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Valuing health in a racially and ethnically diverse community sample: an analysis using the valuation metrics of money and time

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Abstract

Purpose—Limited research in health valuation analyzes samples with high proportions of racial/ethnic minorities within the United States. The primary objective was to explore patterns of health valuation across race/ethnicity using the Collaborative Psychiatric Epidemiology Surveys. A secondary objective was to analyze whether mental health disorder and immigrant status were associated with these estimates.

Methods—Health valuation questions using different metrics (time and money) were analyzed. Ordered logit models stratified across poor and moderate health tested differences by race/ethnicity, with mental health disorder and immigrant status as covariates.

Results—Asians in moderate health and Latinos were willing to pay more for health than non-Latino whites. Asians in moderate health were willing to trade more time for health. Latinos in poor health were less willing to trade time and gave disproportionate zero-trade responses. Lifetime history of anxiety disorder was positively associated with both metrics. Immigrant status confounded money valuation for Asians in moderate health, and time valuation for Latinos in poor health.

Conclusions—Health valuation estimates vary across race/ethnicity depending upon the metric. Time valuation scenarios appear less feasible for Latinos in poor health. More research is necessary to understand these differences and the role of immigrant status in health valuation.

Keywords

Health valuation; Utilities; Racial/ethnic minorities; Mental health

Introduction

The value that individuals hold for subjective health states is an important component of the cost-benefit and cost-effectiveness analyses used to guide decision making in health care. However, little research on differences in valuation estimates has been conducted using samples with high proportions of racial/ethnic minorities and immigrant populations within the United States. Many cost-effectiveness studies incorporate values that have been determined using non-Latino white samples [1], and comparisons of health valuation estimates by race and ethnicity have yielded inconsistent findings [2–6].

Given that estimates of health valuation also vary depending upon the measures used [7], it can be difficult to draw conclusions about differences due to race/ethnicity independent of the measurement strategies employed. Health valuation estimates are generated using different metrics to represent a change in health status. For example, money is used in willingness to pay studies for cost-benefit analyses, whereas time or life-years are used in time trade-off and standard gamble studies in cost-effectiveness and cost-utility analyses [8, 9].

Recent cross-cultural work using the EQ-5D [10] has found wide cultural differences in valuation of different disability states, both between the United States and the United Kingdom [11] and between the United Kingdom and Spain [12]. Differences between the United States and the United Kingdom have been hypothesized to be due in part to the high proportion of Latino immigrants in the United States [11]. EQ-5D scores have been found to vary across racial/ethnic groups in the United States [5], although findings are not stratified by immigrant status. Given the increasing number of immigrants in the United States [13–15], understanding how valuation metrics work to represent health states in these populations is critical to inform design of utility studies in health care decision making and to interpret their findings. Differences across culture and race/ethnicity groups may be due to actual differences in how they value the health state, or alternately due to how diverse groups interpret the metric used to estimate the health value. For example, the value of time may vary across cultures, and some groups may systematically find it more difficult to sacrifice time for an improved health state [5].

Other health factors may also be associated with health valuation using these metrics. Few studies using community samples have considered the effect that co-occurring mental health disorders may have on the valuation process, despite high levels of disorder in those with co-occurring chronic illness [16]. Most health valuation studies have been conducted using clinical samples with current disorder [17–22]. Within clinical samples, small studies have assessed that patients with non-psychotic mental health disorders can conceptualize health improvements effectively using a range of utility measurement techniques [23, 24]. The few studies that have studied valuation in community samples for individuals with mental health disorder have found lower utility values for those with depression and anxiety disorders [25–27].

The *primary* objectives of this study are twofold. First, we analyze whether health valuation patterns vary across race and ethnicity, using the Collaborative Psychiatric Epidemiology

Surveys (CPES) which include two similarly constructed health valuation questions—one using money as the valuation metric and one using time. Secondly, we observe whether these racial/ethnic patterns of valuation differ across these two metrics. If the health valuation patterns vary across racial/ethnic groups and yet the patterns are similar regardless of the metric used, we can conclude that differences in valuation are likely due to race/ethnicity. However, if these racial/ethnic patterns also vary across the scenarios, differences in valuation could be due to racial/ethnic differences in the value placed on the particular metric. Our *secondary* objective is to assess the impact of lifetime history of mental health disorder and immigrant status on patterns of valuation. Consistent with previous work, we expect lifetime history of mental health disorder will be correlated with willingness to pay more money and trade more time for health. We have no expectation for how immigrant status will affect patterns of health valuation because we are aware of no previous study that considers this factor. Our analyses provide some of the first information regarding valuation patterns in a diverse community sample with a robust sample of immigrants where all have been assessed for mental health disorders.

Methods

Data source

The CPES [28] dataset combined information from the National Latino and Asian American Study (NLAAS) [28] and the National Comorbidity Survey Replication (NCS-R) [29], two national surveys that assessed psychiatric disorders and service use. The NLAAS was a nationally representative household sample of Latino and Asian Americans conducted in 2002–2003. NLAAS interviews were conducted in English, Spanish, Chinese, Tagalog and Vietnamese, based on the respondents' language preferences. The weighted response rates for the NLAAS samples were as follows: 73.2% for the total sample; 75.5% for the Latino sample; and 65.6% for the Asian sample [30]. The NCS-R was administered from February 2001 through April 2003, with a response rate of 70.9%. Eligible respondents were English-speaking, non-institutionalized adults ages 18 or older living in civilian housing in the coterminous United States. All inferential procedures accounted for the complex survey design and were conducted using Stata statistical software version 10.1. The NCS-R was administered in two parts: Part I that included the core diagnostic assessments was administered to all respondents, and a subset of Part I respondents completed Part II of the survey that included additional questions addressing service use, consequences, and correlates of psychiatric illness. For this analysis, we included the Asians and Latinos from the NLAAS, and the non-Latino whites from the NCS-R.

Dependent variable

Our dependent variables were two health valuation questions that asked (1) how much money respondents would trade, and (2) how many days of disability respondents would trade for perfect health. These valuation questions were asked identically and in the same order within parallel sections of the NCS-R and the NLAAS. Respondents described their overall physical and mental health in the last 30 days on a scale between 0 (worst) and 100 (best). Respondents who rated their overall health less than 90 screened into the health valuation questions. The money question used a staged bidding game where respondents were asked whether they would pay \$100 to increase health from the rating they assigned in the previous question (a value between 0 and 89) to perfect health for 30 days. Those willing to pay \$100 were subsequently asked whether they would pay \$500. Those not willing to pay \$100 were asked whether they would pay \$50. This bidding game resulted in four categories of money valuation: 0 to <\$50, \$50 to <\$100, \$100 to <\$500, and \$500 or more.

The time valuation bidding game used time instead of money as the valuation commodity. Respondents were asked whether they would take a free treatment that would move them from their current health status value (between 0 and 89) to perfect health. To get the treatment, they could not get out of bed and do things for 3 days, but after that would have perfect health for the rest of the month. Those who were willing were then asked whether they would trade 7 days, while those who were not were asked whether they would trade 1 day. The bidding game resulted in four categories: no days, 1 or 2 days, 3–6 days, or 7 days or more.

Independent variables

Our primary explanatory variable was race/ethnicity (non-Latino white, Latino or Asian)—adjusted for age and gender. Sociodemographic characteristics included marital status, household income, education, having private medical insurance, and immigrant status. We also included measures for any 12-month chronic illness to account for existing health conditions. Measures for any lifetime mental disorder included any depressive disorder (major depressive disorder or dysthymia), any anxiety disorder (agoraphobia, social phobia, generalized anxiety disorder, posttraumatic stress disorder or panic disorder) and any substance use disorder (drug abuse, drug dependence, alcohol abuse, alcohol dependence). Prevalence of psychiatric disorders was evaluated using the diagnostic interview of the World Mental Health Survey Initiative version of the WMH-CIDI [31], a fully structured diagnostic instrument based on criteria of the Diagnostic and Statistical Manual of Mental Disorders, Version 4 (DSM-IV).

Statistical analyses

To assess our primary study objective, we conducted bivariate analyses to determine differences in health valuation patterns. Within each racial/ethnic group, respondents who screened into the valuation questions were compared to those who did not to assess differences. Significance was evaluated with a Rao-Scott statistic for the Pearson chi-square test for contingency tables. For those who screened into the valuation questions, Pearson chi-squares tested age- and gender-adjusted differences across groups in responses to both the money and time questions. The age and gender adjustment was accomplished prior to the bivariate analyses by matching the survey weight to the US Census 2000 age and gender population distribution. Because only 6.39% of the sample chose \$50 to less than \$100 for the money valuation question, we combined them with the 22.77% who chose less than \$50 into a single category.

Next, to assess the second part of our primary objective, we analyzed whether patterns by race and ethnicity were consistent across valuation metrics. Depending upon the initial health status rating, the valuation exercise represented a larger distance from current health to perfect health for those in poor health compared to those in moderate health. Hence, we modeled the relationship with money and time across stratified health scale categories (poor and moderate), where the respondents within each category were faced with roughly similar health improvements to value.

To pool the NLAAS and NCS-R samples and split respondents into poor and moderate categories, we first made the represented proportions of non-Latino whites, Latinos and Asians equal across groups to ensure that the larger non-Latino white sample values were not over-weighted in the splitting process. So, for example, given two Latino respondents who valued their health at 20 and 30, and a non-Latino white sample of 5 respondents with health scale values of 10, 40, 50, 60, and 70, combining these simple unadjusted samples would result in the Latino who scores a 30 being grouped in the poor health category (the lower 33% of the sample) even though within the sample of 2 Latino respondents, he

represents a higher health category. Hence, to combine the groups in such a way that the poor and moderate categories would accurately reflect the value of the Latino and Asians' health status in the combined sample, we adjusted the weights within the racial/ethnic categories. In the above example, increasing the weights of the Latino values would ensure that in the combined sample, the Latino who scored 30 would group in the moderate health scale group (greater than 33% of the sample). Following adjustments, the only differences between the original and adjusted values were at the margins, and the cut point of 33% yielded the same sample distribution across the groups (data not shown).

For each racial/ethnic group, bivariate analyses adjusted for age and gender were run for the money and time valuations for poor and moderate health categories (using a cut point of 33%). Multivariate analyses using ordered logistic regression were used to test whether the money and time valuation patterns in the bivariate models remained significant when controlling for other potential confounders. We ran three staged models, stratified across poor and moderate health status to fully interact health status with all variables in the models. In Model 1, we entered race/ethnicity, controlling for age and gender. In Model 2, we included all covariates except immigrant status. To address our secondary analytic objective, we included a history of depression, anxiety or substance use disorder as explanatory variables, to test whether mental health disorder was positively associated with higher willingness to pay money or trade time for health. To assess the influence of immigrant status, we included this single variable in Model 3 to observe whether patterns of valuation shifted across race/ethnicity and whether these shifts were consistent across metrics.

A potential for bias exists as the money and time valuations reference a subjective anchoring valuation of current health between 0 and 89. If this valuation is biased (e.g., if Latinos systematically give themselves a lower health rating than whites regardless of objective health status differences), then the health valuation anchoring scores and subsequent health values relative to this score will not have the same meanings across the groups. Hence, we ran sensitivity analyses to test whether our findings could be due to differences in patterns in the initial rating question. Instead of taking the initial health scale score and adjusting the weights by race and ethnicity for the total sample, as described above, here we treated each racial/ethnic group separately. We first converted the health scale scores to the percentile scores within that racial/ethnic group. So, for example, if someone scored themselves at 30, but half the respondents in that racial/ethnic group scored themselves lower than 30, the value for that respondent would be equal to 50%. Then, we combined percentage values of the three independent samples into a combined sample. Finally, the sample was cut at the half-point for the poor and moderate categories, and regressions were run with these definitions to test robustness of findings.

Results

A majority (56.79%) of the sample rated their physical and mental health as 90 or greater, screening out of the valuation questions. There were significant differences in the proportions who screened into the valuation questions across race and ethnicity, with 44.65% of non-Latino whites rating their health less than 90 compared to 36.02% of Latinos ($P<0.001$) and 34.42% of Asians ($P<0.001$) (Table 1). Proportions that screened into the valuation questions by sociodemographic and health characteristics were as expected for all racial ethnic groups. Lower proportions of 18–34 year olds, higher proportions of respondents 65 years or older, and higher proportions of widowed, separated or divorced rated their health less than 90. Higher proportions of those with any 12-month mental health disorder screened into the valuation questions. Greater proportions of non-Latino white respondents in lower income and education groups rated their health less than 90. For

Latinos and Asians, the differences in these SES categories were more uniform and not significant.

Bivariate analyses for both metrics (Table 2) that did not control for differences in health status between the racial/ethnic groups yielded significant differences. The analyses show that 51.83% of Latinos and 42.15% of Asians were willing to pay \$500 or more for perfect health, whereas only 36.91% of non-Latino whites were willing to pay that much. Responses for the non-Latino white group were more closely distributed across the three money categories than those for Latinos or Asians. For time valuation, differences were also evident across racial and ethnic groups, with non-Latino whites and Asians showing a similar distribution pattern increasing across categories, but Latinos demonstrating a curvilinear pattern with the highest proportions in that group clustering in both the lowest (34.95%) and highest categories (30.23%).

In addition to differences between racial/ethnic groups, the findings in Table 2 demonstrate that the patterns by race and ethnicity vary depending upon the metric. Stratifying the sample into poor and moderate health provides further evidence of different patterns across metrics (see Fig. 1). The highest proportions across racial/ethnic groups in poor health were willing to pay \$500 or more (Fig. 1) ($P = 0.008$). For non-Latino whites and Asians, we saw a stepwise increase across the three valuation categories. However, for Latinos in poor health, there was little difference between the first and second categories, but a large increase for those willing to pay \$500 or more (57.56%). For the time metric, non-Latino whites and Asians in poor health exhibited patterns similar to the money valuation question and to each other, with proportions increasing stepwise as the number of days also increased ($P < 0.001$). However, for Latinos there was a curvilinear pattern, with 29.67% not willing to trade any time and 41.38% willing to trade seven days or more. Hence, for respondents in poor health, patterns for Latinos varied across the metrics, while those for non-Latino whites and Asians were more stable.

For the moderate health category, whereas non-Latino whites continued to demonstrate a consistent pattern across both metrics, for Latinos and Asians we found different patterns compared to non-Latino whites and across the two metrics. For Latinos and Asians in moderate health, we observed a continued *increase* in willingness to pay as the payment amount increased, with the greatest proportion still willing to pay more than \$500 for perfect health ($P < 0.001$). This was in contrast to the non-Latino whites, who demonstrated a *decrease* as the payment amounts increased for those in moderate health. For the time metric, for non-Latino whites there was also a regular decrease in willingness to trade time. But, for Latinos, there was again a disproportionate number unwilling to trade any time for health (40.62%), and a large drop between the first and second categories with little variability across the remaining categories ($P = 0.001$). For Asians in moderate health, there was little variability across any of the time categories. Given the disproportionate number of Latinos who were not willing to trade any days for health, we also analyzed the feasibility of the money valuation questions for evidence of zero-trade responses embedded in the first money category (0–<\$100). In contrast to time valuation, we found only 7–11% in poor health and only 15–20% in moderate health answering zero across all racial/ethnic groups (data not shown). Hence, the disproportionate zero-trade phenomenon appears to be isolated to Latinos in poor health with the time metric.

The multivariate models were consistent with these patterns in relation to our primary analytic objective. For the money valuation questions (Table 3), we found positive relationships in Models 1 and 2 with Latinos in poor health ($P = 0.086$ in Model 1; $P = 0.047$ in Model 2) and Asians and Latinos in moderate health ($P < 0.001$ both models) willing to spend more money than non-Latino whites. For the time valuation metric (Table 4),

consistent with the bivariate analyses, Latinos in poor health were willing to trade *less* time for health than non-Latino whites in the first two models ($P = 0.015$ in Model 1; $P = 0.012$ in Model 2), and Asians in moderate health were willing to trade more time for health than non-Latino whites ($P = 0.003$ in Model 1; $P < 0.001$ in Model 2).

Addressing our secondary objectives, we found positive relationships across time and money metrics for anxiety disorder and for depression with the time metric in Model 2. Individuals with a lifetime history of mental health disorder were willing to pay more money and trade more time than those without, indicating a lower value (or utility) for current health. After introducing the immigrant variable in Model 3, there was no longer a significant difference in what Asians in moderate health were willing to pay nor in the days Latinos in poor health were willing to trade, compared to non-Latino whites.

The relationships of SES covariates were stable across Models 2 and 3, with few significant associations. Only having private health insurance was consistently and negatively associated with health valuation across both metrics.

The sensitivity analyses yielded results that were overall consistent with our findings (results not shown). Patterns for Latinos and Asians were uniform for the money valuation scenario; however, in the time valuation scenario, whereas the same patterns were evident for Latinos, there were no longer strong differences between Asians in moderate health and non-Latino whites. Hence, findings of differences for Asians in the time valuation scenario should be viewed with some caution.

Discussion

This study of a community-based sample finds differences between racial/ethnic minorities and non-Latino whites in health valuation using metrics of money and time. In addition, the patterns are not consistent across the two metrics, suggesting that despite similar health valuation exercises, the meaning of the metric itself may vary across race/ethnicity. Latinos in poor and moderate health and Asians in moderate health are willing to spend more for perfect health than non-Latino whites. Asians in moderate health are similarly willing to trade more time for health than non-Latino whites. However, Latinos in poor health are willing to trade *less* time for health than non-Latino whites. Both metrics were positively correlated with a history of anxiety disorder, and the time metric was also sensitive to depressive disorder, indicating that they discriminate well across these conditions. However, the time metric appeared less feasible overall with Latinos than the money metric and sensitivity analyses indicated the time valuation estimates for Asians in moderate health may not be stable. Immigrant status was a confounding factor for Latinos in poor health using the time metric, and for Asians in moderate health using the money metric.

A higher proportion of non-Latino whites rated their health less than 90 and screened into the health valuation questions, in contrast to other studies that have found Latinos [32, 33] and Asians [34, 35] rate their health worse than non-Latino whites on a 5-point rating scale. Possible reasons include a lack of parallelism with prior studies due to the 0–100 point health scale and the fact that this screener item followed three primer questions, asking how the respondent would rate the health states of a person with a broken leg, arthritis and cancer. A recent study found that self-rated health was significantly worse for Latinos (but not whites) when asked before rather than after the chronic conditions questions, suggesting that contextualizing the self-rated health question influenced Latino responses [36].

The differences we found across race/ethnicity are consistent with other findings that question the generalizability of preferences in valuation exercises across race/ethnicity [37]. Both Latinos and Asians were willing to pay significantly more money for health than non-

Latino whites. Further, the data indicate that Latinos in poor health may be systematically less willing to trade time for health compared to non-Latino whites. These findings suggest caution for health valuation studies where algorithms generated through time trade-off estimates using non-Latino white populations are applied to other racial/ethnic groups [38].

Not only did differences emerge in the value placed on health improvement, our study suggests that the metrics may have different meanings across race/ethnicity which may affect their feasibility. The curvilinear distribution of responses to the time valuation questions in the bivariate analyses, as well as the disproportionate number of zero-trade responses, suggests that for Latinos in poor health, trading time for health may be a complicated task. Qualitative work suggests that for respondents with strong religious or spiritual beliefs, time trade-off questions may not accurately reflect health values because they feel it is not in their power to make such decisions [39]. Further investigation of Latinos and time valuation is required to better understand these patterns.

Our finding that Latinos and Asians are willing to pay more for health than non-Latino whites is in contrast to other studies using money as a valuation metric [40]. This inconsistency could be due to differences in the proportion of immigrants usually included in clinical studies compared to the large numbers of immigrants in the CPES. Latinos and Asians, and particularly immigrants, may be willing to pay more for health because health care access may be more constrained [41]. Immigrant status moderates the effect of money valuation for Asians in moderate health and is a positive predictor of willingness to pay. Illness might have different consequences, particularly for the foreign-born (e.g., a risk in job permanence, a need to return home), resulting in higher value for improved health. It may also reflect a lack of family support needed to cope with an unfamiliar health care system [42]. Differences may also be due to differences in the value placed on money as a metric for racial/ethnic minorities compared to non-Latino whites; whether paying more money for perfect health reflects less value for money itself for these groups rather than higher value for health requires further research.

Immigrant status also moderated the effect of time valuation for Latinos in poor health, but the association was in the opposite direction, suggesting that immigrant status is a factor in Latinos' being less willing to trade time for health than non-Latino whites. However, as noted above, this may be due to feasibility issues with the time metric for immigrant Latinos, who may not be willing to consider a hypothetical scenario in which time is traded for health.

Those with a lifetime anxiety disorder had higher valuation of health improvements than those without across both metrics, and those with a depressive disorder in poor health had higher valuation using the time metric. These findings are consistent with studies that found a lower utility for current health for those with probable depression [17, 25, 27], generalized anxiety disorder [22, 26] and a life time diagnosis of schizophrenia that was in remission [43]. These findings add to a growing literature that suggests the negative utility of anxiety disorders is a critical focus for quality of life research [22, 44].

Few significant relationships were evident between income or education and health valuation across either the money or time metrics. The relationship between socioeconomic factors and health valuation is inconsistent in previous health valuation studies [21, 23, 45, 46]. The fact that Latinos and Asians who screened into the questions were distributed evenly across income and education is consistent with the healthy immigrant hypothesis whereby lower income immigrants have better health risk profiles compared to lower income whites [47]. This factor may have confounded the association between SES and health valuation, in contrast to other studies containing fewer immigrants. Also of interest is

that private health insurance is a more salient predictor of health valuation, with negative and significant associations across all models. These findings suggest structural factors of the health system may independently affect respondents' approach to valuation exercises and may be a more important predictor than other SES factors.

This study has several limitations. First, it is possible that there are unaccounted biases that resulted from truncating the sample at a health scale value of 90. The missing data for those who rated themselves as 90 or above limits the generalizability of the findings. Due to the truncated sample, we chose to run our models stratified across poor and moderate health. We recognize that stratifying the sample in this way limits power and constrains our ability to understand the relationship of the health status variable to the outcomes, as health status is fully interacted with all variables in the models. However, given the large sample size, power was not a primary issue. Further, non-stratified models that included health status as a continuous variable were not particularly informative with regard to the relationship between this variable and the outcomes (results not shown). Also, the stratified models provided more information about the variability of racial and ethnic groups across health status which was our primary objective.

Lastly, the valuation questions only considered four values for health, and thus we cannot rule out starting point biases. Given the range of the dependent variable is limited, we could not model a continuous variable as is sometimes done, particularly in studies using money as the metric. However, since the money and time valuation questions were presented identically to all samples, this limitation could not explain differences found across racial/ethnic groups.

Findings from this study have important implications for cost-utility measurement and medical decision making [48, 49]. Using valuation metrics that differ across race and ethnicity for utility measurement as part of cost-effectiveness analyses could result in undervaluing or overvaluing health interventions for these groups, and subgroup analyses may be necessary [50, 51]. Our findings inform ongoing debate about whether the EQ-5D yields significantly different estimates across race/ethnicity [5, 38] and suggests further research on the validity of time valuation strategies with Latino immigrants to the U.S. is critical. Analyzing different patterns of valuation across racial/ethnic groups also provides important information for health systems about trade-offs of money and time for health. For example, health policy strategies focused on lowering cost may not result in an increase in health utilization for certain populations, given the money valuation metric was not as sensitive to variation across poor and moderate health status for Latinos and Asians. Alternately, if Latinos are less willing to trade time for health, system strategies to decrease wait times may be powerful ways to improve access. It is important to conduct qualitative work to better understand the meaning of the metrics used in health valuation scenarios across race/ethnicity and assess their impact on health care decision making.

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Fig. 1.
Variation in money and time valuation questions across race and ethnicity

Table 1

Proportions of those who screened into the health valuation questions (<90) across demographic and health status variables by racial/ethnic groups

	Non-Latino Whites <90	Latinos <90	Asians <90
Number of observations (%)	2051 (44.65)	971 (36.02)	730 (34.42)
18–34 years (%)	40.11	29.24	29.86
35–49 years (%)	43.13	37.53	36.92
50–64 years (%)	42.69	48.61	32.91
65 years or more (%)	55.93	52.27	46.59
<i>P</i> -value	<0.001	<0.001	0.013
Male (%)	43.06	33.35	33.16
Female (%)	46.09	38.91	35.55
<i>P</i> -value	0.127	0.006	0.371
<\$15,000 (%)	64.96	37.61	41.15
\$15,000–\$34,000 (%)	50.18	34.57	38.96
\$35,000–\$74,999 (%)	43.07	38.39	33.20
\$75,000 or more (%)	34.44	31.76	30.72
<i>P</i> -value	<0.001	0.344	0.040
<High school (%)	59.09	37.66	41.24
High school grade (%)	49.24	34.31	32.99
13–16 years (%)	42.72	36.21	34.51
17 years or more (%)	34.05	32.40	32.45
<i>P</i> -value	<0.001	0.365	0.201
Married (%)	40.42	35.82	33.09
Never married (%)	42.36	29.67	33.65
Widowed/sep/div (%)	56.52	46.97	45.17
<i>P</i> -value	<0.001	<0.001	0.076
US born (%)	45.07	39.22	34.81
Immigrant (%)	32.65	33.74	34.14
<i>P</i> -value (%)	0.047	0.026	0.846
No chronic 12-month health disorder (%)	32.74	25.41	28.23
Any chronic 12-month health disorder (%)	51.16	51.08	40.80
<i>P</i> -value	<0.001	<0.001	<0.001
No mental health disorder (%)	40.00	31.27	31.67
Any mental health disorder (%)	63.06	60.30	59.78
<i>P</i> -value	<0.001	<0.001	<0.001
No depressive disorder (%)	42.13	32.85	32.97
Any depressive disorder (%)	71.42	69.90	64.60
<i>P</i> -value	<0.001	<0.001	<0.001
No anxiety disorder (%)	41.17	33.10	32.59
Any anxiety disorder (%)	66.23	63.90	60.95

	Non-Latino Whites	Latinos	Asians
	<90	<90	<90
<i>P</i> -value	<0.001	<0.001	<0.001
No substance disorder (%)	44.23	35.61	34.15
Any substance disorder (%)	55.15	50.32	54.77
<i>P</i> -value	0.002	0.049	0.034
No specialist use (%)	42.79	33.97	33.38
Any specialist use (%)	64.53	72.25	66.92
<i>P</i> -value	<0.001	<0.001	<0.001

Table 2

Age- and gender-adjusted distribution of money and time valuation questions across racial/ethnic groups

	Non-Latino Whites (<i>n</i> = 2015)	Latinos (<i>n</i> = 955)	Asians (<i>n</i> = 720)
Willing to pay up to \$100 (%)	30.95	22.96	23.96
\$100–<\$500 (%)	32.14	25.21	33.89
\$500 or more (%)	36.91	51.83	42.15
Chi-square <i>P</i> -value	<0.001		

Willing to trade	Non-Latino Whites (<i>n</i> = 2003)	Latinos (<i>n</i> = 955)	Asians (<i>n</i> = 721)
No days (%)	24.41	34.95	22.47
1 or 2 days (%)	20.59	18.26	18.73
3–6 days (%)	27.00	16.56	25.37
7 or more (%)	28.00	30.23	33.42
Chi-square <i>P</i> -value	<0.001		

Table 3

Ordered logistic regression models analyzing money valuation—poor and moderate health rating scales

Variable (n)	Money valuation—poor health scale ratings								
	Model 1			Model 2			Model 3		
	Coeff.	SD	P-value	Coeff.	SD	P-value	Coeff.	SD	P-value
<i>Non-Latino White (936)</i>									
Latino (491)	0.255	0.147	0.086	0.319	0.159	0.047	0.367	0.212	0.086
Asian (296)	−0.086	0.159	0.588	−0.026	0.160	0.874	0.047	0.241	0.847
<i>18–34 years old (414)</i>									
35–49 years old (533)	1.279	0.231	<i>P</i> <0.001	1.151	0.222	<i>P</i> <0.001	1.151	0.222	<i>P</i> <0.001
50–64 years old (439)	1.516	0.200	<i>P</i> <0.001	1.351	0.199	<i>P</i> <0.001	1.352	0.199	<i>P</i> <0.001
65 years or more (337)	1.068	0.212	<i>P</i> <0.001	0.862	0.253	<i>P</i> <0.001	0.863	0.254	<i>P</i> <0.001
Female (1058)	−0.229	0.159	0.152	−0.231	0.173	0.186	−0.231	0.174	0.186
<i>Married (827)</i>									
Never married (337)				−0.455	0.172	0.009	−.458	0.175	0.010
Widow/sep/div (559)				−.321	0.165	0.055	−.323	0.165	0.053
<i>Less than \$15 K (510)</i>									
\$15 K–\$34,999 (417)				−0.050	0.177	0.777	−0.050	0.177	0.777
\$35 K–\$74,999 (478)				−.182	0.269	0.501	−.183	0.270	0.498
\$75 K or more (318)				0.148	0.288	0.609	0.145	0.290	0.617
<i>Less than high school (524)</i>									
High school grade (463)				0.444	0.201	0.029	0.442	0.200	0.029
13–16 years (428)				0.178	0.215	0.408	0.176	0.214	0.413
17 or more years (308)				0.292	0.224	0.195	0.293	0.225	0.196
Private insurance (715)				−0.391	0.171	0.024	−.393	0.171	0.023
Any lifetime depressive disorder (696)				0.232	0.162	0.156	0.232	0.162	0.157
Any lifetime anxiety disorder (758)				0.362	0.190	0.060	0.363	0.190	0.059
Any lifetime SUD (335)				0.027	0.155	0.863	0.024	0.155	0.879
Any chronic 12-month illness (1324)				0.253	0.178	0.160	0.252	0.179	0.161
Immigrant (586)							−.091	0.253	0.719

Variable (n)	Money valuation—moderate health scale ratings								
	Model 1			Model 2			Model 3		
	Coeff	SD	P-value	Coeff	SD	P-value	Coeff	SD	P-value
<i>Non-Latino White (1073)</i>									
Latino (459)	0.782	0.136	<i>P</i> <0.001	0.953	0.172	<i>P</i> <0.001	0.751	0.218	<i>P</i> <0.001
Asian (417)	0.561	0.140	<i>P</i> <0.001	0.603	0.151	<i>P</i> <0.001	0.335	0.217	0.126
<i>18–34 years old (713)</i>									
35–49 years old (625)	0.438	0.134	<i>P</i> =0.001	0.385	0.172	0.028	0.380	0.173	0.030
50–64 years old (385)	0.751	0.188	<i>P</i> <0.001	0.743	0.243	0.003	0.736	0.242	0.003
65 years or more (226)	1.007	0.262	<i>P</i> <0.001	1.053	0.377	0.006	1.062	0.377	0.006
Female (1074)	0.161	0.117	0.172	0.201	0.137	0.146	0.194	0.136	0.156
<i>Married (1042)</i>									
Never married (487)				0.096	0.210	0.650	0.106	0.209	0.613
Widow/sep/div (420)				0.042	0.172	0.807	0.048	0.172	0.781
<i>Less than \$15 K (291)</i>									
\$15 K–\$34,999 (404)				–.018	0.285	0.950	–.017	0.285	0.952
\$35 K–\$74,999 (679)				–.089	0.279	0.750	–.090	0.278	0.747
\$75 K or more (575)				0.566	0.363	0.122	0.563	0.361	0.122
<i>Less than high school (333)</i>									
High school grade (522)				–.020	0.154	0.899	0.002	0.154	0.992
13–16 years (574)				0.208	0.194	0.286	0.236	0.194	0.225
17 or more years (520)				0.184	0.236	0.437	0.198	0.233	0.398
Private insurance (1203)				–.263	0.146	0.075	–.259	0.146	0.079
Any lifetime depressive disorder (487)				0.163	0.155	0.297	0.172	0.155	0.270
Any lifetime anxiety disorder (526)				0.340	0.095	0.001	0.342	0.096	<i>P</i> <0.001
Any lifetime SUD (308)				0.226	0.143	0.116	0.236	0.141	0.097
Any chronic 12-month illness (1177)				0.163	0.161	0.312	0.173	0.160	0.282
Immigrant (608)							0.414	0.221	0.064

Table 4

Ordered logistic regressions models analyzing time valuation—poor and moderate health rating scales

Variable (n)	Time valuation—poor health scale ratings					
	Model 1			Model 2		
	Coeff.	SD	P-value	Coeff.	SD	P-value
<i>Non-Latino White (931)</i>						
Latino (487)	−0.405	0.164	0.015	−0.484	0.190	0.012
Asian (292)	−0.124	0.169	0.463	−0.022	0.186	0.907
<i>18–34 years old (416)</i>						
35–49 years old (530)	0.708	0.176	<i>P</i> <0.001	0.582	0.186	0.002
50–64 years old (433)	0.969	0.190	<i>P</i> <0.001	0.816	0.247	0.001
65 years or more (331)	0.828	0.248	0.001	0.592	0.308	0.058
Female (1053)	−0.284	0.151	0.062	−0.326	0.178	0.069
<i>Married (817)</i>						
Never married (339)				−0.306	0.256	0.234
Widow/sep/div (554)				−0.136	0.173	0.436
<i>Less than \$15 K (512)</i>						
\$15 K–\$34,999 (411)				−0.113	0.238	0.636
\$35 K–\$74,999 (472)				−0.470	0.255	0.068
\$75 K or more (315)				−0.068	0.258	0.794
<i>Less than high school (521)</i>						
High school grade (460)				0.112	0.176	0.526
13–16 years (423)				0.175	0.186	0.348
17 or more years (306)				−0.100	0.233	0.668
Private insurance (713)				−0.429	0.136	0.002
Any lifetime depressive disorder (693)				0.434	0.126	<i>P</i> <0.001
Any lifetime anxiety disorder (746)				0.395	0.149	0.009
Any lifetime SUD (336)				0.195	0.161	0.229
Any chronic 12 month illness				0.314	0.191	0.103
Immigrant (576)				−0.218	0.301	0.471

Variable (n)	Time valuation—moderate health scale ratings								
	Model 1			Model 2			Model 3		
	Coeff.	SD	P-value	Coeff.	SD	P-value	Coeff.	SD	P-value
<i>Non-Latino White (1067)</i>									
Latino (464)	−0.196	0.158	0.219	−0.152	0.167	0.364	0.004	0.171	0.983
Asian (422)	0.409	0.132	0.003	0.585	0.138	<i>P</i> < 0.001	0.798	0.188	<i>P</i> < 0.001
<i>18–34 years old (713)</i>									
35–49 years old (625)	0.031	0.146	0.832	−0.020	0.164	0.905	−0.015	0.163	0.926
50–64 years old (386)	0.200	0.167	0.235	0.128	0.208	0.541	0.134	0.209	0.523
65 years or more (229)	0.527	0.223	0.020	0.219	0.268	0.416	0.214	0.268	0.428
Female (1076)	0.365	0.114	0.002	0.259	0.112	0.023	0.266	0.112	0.020
<i>Married (1043)</i>									
Never married (487)				0.126	0.158	0.427	0.120	0.159	0.451
Widow/sep/div (423)				0.252	0.152	0.100	0.249	0.154	0.107
<i>Less than \$15 K (296)</i>									
\$15 K–\$34,999 (409)				−0.079	0.302	0.793	−0.079	0.301	0.794
\$35 K–\$74,999 (674)				−0.244	0.232	0.294	−0.244	0.231	0.293
\$75 K or more (574)				0.163	0.294	0.581	0.167	0.295	0.573
<i>Less than high school (340)</i>									
High school grade (521)				0.167	0.200	0.405	0.154	0.202	0.447
13–16 years (570)				0.293	0.180	0.106	0.275	0.181	0.133
17 or more years (522)				−0.064	0.214	0.765	−0.072	0.215	0.738
Private insurance (1200)				−0.435	0.135	0.002	−0.441	0.136	0.002
Any lifetime depressive disorder (490)				0.175	0.112	0.120	0.169	0.112	0.135
Any lifetime anxiety disorder (532)				0.319	0.089	<i>P</i> = 0.001	0.318	0.090	<i>P</i> = 0.001
Any lifetime SUD (311)				0.079	0.151	0.603	0.071	0.151	0.639
Any chronic 12-month illness (1178)				0.344	0.134	0.011	0.340	0.134	0.013
Immigrant (616)							−0.325	0.205	0.115