneous regression.

*RQ1: Do economic circumstance items and social status items reflect a single factor or two factors?*

Two structural equation models were created: a correlated two-factor model where the 5-item social status latent variable could covary with the 2-item economic circumstances latent variable, and a single-factor model where a single latent factor was indicated by all 7 items (see both models as Figure 1). Guided by modification indices and theoretical expectations (Raven 1964), we adjusted the model slightly to improve the model fit by correlating the residuals between the social and power ladders. Because the two models we created were nested, we used a chi-squared difference test to determine if the two-factor model was a statistically significant improvement of model fit in comparison to the single factor model (Wan, 2002). The two-factor model fit ( $n = 284$ ,  $\chi^2 = 14.06$ ,  $df = 12$ ;  $RMSEA = .025$ ,  $p = .796$ ) was a statistically significant ( $p = .03$ ) improvement in comparison to the single factor model fit ( $n = 284$ ,  $\chi^2 = 18.78$ ,  $df = 13$ ;  $RMSEA = .04$ ,  $p = .635$ ). In other words, within our data, economic circumstances (as represented by income and education level as indicators) and social status (as measured by the five ladder items as indicators) are best represented as two distinct constructs.

**Figure 1.** Nested Model Comparison for Evaluating SES Items as a One or Two Factor Construct for Study 1.



*Note.* All paths shown are significant ( $p < .001$ ).

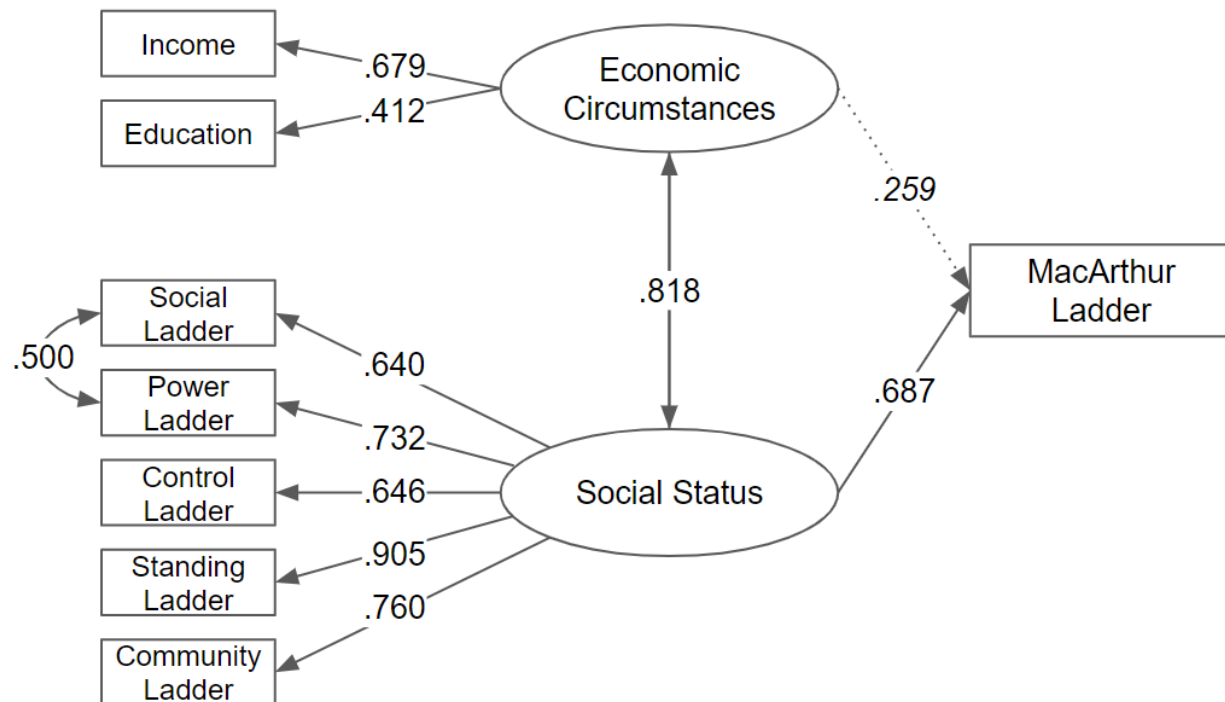
*RQ2: Does self-placement on the MacArthur ladder reflect economic circumstances, social status, or both?*

To answer the second research question, we used the two-factor model to predict scores on the MacArthur ladder from the two latent variables (i.e., economic circumstances and social status) identified in the factor analysis above (see Figure 2). This model was a good fit to the data ( $n = 284$ ,  $\chi^2 = 24.13$ ,  $df = 17$ ;  $RMSEA = .038$ ,  $p = .68$ ). Each indicator was a significant indicator of their associated latent variable. The economic circumstance and social status latent variables were significantly correlated ( $\beta = .818$ ,  $p < .001$ ).

The model indicates that the MacArthur ladder is associated with the social status latent variable ( $\beta = .687$ ,  $p < .001$ ), but not the economic circumstances latent variable ( $\beta = .259$ ,  $p = .069$ ). In other words, subjective judgments about relative access to power, socially influential people, and control over one's life, and relative societal and community standing are associated with MacArthur ladder judgements of subjective SES. On the other hand, the data did not reveal

evidence that responses to the MacArthur ladder are associated with economic circumstances (i.e., annual income and education) above and beyond social status. Thus, our first study suggests that the MacArthur ladder is associated with only social status and not economic circumstances.

**Figure 2.** Structural Equation Model: Economic Circumstances and Social Status Predicting the MacArthur Ladder for Study 1.



*Note.* All paths shown are significant ( $p < .001$ ).

*RQ3: Is the association between the MacArthur ladder and measures of health best explained by economic circumstances, and social status?*

All the health and well-being measures we evaluated had significant zero-order correlations with the MacArthur ladder (see Table 4). To investigate our research question, we predicted life satisfaction, depression, anxiety, self-rated health, chronic illness, and pain using latent variable SEM (see Figure 3). The models measured the association between the economic circumstances and social status latent variables and health and well-being measures, both directly



and indirectly as mediated by the MacArthur ladder in a simultaneous regression. Using this approach, we could evaluate whether controlling for the latent variables could fully account for the relationship between the MacArthur ladder and the health and well-being measures that exist at the zero-order.

Each health measure was evaluated using independent models; thus, we used six models with the same predictors and mediators but with different health and well-being dependent measures. Each model was a good-to-adequate fit to the data (see Table 5). In all models, the MacArthur ladder had a statistically significant association with the social status latent variable ( $\beta$ s > .5,  $ps$  < .05) but not the economic circumstances latent variable. In all of the six models, we found a significant correlation between the economic circumstances and social status latent variables of similar magnitude to the correlation found in Figure 2.

Table 5 shows the direct association between the MacArthur ladder, economic circumstances, and social status on each health measure as well as the indirect effect of social status and economic circumstances via the MacArthur ladder. There were significant direct effects of social status on life-satisfaction, depression, anxiety, and self-rated health but not chronic illness or pain. There were no direct effects of the ladder and no indirect effects of the latent variables on health and well-being via the ladder. The exception to this was in the case of a negative correlation between the MacArthur ladder and life satisfaction, which is likely a suppression effect that emerged when controlling for the effects of the latent variables.

Thus, subjective judgments about relative access to power, socially influential people, control over one's life, and relative societal and community standing (or social status) largely accounts for the zero-order correlation between the MacArthur ladder and health and well-being.

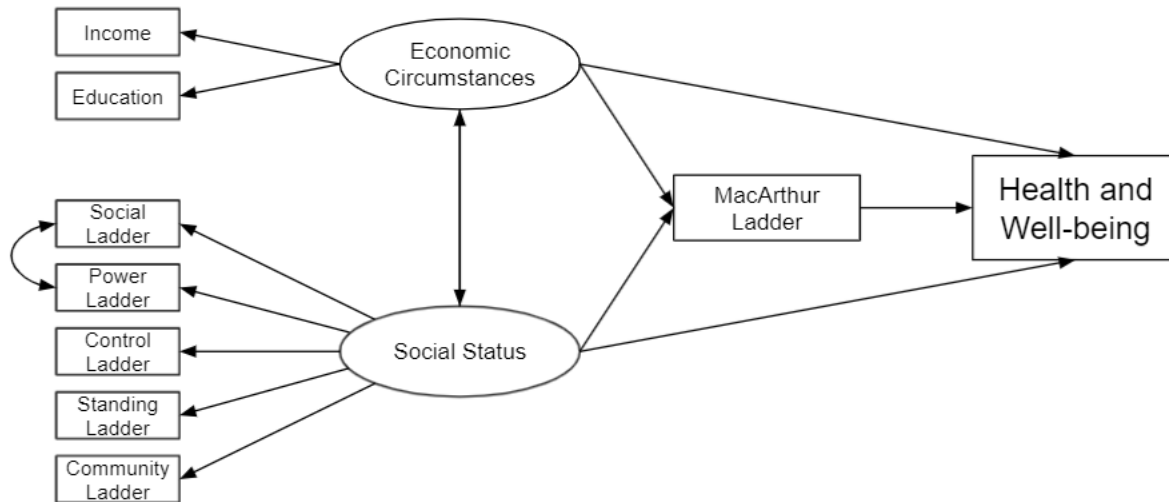
This suggests that the association between the MacArthur ladder and health and well-being is best explained by social status, but not economic circumstances.

**Table 4.** Zero-order Two-Tailed Pearson Correlation of the MacArthur Ladder and Each Health and Well-Being Measure for Studies 1, 2 & 3.

	Study 1	Study 2	Study 3
Satisfaction with life	0.471***	0.459***	0.45***
Depression	-0.354***	-0.325***	-0.249***
Anxiety	-0.42***	-0.357***	-0.327***
Self-rated health	0.34***	0.402***	0.391***
Chronic illness	-0.181**	-0.185**	-0.102**
Z-scored pain	-0.18**	-0.21***	-0.001

Note. \*  $p \leq .05$ , \*\*  $p \leq .01$ , \*\*\*  $p \leq .001$ .

**Figure 3.** Conceptual Model for Estimating Simultaneous Direct and Indirect Effects of Economic Circumstances and Social Status on Health and Well-Being Measures for Study 1.



**Table 5.** Standardized Direct and Indirect Effects of Economic Circumstances and Social Status on Health and Well-Being Measures for Study 1.

	Life satisfaction	Depression	Anxiety	Health	Illness	Pain
N =	235	239	238	284	283	284
Direct effect of Ladder	-.484**	0.26	0.169	-0.297	0.013	0.207
Direct effect of Economic Circumstances	0.25	-0.241	0.035	0.194	-0.037	-0.657
Direct effect of Social Status	.842***	-.446*	-.683**	.531**	-0.182	0.161
Indirect effect of Econ Circumstances via Ladder	-0.098	0.106	0.027	-0.076	0.004	0.052
Indirect effect of Social Status via Ladder	-.359**	0.146	0.13	-0.205	0.009	0.144
<b>Model Fit Statistics</b>						
Chi-squared	50.89	47.52	44.19	35.13	27.64	41.73
Chi-squared df	22	22	22	22	22	22
RMSEA	0.075	0.07	0.065	0.046	0.03	0.056
RMSEA p-value	0.063	0.11	0.172	0.564	0.833	0.32

*Note.* \*  $p \leq .05$ , \*\*  $p \leq .01$ , \*\*\*  $p \leq .001$ .

### Study 1: Discussion

The results from our initial exploratory study provide preliminary evidence that there is reason to distinguish between social status and economic circumstances and to see the MacArthur ladder health association as primarily explainable via social status compared to economic circumstances. Furthermore, we found that the relationship between the MacArthur ladder and health and well-being is accounted for when controlling for social status and economic circumstances. Furthermore, social status is the only part of the model to explain life satisfaction, depression, anxiety, and self-rated health.

These results revealed very little role for economic circumstances which was surprising given the explicit instructions of the MacArthur ladder that participants were to place themselves on the ladder based on their jobs, education, and income. Despite these instructions, participants' actual reported education and income did not predict the MacArthur ladder above and beyond social status. Rather, these preliminary results suggest that participants' perceptions of their power, sense of control, access to influential others, and their standing in society and their communities are what explains their scores on the MacArthur ladder measure and the subjective SES-health gradient.

However, an important caveat is that we measured economic circumstances using only two simple--albeit commonly used—indicators: education and income. While using education and income as the sole indicators of SES is a fairly common practice across many areas of social and health science, our investigation would likely benefit from more robust measures of economic circumstances. In Study 2, we wanted to replicate and extend our investigation. Specifically, we tested whether a more comprehensive measure of economic circumstances would further our investigation. Thus, the procedures were nearly identical to Study 1, but we gathered additional information about participants’ economic circumstances to incorporate into our model.

## **Study 2: Method**

### **Participants**

We gathered data from 331 participants recruited from Amazon Mechanical Turk but rejected six due to inadequate performance on a quality check (i.e. they didn’t respond to a prompt about their status in the US in adequate English). A further 10 participants were removed for being outliers (Mahalanobis Distance  $p < .001$ ). Thus the final sample size was 315 though the analyses have sample sizes of 305 because participants provided ambiguous write-in answers to the housing question ( $n = 7$ ), and/or didn’t respond to the home/vehicle value ( $n = 2$ ) or income question ( $n = 1$ ). Participants were 54% women with a mean age of 44 ( $SD_{age} = 14$ ,  $Min_{age} = 18$ ,  $Max_{age} = 83$ ). The sample included participants identifying as exclusively non-Hispanic White ( $n=236$ ), Black ( $n=25$ ), Hispanic ( $n=10$ ), Asian ( $n=31$ ), or other ( $n=8$ ). Fifty percent reported being “Very” or “Somewhat” liberal, 28.2% reported being “Very” or “Somewhat” conservative, and 21% reported being neither. See Table 1 for participant demographics across all studies.

## Socioeconomic Measures

### *Economic circumstances*

We expanded how we measured economic circumstances, by using the MacArthur Sociodemographic Questionnaire (Singh-Manoux, Adler, & Marmot, 2003). Participants reported their work status (89% working full time, part time, keeping house, retired, or full-time student; 11% unemployed or looking for work), home status (68% owned homes, 32% rented), and educational attainment (28% high school graduates, 14% associate's degree, 33% Bachelor's degree, 25% post-bac degrees). Annual household income was provided as a free-response to a question about income from all sources. The mean household income was \$69,016 and the median income was \$60,000 (Min = 0, Max = 315,000, SD = \$48,528). An estimate of household savings was provided as a free-response to a question about the participant and participant spouse's checking, savings, stocks and bonds that could be cashed in if needed. The mean amount of estimated household savings was \$164,011 and the median amount was \$15,000 (Min = 0, Max = \$10,000,000<sup>1</sup>, SD = \$675,867). An estimate of the value of the participants vehicle(s) and home(s) was provided as a free-response. The mean home and vehicle value was \$210,860 and the median amount was \$125,000 (Min = 0, Max = \$5,000,000<sup>1</sup>, SD = \$392,916). The free-response values were transformed to normalize them. Participants were also asked to estimate how long they could maintain their standard of living if they lost "all current sources of household income". In response to this question, 12% said less than a month, 22% said 1-2 months, 29% said 3-6 months, 13% said 7-12 months, and 23% said more than a year. Other questions asked participants to estimate their amount of short term (e.g. credit cards, title loans, etc.) and long term (e.g. car and home loans) debt, and to report their household member

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<sup>1</sup> Analyses were largely unchanged by removing the 15 participants who had savings or home/vehicle values above \$1 million.

composition (number of adults, children, and income earning adults), but these questions were not used in the analysis.

### ***Social status***

Social status was measured using the same five items identified in the EFA of Study 1: the power, control, access to socially influential others, and community and societal standing ladders. The ladder measures and descriptive statistics for each measure across all studies can be found in the [supplemental materials](#).

### **Health and Well-being Measures**

Health and Well-being was measured using the same methodology as in Study 1: satisfaction with life ( $\alpha = .92$ ), depression ( $\alpha = .90$ ), anxiety ( $\alpha = .95$ ), self-rated health, chronic illness, and pain ( $\alpha = .93$ ). See Table 2 for descriptive statistics for each health and well-being measure across all studies.

## **Study 2: Results**

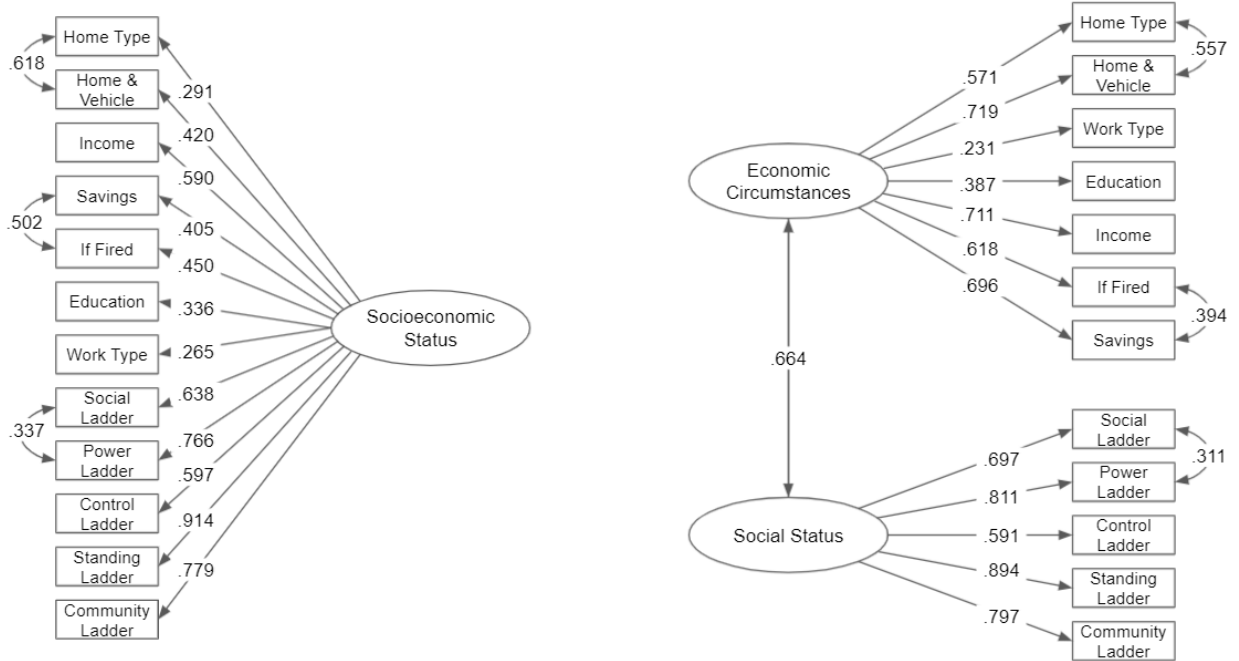
We relied on the results from Study 1 to guide our confirmatory factor analyses (CFA) in Study 2. Consistent with models created in Study 1, the social status latent variable was indicated by the same five measures: the power, control, access to socially influential others, community standing and societal standing ladders. Indicators of economic circumstances were selected based on their correlations to one another and impact on model fit. This approach resulted in inclusion of seven items as indicators of economic circumstances: home and vehicle value, savings, income, how long a standard of living would be maintained if fired, housing status, educational attainment, and work status. We used these items to build a more substantial economic circumstances latent variable than was present in the statistical models from Study 1. We used the new economic circumstances indicators in conjunction with the previously used indicators of

social status, the MacArthur ladder, and health and well-being measures to revisit the same research questions from Study 1.

*RQ1: Do economic circumstance items and social status items reflect a single factor or two factors?*

We took the same nested model comparison approach used in Study 1, but now with more robust measures of economic circumstances. We maintained the correlated residuals of the power and social ladders from Study 1. Guided by modification indices, we added 2 additional correlated residuals between economic circumstances indicators to improve model fit (see Figure 4). The two-factor model fit ( $n = 305$ ,  $\chi^2 = 107.19$ ,  $df = 50$ ;  $RMSEA = .061$ ,  $p < .119$ ) was a statistically significant ( $p < .001$ ) improvement in fit compared to the single factor model fit ( $n = 305$ ,  $\chi^2 = 217.48$ ,  $df = 51$ ;  $RMSEA = .103$ ,  $p < .001$ ). Replicating the finding in Study 1, our data revealed that economic circumstances and social status are best represented as distinct constructs. Compared to the results of Study 1, Study 2 showed a very large difference in model fit between the single and two factor models and the correlation between the two factors was a bit lower ( $r = .79$  in Study 1 vs.  $r = .66$  in Study 2). These findings indicate a greater distinction between social status and economic circumstances when economic circumstances are modeled with more indicators.

**Figure 4.** Nested Model Comparison for Evaluating SES Items as a One or Two Factor Construct for Study 1.



*RQ2: Does self-placement on the MacArthur ladder reflect economic circumstances, social status, or both?*

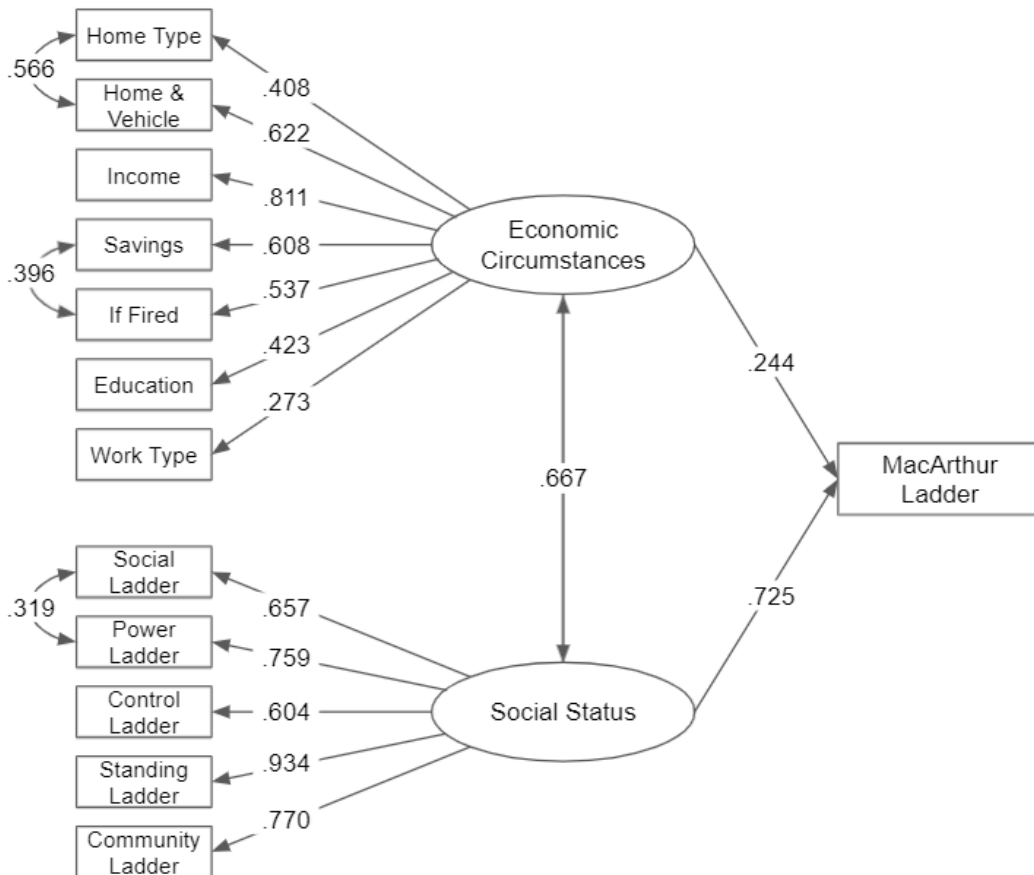
As in Study 1, we simultaneously estimated the association between the social status and economic circumstances latent variables and the MacArthur ladder. Including the previously implemented correlated residuals, the model was a good fit to the data ( $n = 305$ ,  $\chi^2 = 125.03$ ,  $df = 60$ ;  $RMSEA = .06$ ,  $p = .136$ ). Each indicator had a statistically significant association with their respective latent variable (see Figure 5). The economic circumstance and social status latent variables were correlated ( $\beta = .667$ ,  $p < .001$ ).

The analysis indicated that the MacArthur ladder was associated with both the social status latent variable ( $\beta = .725$ ,  $p < .001$ ), and the economic circumstances latent variable ( $\beta = .244$ ,  $p < .001$ ). These results suggest that there are distinct socio- and -economic aspects to subjective socioeconomic status, as measured by the MacArthur ladder. Based on the relative



effect sizes, subjective judgments on the MacArthur ladder have a stronger association with social status relative to economic circumstances.

**Figure 5.** Structural Equation Model: Economic Circumstances and Social Status Predicting the MacArthur Ladder for Study 2.



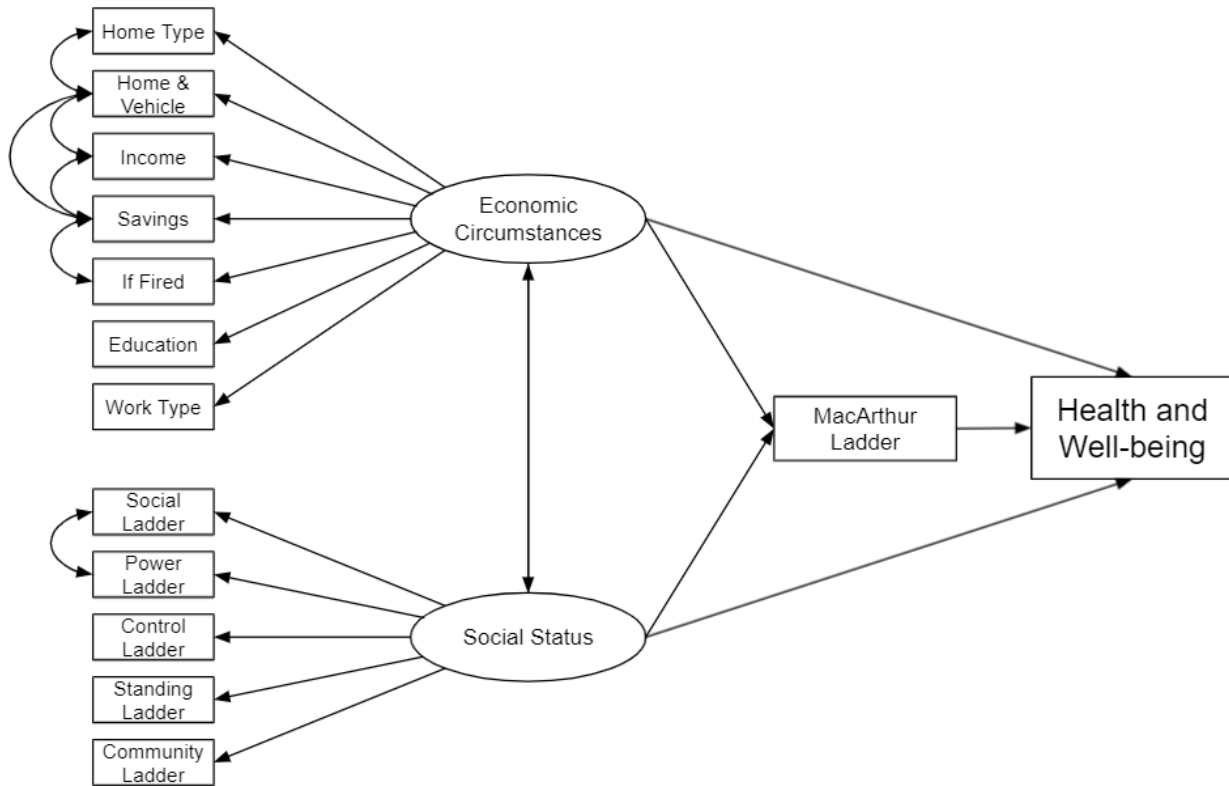
RQ3: *Is the association between the MacArthur ladder and measures of health best explained by economic circumstances, social status, or both?*

As in Study 1, all the health and well-being measures we evaluated had significant zero-order correlations with the MacArthur ladder (see Table 4). We modeled the estimated association between the latent variables (social status and economic circumstances) and each health and well-being measure, both directly and indirectly as mediated by the MacArthur ladder

in a simultaneous regression (see Figure 6). We ran six independent analyses to evaluate our research question for each of the six health and well-being measures of interest: life satisfaction, depression, anxiety, health, chronic illness, and pain. Each of the six models was a good to adequate fit to the data. Like in Study 1, each model revealed that the MacArthur ladder had a statistically significant association with both latent variables representing economic circumstances and social status ( $ps < .001$ ) and the latent variables were correlated ( $ps < .001$ ).

Table 6 shows the direct associations between the MacArthur ladder, economic circumstances, and social status on each health measure as well as the indirect effect of social status and economic circumstances via the MacArthur ladder. In line with Study 1, we found a significant direct effect of the social status latent variable on life satisfaction ( $\beta = .351, p = .009$ ) and self-rated health ( $\beta = .276, p = .047$ ) and no effect on illness and pain, nor did we replicate the significant association between social status and depression or anxiety. Instead, we found a significant direct effect of the economic circumstances latent variable on four out of six of our health and well-being measures (see Table 6): life satisfaction ( $\beta = -.372, p < .001$ ), anxiety ( $\beta = -.243, p = .027$ ), chronic illness ( $\beta = -.266, p = .019$ ), and pain ( $\beta = -.354, p = .002$ ). We found no direct or indirect effects on the depression dependent variable. Given the significant zero-order correlation between depression and the MacArthur ladder (see Table 4), the lack of significance is likely due to splitting the variance among the three predictors. Importantly, the inclusion of the latent variables in the model reduced the association between the MacArthur ladder and the health and well-being measures to non-significance.

**Figure 6.** Conceptual Model for Estimating Simultaneous Direct and Indirect Effects of Economic Circumstances and Social Status on Health and Well-Being Measures for Studies 2 and 3.



**Table 6.** Standardized Direct and Indirect Effects of Economic Circumstances and Social Status on Health and Well-Being Measures for Study 2

	Life satisfaction	Depression	Anxiety	Health	Illness	Pain
N =	305	305	305	305	305	305
Direct effect of Ladder	-0.068	-0.219	-0.013	0.007	0.049	-0.044
Direct effect of Economic Circumstances	.289**	-0.181	-.248*	.198*	-.244*	-0.394***
Direct effect of Social Status	.358**	0.037	-0.174	.286*	-0.091	0.15
Indirect effect of Econ Circumstances via Ladder	-0.017	-0.054	-0.003	0.002	0.012	-0.011
Indirect effect of Social Status via Ladder	-0.05	-0.159	-0.01	0.005	0.036	-0.032
<b>Model Fit Statistics</b>						
Chi-squared	149.93	153.36	171.32	135.1	130.43	142.96
Chi-squared df	70	70	70	70	70	70
RMSEA	0.061	0.062	0.069	0.055	0.053	0.058
RMSEA p-value	0.085	0.062	0.009	0.257	0.339	0.149

Note. \*  $p \leq .05$ , \*\*  $p \leq .01$ , \*\*\*  $p \leq .001$ .

## Study 2: Discussion

Results from Study 2 build on the findings from Study 1. Across both studies, we found evidence for the same three conclusions: 1) We were able to differentiate between social status and economic circumstances. 2) The MacArthur ladder was associated with both constructs. Finally, 3) the SES-health gradient was explainable via social status and economic circumstances. In a simultaneous analysis, social status and economic circumstances latent variables fully explained the relationship between the MacArthur ladder and each dependent variable except depression.

Despite discrepancies between Studies 1 and 2, both studies demonstrate that social status and economic circumstances are distinct constructs. However, the analyses from Study 1 found that the MacArthur ladder was associated with only social status, while Study 2 found that both social status and economic circumstances were associated with the MacArthur ladder. Similarly, in Study 2 (compared to Study 1), economic circumstances played a much more significant role in explaining the relationship between the MacArthur ladder and health and well-being. By expanding our measure of economic circumstances in Study 2, we found that the link between the MacArthur ladder and measures of health is explainable with both social status and economic circumstances.

These findings demonstrate that Study 1 likely underestimated the role of economic circumstances in our analyses. It is important to point out that our underestimation of economic circumstances in Study 1 resulted from following the fairly common approach to measuring economic circumstances via education and income. Our second study has demonstrated that this approach, though convenient, may lead to researchers underestimating the role of economic

circumstances in health and well-being, particularly relative to a subjective measure like the MacArthur ladder.

Studies 1 and 2 were both exploratory in nature. In Study 1, we developed a way of measuring social status that was distinct from common ways of measuring economic circumstances (i.e., education and income). We found evidence that our measure of social status was associated with the MacArthur ladder while economic circumstances were not, and social status (but not economic circumstances) could explain the relationship between the MacArthur ladder and health and well-being. In Study 2, we expanded how we measured economic circumstances and provided evidence that both social status and a more robust measure of economic circumstances are associated with the MacArthur ladder, and both could explain the relationship between the MacArthur ladder and some health and well-being dependent variables. In Study 3, we replicated the methodology used in Study 2 within a larger sample that was more representative of US demographics and would have greater variation in physical and mental health functioning.

### **Study 3: Method**

#### **Participants**

For Study 3, we worked with a team at Qualtrics Panels to gather 800 participants with representation on three dimensions: age, race, and income. They provided a dataset with 813 participants. Following our pre-registered methodology (<https://aspredicted.org/blind.php?x=ij7hc2>), 24 participants were removed for being outliers (Mahalanobis Distance  $p < .001$ ). Thus, the final sample size was 789, though the analyses have sample sizes of 721-722 because participants provided ambiguous write-in answers to questions about housing ( $n = 24$ ) or didn't respond to questions about education ( $n = 11$ ), income ( $n = 20$ ),

and/or home/vehicle value (n = 23). Participants were 49% women with a mean age of 47 ( $SD_{age} = 17$ ,  $Min_{age} = 18$ ,  $Max_{age} = 100$ ). The sample included participants identifying as exclusively non-Hispanic White (n = 475), Black (n = 96), Hispanic (n = 72), Asian (n = 44), or other (n = 34). Thirty-five percent reported being “Very” or “Somewhat” liberal, 31% reported being “Very” or “Somewhat” conservative, and 34% reported being neither. Relative to the sample from Study 2, this sample was more racially and ethnically diverse and had more older participants and more men. The demographic composition of our sample more closely matched the demographics of the U.S. (U.S. Census Bureau, 2019)

## **Socioeconomic Measures**

### ***Economic circumstances***

We used the same measures to estimate participant economic circumstances as those used in Study 2. Participants reported their work status (90% working full time, part time, keeping house, retired, or full-time student; 10% unemployed or looking for work), home status (72% owned homes, 28% rented), and educational attainment (3% less than high school, 26% high school graduates, 14% associate's degree, 31% Bachelor's degree, 27% post-bac degrees). The mean household income was \$79,253 and the median income was \$62,000 (Min = 0, Max = 750,000,  $SD = \$73,076$ ). The mean amount of estimated household savings was \$290,160 and the median amount was \$20,000 (Min = 0, Max = \$10,000,000<sup>2</sup>,  $SD = \$1,010,832$ ). The mean home and vehicle value was \$380,580 and the median amount was \$110,000 (Min = 0, Max = \$10,000,000<sup>2</sup>,  $SD = \$1,102,873$ ). Participants were also asked to estimate how long they could maintain their standard of living if they lost “all current sources of household income”. In

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<sup>2</sup> Analyses were largely unchanged by removing the 83 participants who had savings or home/vehicle values above \$1 million.

response to this question, 14% said less than a month, 20% said 1-2 months, 21% said 3-6 months, 12% said 7-12 months, and 33% said more than a year.

### *Social status measures*

Social status was measured using the same five items as in Studies 1 and 2: the power, control, access to socially influential others, and community and societal standing ladders.

### **Health and Well-Being Measures**

The dependent variables were measured using the same methodology as in Studies 1 and 2: satisfaction with life ( $\alpha = .91$ ), depression ( $\alpha = .87$ ), anxiety ( $\alpha = .93$ ), self-rated health, chronic illness, and pain ( $\alpha = .96$ ).

One goal of attaining a more representative sample in terms of age, race, and income was to investigate our research questions in a sample with more variation in health conditions. Our more representative sample showed more variance in chronic illness compared to the previous samples. In Study 1, 52% of the sample reported no chronic illnesses. 40% of Study 2 participants reported no chronic illnesses, while 30% of participants in Study 3 reported no chronic illnesses.

See Table 2 for descriptive statistics for each outcome variable across all studies.

### **Study 3: Results**

Study 3 is a direct replication of Study 2 in a larger and more representative sample. We again completed the same analyses to provide answers to the three substantive research questions: Can we distinguish economic circumstances from social status? Does self-placement on the MacArthur ladder reflect economic circumstances, social status, or both? Is the association between the MacArthur ladder and measures of health best explained by economic circumstances, social status, or both?

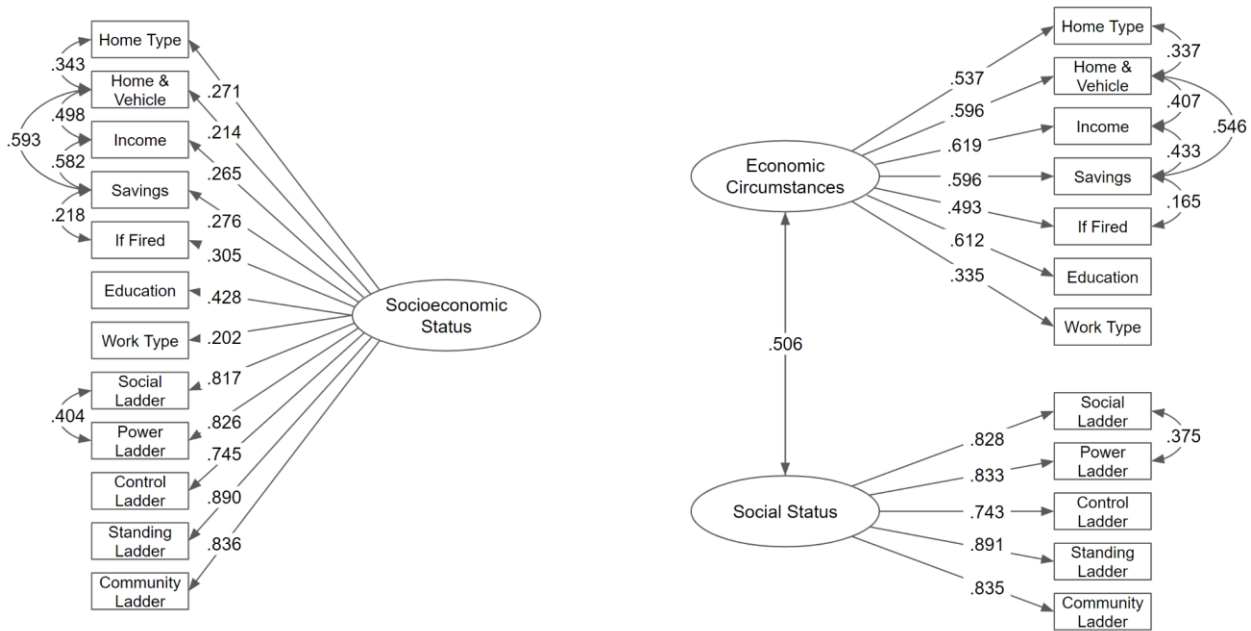
The analyses for our third research question were pre-registered on the Aspredicted.com website. As part of the preregistration, we pre-determined how we would measure our outcomes (i.e. the same as the two previous studies), how we would conduct the analyses (i.e. with the same SEM model we had used in Study 2), and how we deal with outliers (i.e. the previously implemented method). We also pre-registered our sample size of 800.

*RQ1: Do economic circumstance items and social status items reflect a single factor or two factors?*

We took the same nested model comparison approach as in Studies 1 and 2. We maintained the correlated residuals from the two previous studies. Guided by modification indices, we added 3 new correlated residuals between economic circumstances indicators to improve model fit (see Figure 7). The two-factor model fit ( $n = 722$ ,  $\chi^2 = 167.12$ ,  $df = 47$ ;  $RMSEA = .059$ ,  $p = .05$ ) was a statistically significant ( $p < .001$ ) improvement in comparison to the single factor model fit ( $n = 722$ ,  $\chi^2 = 422.87$ ,  $df = 48$ ;  $RMSEA = .104$ ,  $p < .001$ ). Thus, we once again found that economic circumstances and social status are best represented as distinct constructs.



**Figure 7.** Nested Model Comparison for Evaluating SES Items as a One or Two Factor Construct for Study 3.



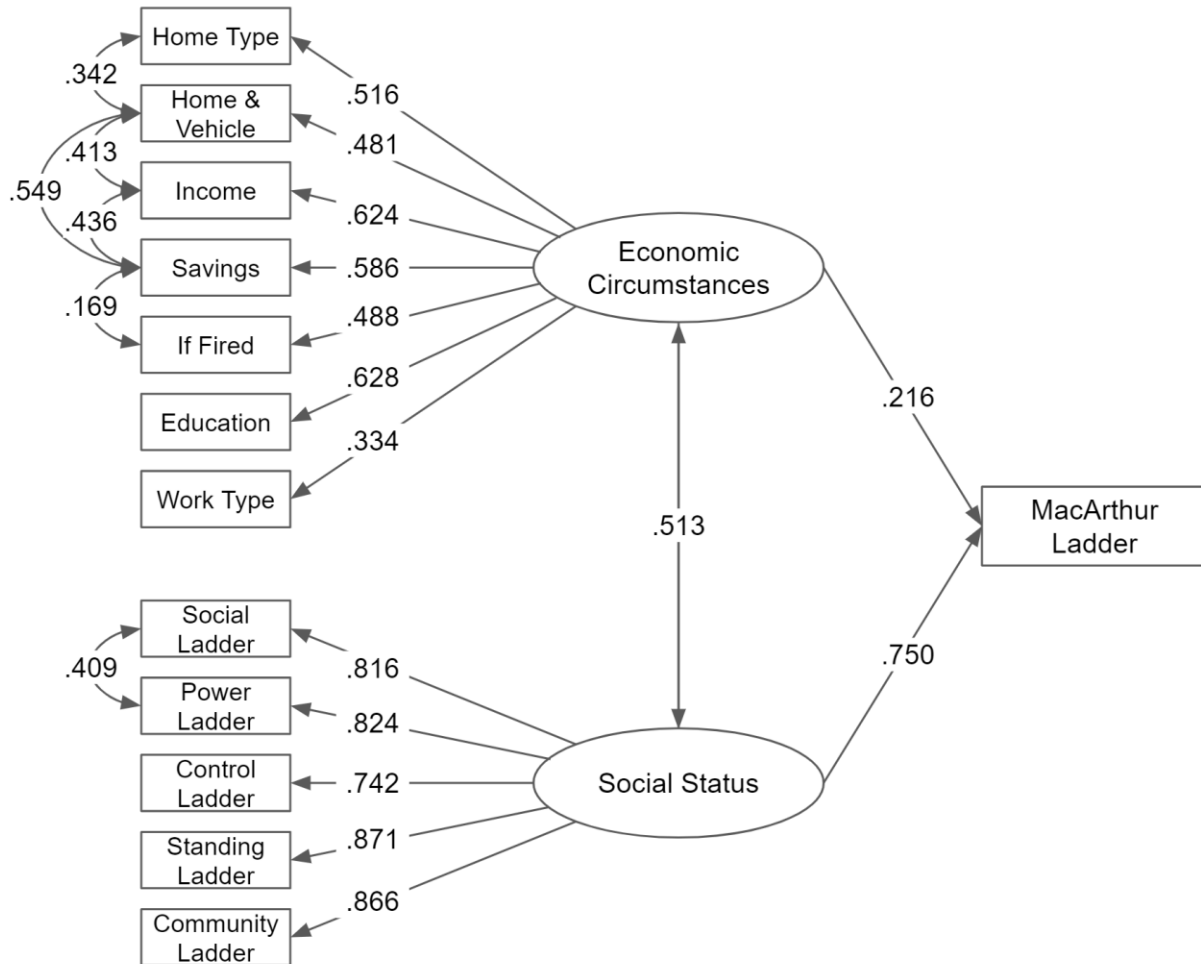
*RQ2: Does self-placement on the MacArthur ladder reflect economic circumstances, social status, or both?*

We predicted MacArthur ladder scores from both the social status and economic circumstances latent variables to test our second research question. Including the previously implemented correlated residuals, the model was an adequate fit to the data ( $n = 722$ ,  $\chi^2 = 223.72$ ,  $df = 57$ ;  $RMSEA = .06$ ,  $p = .005$ ). Each indicator had a statistically significant association with their associated latent variable ( $\beta > .273$ ,  $ps < .001$ ). The economic circumstance and social status latent variables were correlated ( $\beta = .513$ ,  $p < .001$ ), though to a lesser extent than the correlation seen in Studies 1 and 2 ( $\beta = .818$  and  $\beta = .667$  respectively).

The model indicates that variance in the MacArthur ladder is predicted by variance in both the social status latent variable ( $\beta = .750$ ,  $p < .001$ ), and the economic circumstances latent variable ( $\beta = .216$ ,  $p < .001$ ). Thus, responses to the MacArthur ladder are associated with

participants' economic circumstances as well as their perception of their relative power, control, access to influential others, and standing within their community and society. As in Studies 1 and 2, subjective judgments on the MacArthur ladder are more strongly correlated with social status than economic circumstances.

**Figure 8.** Structural Equation Model: Economic Circumstances and Social Status Predicting the MacArthur Ladder for Study 3.



RQ3: *Is the association between the MacArthur ladder and measures of health best explained by economic circumstances, social status, or both?*

We used the same mediation structural equation model from Study 2 (Figure 6), where we modeled the estimated association between the latent variables (social status and economic circumstances) and each health and well-being measure, both directly and indirectly as mediated by the MacArthur ladder in a simultaneous regression. Again, we ran six independent analyses to evaluate our research question for each health/well-being measures of interest: life satisfaction, depression, anxiety, self-rated health, chronic illness, and pain. Each of the six models was an adequate fit to the data. Like in Studies 1 and 2, each model revealed that the MacArthur ladder had a statistically significant association with both latent variables representing economic circumstances and social status ( $ps < .001$ ) and the latent variables were correlated ( $ps < .001$ ).

We found a significant direct effect of the social status latent variable on four of our health/well-being measures: life satisfaction ( $\beta = .529, p < .001$ ), depression ( $\beta = -.177, p = .031$ ), anxiety ( $\beta = -.221, p = .005$ ) and self-rated health ( $\beta = .495, p < .001$ ). All six analyses also revealed statistically significant direct effects of the economic circumstances latent variable on each health and well-being measure (see Table 7): life satisfaction ( $\beta = .267, p < .001$ ), depression ( $\beta = -.375, p < .001$ ), anxiety ( $\beta = -.419, p < .001$ ), self-rated health ( $\beta = .257, p < .001$ ), chronic illness ( $\beta = -.171, p = .004$ ), and pain ( $\beta = -.298, p < .001$ ).

When these direct effects from both latent variables were taken into account, the zero-order correlations between the MacArthur ladder and the health and well-being variables were reduced to non-significance except in the care of self-rated health. Though, importantly, the direct effect of the MacArthur ladder on self-rated health was negative (i.e., opposite of the directionality at the zero-order), a sign of a suppression effect.

**Table 7.** Standardized Direct and Indirect Effects of Economic Circumstances and Social Status on Health and Well-Being Measures for Study 3.

	Life satisfaction	Depression	Anxiety	Health	Illness	Pain
N =	722	722	722	721	721	722
Direct effect of Ladder	-0.148	0.135	0.109	-.176*	0.117	0.041
Direct effect of Economic Circumstances	.267***	-.375***	-.419***	.257***	-.171**	-0.298***
Direct effect of Social Status	.529***	-.177*	-.221**	.495***	-0.132	0.15
Indirect effect of Econ Circumstances via Ladder	-0.032	0.029	0.023	-.039*	0.025	-0.009
Indirect effect of Social Status via Ladder	-0.111	0.102	0.082	-.132*	0.088	-0.031
<b>Model Fit Statistics</b>						
Chi-squared	251.27	285.04	296.54	241.72	248.63	266.92
Chi-squared df	67	67	67	67	67	67
RMSEA	0.062	0.067	0.069	0.06	0.061	0.064
RMSEA p-value	0.009	<0.001	<0.001	0.02	0.011	0.002

*Note.* \*  $p \leq .05$ , \*\*  $p \leq .01$ , \*\*\*  $p \leq .001$ .

### Study 3: Discussion

Results from Study 3 replicated the essential findings from Study 2 in a sample that is representative of the U.S. population in term of race, income, and age. As in both Study 1 and 2, our nested model comparison revealed that indicators of social status and economic circumstances are best modeled as two distinct factors. We replicated the finding that the MacArthur ladder is associated with both social status and economic circumstances, but the association with social status is relatively stronger. Finally, results from Study 2 and 3 revealed that the association between the MacArthur ladder and health/well-being measures is explained by both social status and economic circumstances.

We note that while Study 3 largely replicated the results of Study 2, there were also some discrepancies in the results across studies. Specifically, in Study 2, there were no significant direct effects of social status on depression or anxiety, while these effects were found in Study 3. Similarly, Study 3 revealed a significant direct effect of economic circumstance between the MacArthur ladder and depression, but this effect was not seen in the results of Study 2.

However, the differences found between Study 2 and 3 do not detract from the overall pattern of findings. First, it is notable that the standardized effect sizes and directionality are

generally comparable between studies. This indicates that the additional statistically significant effects found in Study 3 are likely due to increased sample size and not a fundamental difference in the findings. The key findings of Study 2 were that the MacArthur ladder is associated with both social status and economic circumstances, and that both factors are involved in explaining the association between the MacArthur ladder and health and well-being measures. These key findings were replicated in Study 3.

### **General Discussion**

Across three correlational studies (N = 1,310), we investigated the nature of subjective socioeconomic status (as measured by the MacArthur ladder) and the subSES-health gradient. Specifically, we sought to disentangle the social status and economic components of subjective socioeconomic status, and to determine if these two components uniquely explain the subSES-health gradient.

The first step in our investigation was to develop a measure of social status that has no explicit roots in economic circumstances. In Study 1, we explored many potential sources of social status and determined that five facets best represent the social status factor: peoples' relative and subjective judgements of their perceived control over their lives, power in society, access to influential people, and standing within their community and society.

Generally, we found that the concept of subjective SES has likely confounded two distinct concepts: social status and economic circumstances. Both of these factors are associated with one's perception of their subjective SES, yet across all three studies responses to the MacArthur ladder seem to be more strongly related to one's perceived social status and to a lesser extent by their objectively measurable economic circumstances. We were also able to differentially predict health and well-being measures using social status and economic

circumstances and these relations explained the association between the MacArthur ladder and health and well-being. This indicates that the subSES-health gradient is contributed to by both social status and economic circumstances and that neither one alone fully explains the phenomenon.

Subjective SES (as measured by the MacArthur ladder) has become a focal and widely used concept across a wide variety of research areas including economic inequality (Sánchez-Rodríguez, et al. 2019), physical health (Cundiff & Matthews, 2017), mental health (Scott, et al., 2014), health disparities (Wolff, et al., 2010), aggression (Greitemeyer & Sagioglou, 2018), smoking (Reitzel, et al., 2014), and more. Part of the surge in research focused on subjective SES is that it is a theoretically interesting single item measure with powerful predictive utility. The current paper provides one possible explanation for why this measure is so predictive: it is tapping into two important constructs, namely relative social status and economic circumstances, at once. From a measurement perspective this also means that the MacArthur ladder is confounded. Our work demonstrates that--at least in the health context--when the MacArthur ladder successfully predicts an outcome, there is ambiguity about why. The predictive value of the MacArthur ladder might be explainable because it is measuring social status, economic circumstances, or some combination of the two.

This ambiguity sheds light on the two interesting findings in the literature noted at the beginning of this paper: The MacArthur ladder has a surprisingly low correlation with objective SES measures ( $r \sim .4$ ; Adler et al., 2000), and the MacArthur ladder is often a stronger predictor of health outcomes than objective SES indicators (Singh-Manoux, Marmot & Adler, 2005). Our findings suggest that objective indicators of SES only tell part of the story of hierarchy and how hierarchy influences our health. Subjective SES measures, like the MacArthur ladder, provide a

richer idea of someone's position in the social *and* economic hierarchy. For this reason, is it not perfectly correlated with objective SES (that only focuses on the economic hierarchy) and it is a better predictor of health because health is influenced by one's position within both a social and economic hierarchy. This is somewhat distinct from the views of others (Tan, et al. 2020) who propose that subjective SES reflects one's economic circumstances and an evaluative judgement about those economic circumstances.

When investigating how subSES relates to an outcome, researchers could gain clarity by disambiguating subSES into its component parts, social status and economic circumstances. In the current paper, we identified items that successfully measured each construct. While trading the single-item MacArthur ladder for the 12 items we used to measure social status and economic circumstances slightly increases the length of surveys, it provides greater clarity on the role of separate factors contributing to the health gradient.

### **Limitations and Future Directions**

The primary limitation of the current paper is that the design is cross-sectional, and the analyses are correlational. For this reason, we cannot draw any conclusions about the causal relations between any of the variables based on the current data. This limitation can be overcome by future experimental or longitudinal research designed to explore causal mechanisms. For example, our work suggests that experimental manipulations of subjective SES could be designed to target self-perceptions of social status as well as self-perceptions of economic circumstances. Researchers who study the role of physiological stress in the SES-health gradient can determine if this stress emerges because of relative deprivation of social status or economic circumstances.

Another limitation of the current paper is that the results could be influenced by our similar approach in measuring social status, the MacArthur ladder, and some of the outcomes. Part of the reason for the high correlation between the social status ladders and the MacArthur ladder could be shared method variance. That is to say, that all of the measures used a ladder where participants made subjective judgements about their relative status. Of course, shared method variance is not the whole story, as evidenced by analyses in Appendix 1 that revealed very little predictive value to a different set of ladder-based subjective and relative status indicators in Study 1. A similar concern could be that the estimated association between social status items and subjective outcomes, like self-rated health and satisfaction with life, could be inflated because these measures are all subjective. However, subjectivity is inherent to some of the measures we are investigating. Life-satisfaction and pain necessarily include subjectivity, yet these subjective experiences are enormously important (Erdogan, 2012; Gerbershagen, 2002). Nevertheless, future research can incorporate more non-subjective measures of health and well-being such as biological indicators and diagnoses from medical records.

A final limitation of the current paper is about when and where the data were gathered. Since the data were gathered in the US, we cannot be sure how our findings would apply to other countries. Also, we gathered some of the data during a tumultuous time in society. Data for Study 1 were gathered in late November 2019 and data for Study 2 in early February 2020. The World Health Organization (2020) reported over 1 million cases of COVID-19 on April 4th, 2020. Over the next year, many people's economic circumstances drastically shifted and accordingly we delayed Study 3 until late March 2021. It is difficult to know how the global pandemic influenced social status, economic circumstances, and the link they have with subjective SES, health and well-being. While this may raise concerns about the generalizability



of our Study 3 data, it is reassuring that the results are relatively consistent across all three studies.

## **Conclusion**

Socioeconomic status is a fundamental aspect of life that shapes one's experiences, identity, and important life outcomes. A growing body of research using the MacArthur ladder suggests that subjective SES may play an important role in explaining the effects of SES, especially for health outcomes. The studies presented in this article provide support for the contention that subjective SES is a "higher order" concept composed of two distinct concepts: social status and economic circumstances. Furthermore, social status and economic circumstances make differential contributions to the SES-health gradient. We suggest researchers who focus on socioeconomic status, particularly subjective SES, keep in mind the confounded nature of this construct. The current paper also offers a methodological approach to differentiating subjective social status from objective measures of economic circumstances.

## APPENDIX 1: STUDY 1 ANALYSES AND RESULTS INCLUDING THE SOCIAL STATUS LATENT VARIABLE

The factor analysis in Study 1 revealed 2 factors: Factor 1, social status, and factor 2, social identity status (composed of the sexuality and race ladder measures). The analyses found in the main paper do not include this second factor. However, as Study 1 was exploratory, we did attempt to use both social status and social identity status in our analyses. This led us to use a three-factor model; but these analyses did not reveal any predictive utility to the social identity status items, so we dropped them from our primary analysis. The results of our analyses that include social identity status are included below in this appendix.

*RQ1: Do economic circumstance items, social status items, and social identity items reflect a single factor, two factors, or three factors?*

To address this question, three structural equation models were created. In one model, 3 latent variables were allowed to covary: a 5-item social status latent variable, a 2 item economic circumstances latent variable, and a 2 item social identity status latent variable (i.e., sexuality and race ladders). In another model, 2 latent variables were allowed to covary: a 7-item status latent variable comprised of both social and social identity status and a 2 item economic circumstances latent variable. We also made some needed improvements to the model fit by correlating the residuals between the social and power ladders; a model addition guided by modification indexes, but also consistent with theoretical expectations that power and social influence are strongly linked (Raven, 1964). Since the three models we created were nested, we used a chi-squared difference test to determine if the higher models demonstrated a statistically significant improvement of model fit in comparison to the lower models (Wan, 2002). The two-factor model fit ( $n = 284$ ,  $\chi^2 = 78.74$ ,  $df = 25$ ;  $RMSEA = .087$ ,  $p = .003$ ) was a statistically significant ( $p = .03$ ) improvement in comparison to the single factor model fit ( $n = 284$ ,  $\chi^2 = 83.34$ ,  $df = 26$ ;  $RMSEA =$

.088,  $p = .002$ ). But the three-factor model fit ( $n = 284$ ,  $\chi^2 = 41.17$ ,  $df = 23$ ;  $RMSEA = .053$ ,  $p = .400$ ) was a statistically significant ( $p < .001$ ) improvement in comparison to the two-factor model fit. In other words, within our data, economic circumstances (as represented by income and education level), social status (as measured by the 5 ladder items), and social identity status (as measured by 2 ladder items) are best represented as 3 distinct constructs.

*RQ2: Does self-placement on the MacArthur ladder reflect economic circumstances, social status, social identity status, or some combination of the three (or none)?*

To answer the second research question, we used a 3-factor model to predict scores on the MacArthur ladder from the two latent variables. This model was a good fit to the data ( $n = 284$ ,  $\chi^2 = 52.09$ ,  $df = 29$ ;  $RMSEA = .053$ ,  $p = .39$ ). Each indicator was significantly predicted by their associated latent variable. There were also statistically significant correlations between the three latent variables ( $r > .28$ ,  $ps \leq .01$ ).

The model indicates that variance in the MacArthur ladder is predicted by variance in the social status latent variable ( $\beta = .690$ ,  $p < .001$ ), but not the economic circumstances latent variable ( $\beta = .290$ ,  $p = .068$ ) nor the social identity status variable ( $\beta = -.093$ ,  $p = .085$ ).

*RQ3: Is the association between the MacArthur ladder and measures of health best explained by economic circumstances, social status, social identity status, or some combination of the three (or none)?*

Using the model (see Figure 6) in the main text, we modeled the estimated association between the latent variables (social status and economic circumstances) and each health and well-being measure, both directly and indirectly as mediated by the MacArthur ladder. Using this

approach, we could evaluate whether the latent variables could fully account for the relationship between the MacArthur ladder and the outcomes.

Each outcome was evaluated in independent models, thus, we used six models with the same predictors and mediators but with different health and well-being outcomes. Each model was a good-to-adequate fit to the data. In all models, social identity status was not predictive of any of the health and well-being variables nor was it predictive of the MacArthur ladder.

**Appendix Table 1.** Standardized Direct and Indirect Effects of Economic Circumstances, Social Status, and Social Identity Status on Health and Well-Being Measures for Study 1.

	Life satisfaction	Depression	Anxiety	Health	Illness	Pain
N =	235	239	238	284	283	284
Direct effect of Ladder	-0.506**	0.29	0.185	-0.299	-0.016	0.13
Direct effect of Economic Circumstances	0.27	-0.264	0.023	0.193	0.001	-0.555
Direct effect of Social Status	.878***	-.469*	-.695**	0.538**	-0.171	0.187
Direct effect of Social Identity Status	-0.097	0.047	0.022	-0.011	-0.066	-0.146
Indirect effect of Econ Circumstances via Ladder	0.058	-0.114	0.005	0.055	0	-0.159
Indirect effect of Social Status via Ladder	.662**	-0.269	-.542*	0.374*	-0.116	0.13
Indirect effect of Social Identity Status via Ladder	0.007	-0.005	-0.002	0.001	0.006	0.014
<b>Model Fit Statistics</b>						
Chi-squared	81.82	77.1	66.22	62.65	58.24	64.28
Chi-squared df	35	35	35	35	35	35
RMSEA	0.075	0.071	0.061	0.053	0.048	0.054
RMSEA p-value	0.026	0.054	0.194	0.39	0.52	0.033

*Note.* \*  $p \leq .05$ , \*\*  $p \leq .01$ , \*\*\*  $p \leq .001$ .

## APPENDIX 2: SOCIAL STATUS LADDER MEASURES

Below are the ladder measures used in Study 1. The first five ladders are those used across all three studies that were used as indicators of the social status latent variable for all analyses.

**Think of this ladder as representing where people stand in their communities.**

People define community in different ways; please define it in whatever way is most meaningful to you. At the top of the ladder are the people who **have the highest standing in their community**. At the bottom are the people **with the lowest standing in their community**.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand at this time in your life, relative to other people in your community.



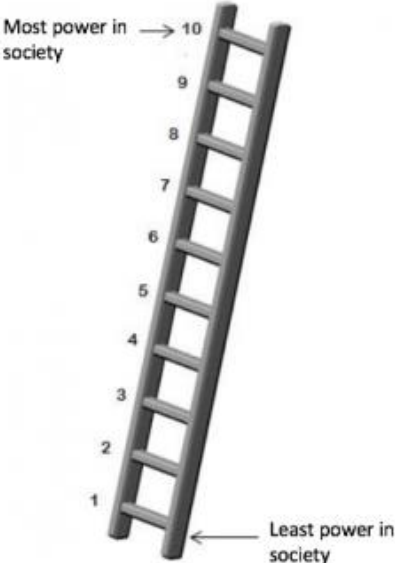
- 1      2      3      4      5      6      7      8      9      10

Think of this ladder as representing where people stand in the United States, **based on how much power they have.**

At the top of the ladder are the people **who have the most power in society.** At the bottom of the ladder are the people **who have the least power in society.** The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



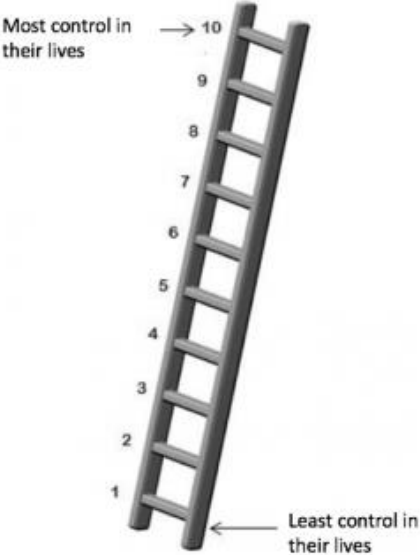
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Think of this ladder as representing where people stand in the United States, **based on how much control they have.**

At the top of the ladder are the people who **have the most control in their lives.** At the bottom of the ladder are the people who **have the least control in their lives.** The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

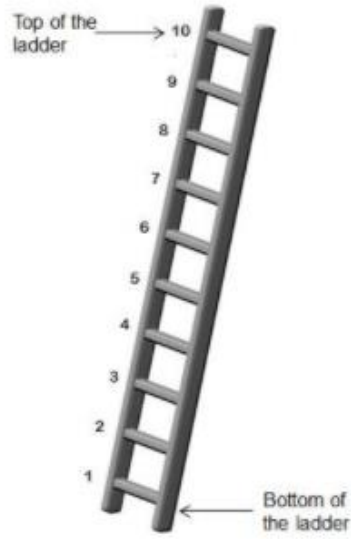
Click the number of the rung where you think you stand relative to others in the United States.



1      2      3      4      5      6      7      8      9      10

Think of this ladder as representing where people stand in society.

Please mark where you think you are on this ladder.



1	2	3	4	5	6	7	8	9	10
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

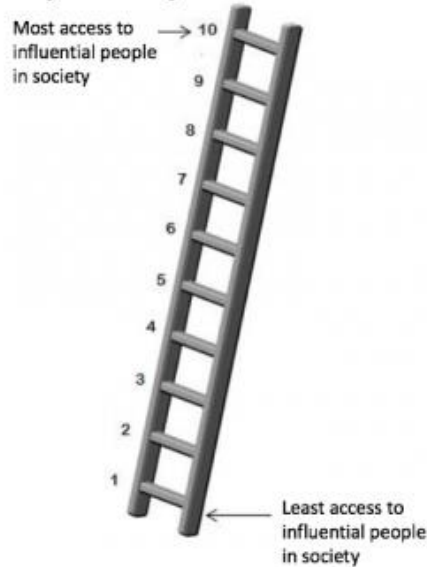


Think of this ladder as representing where people stand in the United States, **based on how much access they have to influential people.**

At the top of the ladder are the people who **have the most access to influential people in society.** At the bottom of the ladder are the people who **have the least access to influential people in society.** The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



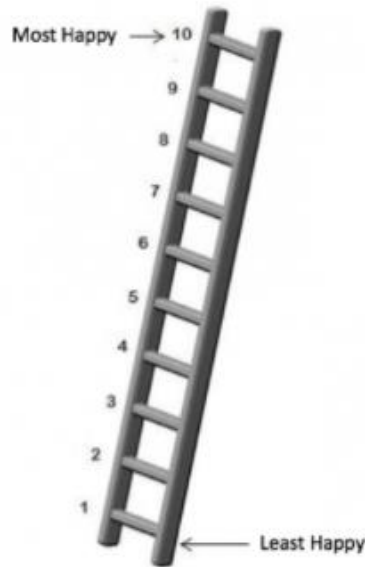
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Think of this ladder as representing where people stand in the United States, **based on their happiness.**

At the top of the ladder are the people **who are the happiest**. At the bottom of the ladder are the people **who are the least happy**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



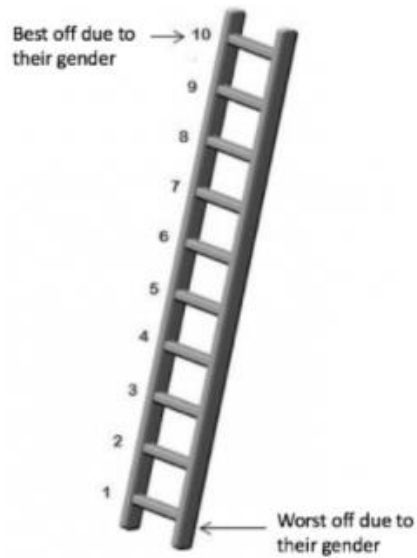
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○      ○      ○      ○      ○      ○      ○      ○      ○      ○

Think of this ladder as representing where people stand in the United States, **based on their gender**.

At the top of the ladder are the people **who are the best off due to their gender**. At the bottom of the ladder are the people **who are the worst off due to their gender**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



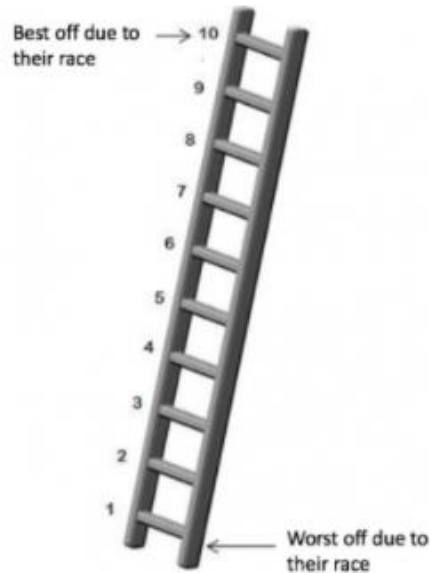
- 1      2      3      4      5      6      7      8      9      10

Think of this ladder as representing where people stand in the United States, **based on their race**.

At the top of the ladder are the people **who are the best off due to their race**. At the bottom of the ladder are the people **who are the worst off due to their race**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



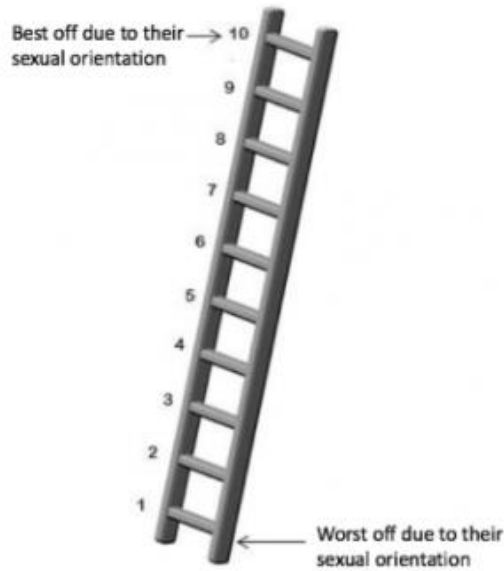
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○      ○      ○      ○      ○      ○      ○      ○      ○      ○

Think of this ladder as representing where people stand in the United States, **based on their sexual orientation**.

At the top of the ladder are the people **who are the best off due to their sexual orientation**. At the bottom of the ladder are the people **who are the worst off due to their sexual orientation**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



1      2      3      4      5      6      7      8      9      10

Think of this ladder as representing where people stand in the United States, **based on their age**.

At the top of the ladder are the people **who are best off due to their age**. At the bottom of the ladder are the people **who are the worst off due to their age**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



1      2      3      4      5      6      7      8      9      10

Think of this ladder as representing where people stand in the United States, **based on their income**.

At the top of the ladder are the people **who have the highest income**. At the bottom of the ladder are the people **who have the lowest or no income**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



- 1      2      3      4      5      6      7      8      9      10

Think of this ladder as representing where people stand in the United States, **based on their education**.

At the top of the ladder are the people **who are the most educated**. At the bottom of the ladder are the people **who are the least educated**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



- 1      2      3      4      5      6      7      8      9      10
-



Think of this ladder as representing where people stand in the United States, **based on how respected their jobs are.**

At the top of the ladder are the people **who have the most respected jobs.** At the bottom of the ladder are the people **who have the least respected jobs or no jobs.** The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



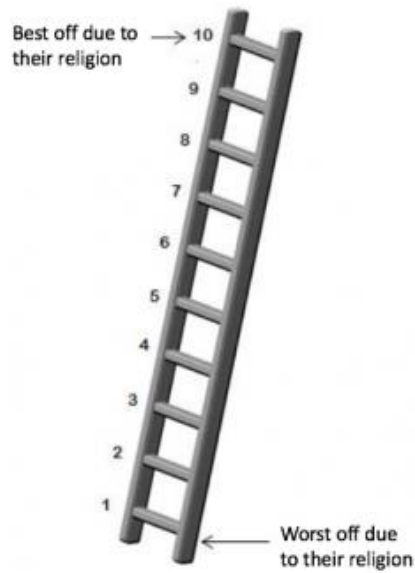
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Think of this ladder as representing where people stand in the United States, **based on their religion**.

At the top of the ladder are the people **who are the best off due to their religion**. At the bottom of the ladder are the people **who are the worst off due to their religion**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



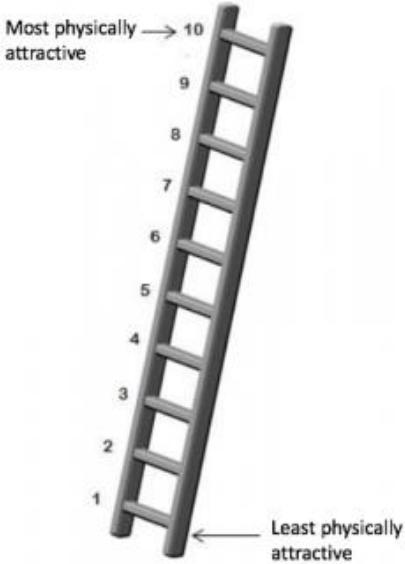
- 1      2      3      4      5      6      7      8      9      10

Think of this ladder as representing where people stand in the United States, **based on their physical attractiveness.**

At the top of the ladder are the people **who are the most physically attractive.** At the bottom of the ladder are the people **who are the least physically attractive.** The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



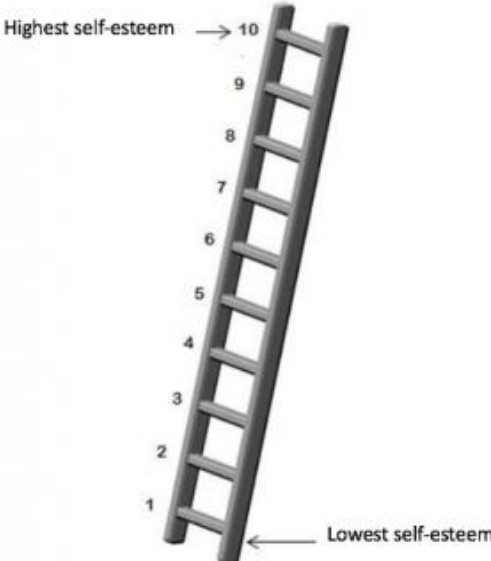
1      2      3      4      5      6      7      8      9      10

Think of this ladder as representing where people stand in the United States, **based on self-esteem**.

At the top of the ladder are the people who **have the highest self-esteem**. At the bottom of the ladder are the people who **have the lowest self-esteem**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



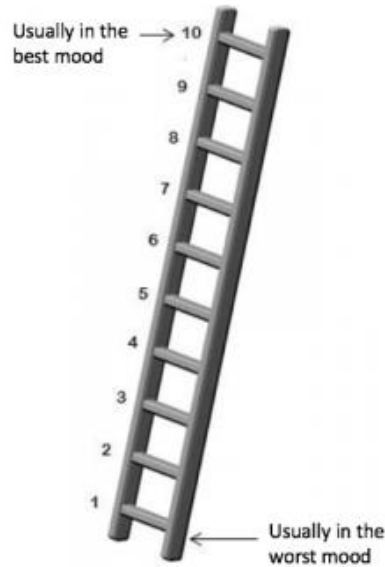
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○      ○      ○      ○      ○      ○      ○      ○      ○      ○

Think of this ladder as representing where people stand in the United States, **based on mood**.

At the top of the ladder are the people **who are usually in the best mood**. At the bottom of the ladder are the people **who are usually in the worst mood**. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



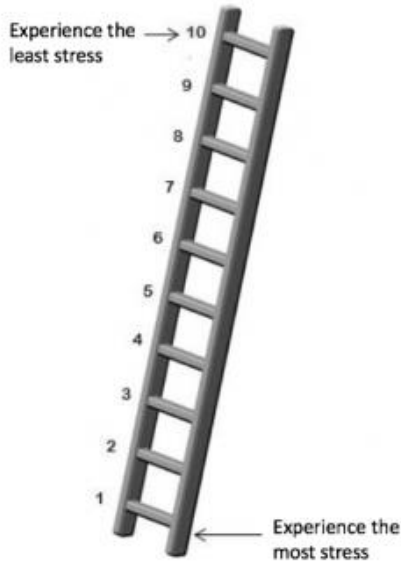
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Think of this ladder as representing where people stand in the United States, **based on how much stress they experience.**

At the top of the ladder are the **people who experience the least stress.** At the bottom of the ladder are the people **who experience the most stress.** The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



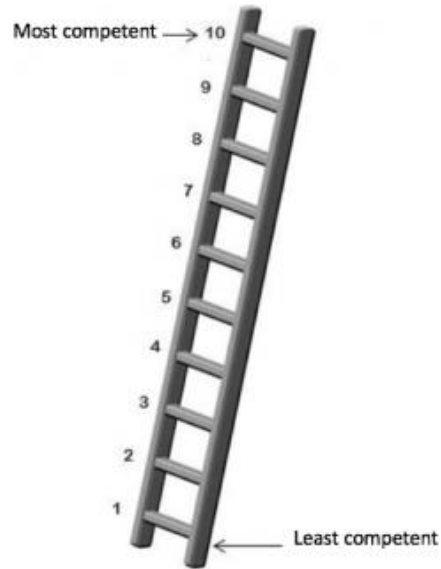
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○      ○      ○      ○      ○      ○      ○      ○      ○      ○

Think of this ladder as representing where people stand in the United States, **based on how competent they are.**

At the top of the ladder are the people **who are the most competent.** At the bottom of the ladder are the people **who are the least competent.** The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

**Where would you place yourself on this ladder?**

Click the number of the rung where you think you stand relative to others in the United States.



- 1      2      3      4      5      6      7      8      9      10

### APPENDIX 3: SOCIAL STATUS LADDER DESCRIPTIVE STATISTICS

**Appendix Table 2.** Descriptive Statistics for the Social Status Ladder Measures Used in Studies 1, 2, & 3.

Variable	Study 1					Study 2					Study 3				
	N	Mean	SD	Median	Skewness	N	Mean	SD	Median	Skewness	N	Mean	SD	Median	Skewness
Social Ladder	284	3.88	2.2	4	0.52	315	3.175	2	3	0.6	787	5.28	2.6	5	0.03
Power Ladder	284	4.11	2	4	0.28	315	4.03	1.8	4	0.26	789	5.21	2.6	5	0.08
Control Ladder	284	5.94	2.2	6	-0.33	315	5.61	2.1	6	-0.19	789	6.44	2.3	7	-0.5
Standing Ladder	284	5.22	1.6	5	-0.2	315	5.06	1.7	5	-0.09	788	6.06	2.2	6	-0.24
Community Ladder	284	5.01	1.8	5	-0.14	315	4.96	1.9	5	-0.07	788	5.96	2.3	6	-0.16



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