What do time-use patterns tell us about the validity of self-reported health?

Marco Faytong-Haro [a], Alexis R. Santos-Lozada [b],*

[a] *Department of Sociology and Criminology, Pennsylvania State University, United States*
[b] *Department of Human Development and Family Studies, Pennsylvania State University, United States*

A B S T R A C T

Objective: This short communication investigates the usefulness of time-use measures to validate subjective health measures such as self-reported health (SRH). It does this by examining time-use patterns and SRH among middle-age adults in the United States distinguished by race/ethnicity and with additional attention to differences in responses based on language of interview for Hispanics.
Methods: Data for this study come from the 2013–2016 American Time Use Survey. We calculated average time-use for personal care; housework; paid work; leisure; volunteering/travel; caregiving; and education for every racial/ethnic group differentiating by SRH for 27,063 adults aged 25–64 years. A series of ANOVAs were computed to assess differences in time-use by SRH.
Results: Non-Hispanic whites and non-Hispanic Blacks who reported poor/fair SRH spent more time in personal care and leisure, and less time in paid work, volunteering/travel, caregiving and education, in comparison to those who reported Excellent/Very Good/Good SRH. Among Hispanics, differences by SRH were found for personal care, paid work, leisure and volunteering/travel. Hispanics who answered in English displayed partially similar patterns in SRH found for non-Hispanic whites and Blacks. Hispanics who answered in Spanish demonstrated differences in SRH in the areas of paid work, leisure and education, diverging from the other groups.
Conclusions: Time-use differences by health status are consistent between non-Hispanic whites, non-Hispanic blacks, but not so for Hispanics. To some extent, Hispanics who answered in English have more comparable patterns to non-Hispanic whites and non-Hispanic Blacks than Spanish respondents. Caution should be exercised when self-reported health measures are used to compare diverse samples collected with surveys that are administered in different languages.

1. Introduction

In recent years, researchers have become increasingly interested in the validation and reliability of self-rated health (SRH) questions, especially when such measures are used to compare groups in diverse populations (Erving & Zajdel, 2021; Santos-Lozada & Howard, 2018; Zajacova & Dowd, 2011). While SRH is a simple-to-get measure of overall physical and mental wellness, there is an increasing concern regarding how different groups may interpret the question and how reliable this measure is (Bzostek, Goldman, & Pebley, 2007; Jylha, 2009; Zajacova & Dowd, 2011). One study focused on whether mortality was equally predicted by SRH and by socioeconomic status found that lower health ratings were more associated with mortality for adults with higher education and income than their lower SES counterparts (Dowd & Zajacova, 2007). Another study found that the relationship between

SRH and objective health differed by socioeconomic status (Dowd & Zajacova, 2010). Similar studies have been conducted focusing on race/ethnicity in the United States (US). For example, when researchers asked whether a cumulative score of physiological dysregulation equally predicted SRH by race/ethnicity; they concluded that this score was less associated with poor/fair SRH for non-Hispanic Blacks and Hispanics than for their non-Hispanic white counterparts (Santos-Lozada & Howard, 2018). In line with these findings, another study found that SRH predicted mortality risk less well for non-Hispanic Blacks and Hispanics than for non-Hispanic whites (Woo & Zajacova, 2016). Related to both of these dimensions, another study found that racial/ethnic minorities and adults with lower education exhibited lower levels of consistency when SRH is assessed two-times about 1 month apart (Zajacova & Dowd, 2011). Altogether, these and other studies provide support to the idea that individuals from different groups

evaluate their health differently. Consequently, they have recommended an exercise of caution in the use of SRH, especially when this measure is employed to compare population subgroups (Dowd & Zajacova, 2010; Erving & Zajdel, 2021; Santos-Lozada & Howard, 2018; Woo & Zajacova, 2016).

In the United States, another instance involves the administration of health surveys in Spanish to Hispanics. It this case, cultural or language conventions regarding vocabulary related-to-health may affect what respondents think constitutes "fair health" (Bzostek et al., 2007; Kandula, Lauderdale, & Baker, 2007; Viruell-Fuentes, Morenoff, Williams, & House, 2011). While most studies that have investigated the validity of SRH in the United States include diversity in their sample (Chandola & Jenkinson, 2000; Finch, Hummer, Reindl, & Vega, 2002; McGee, Liao, Cao, & Cooper, 1999), within group differences such as the ones that emerge for Hispanics who respond to surveys in different languages remain vastly overlooked. Despite the utility of SRH, research continues to suggest that for some populations, subjective health ratings may not be comparable (Dowd & Zajacova, 2007; Erving & Zajdel, 2021). It is suggested that interpretations of health ratings such as "excellent", "very good", "good", "fair", and "bad" may differ depending on an individual's native function of culture and language (Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005; Shetterly, Baxter, Mason, & Hamman, 1996; Viruell-Fuentes et al., 2011).

An emerging line of research has incorporated objective markers of health, such as biomarkers, to the study SRH (Dowd & Zajacova, 2010; Santos-Lozada & Howard, 2018), but to this day none have incorporated behavioral patterns like time-use to assess the validity of this widely used measure. We find in time-use allocation a promising area for validation as it incorporates less subjectivity and bridges on to behavioral traits. According to Bauman, Bittman, and Gershuny (2019), researchers in many fields of study, including demography and public health, use average trends of time allocation in categories like physical activity, house work, paid work, sleep, personal care, sleep, among

others to validate behavioral patterns of different populations (Bauman et al., 2019). Time-use allocation averages per group can provide meaningful insights about how specific groups behave and how that affects their health status (Bird & Fremont, 1991). While some differences in time-use patterns are expected based on race/ethnicity (Pepin, Sayer, & Casper, 2018; Sayer & Fine, 2011), if SRH is a valid metric of health status for diverse populations, we expect differences in time-use to vary similarly by race/ethnicity or within specific subgroups based on health status. In the case of Hispanics, while we expect a comparable pattern in time-use differences by health status, we also expect differences based on language of interview. Previous research has demonstrated that translation issues between Spanish and English versions of the SRH question give rise to some of the data discrepancies between both groups (Bzostek et al., 2007). We suspect that differences between SRH and language of response may be due to the translation from English to Spanish of "fair" to "regular". This translation causes Hispanics to be classified as "*in poor health*" when their intention was to report average or manageable health (Santos-Lozada & Martinez, 2017).

In Fig. 1, we present a hypothetical time distribution for persons categorized as in good health and bad health. A healthy person is expected to spend approximately 8 h working, 8 h sleeping and 8 h in other activities (Johnson & Lipscomb, 2006). The expectation, is that if the dichotomization of self-reported health where poor/fair constitute "bad health" then the time spent in work would reduce and that time would be spent resting or doing other activities. To assert whether the dichotomous SRH measure is accurately capturing health we propose a comparison of time-use patterns by health status and race/ethnicity. If the differences in time-use are comparable across subpopulations then this suggests the dichotomous SRH measure is capturing health status accurately. On the contrary, if the patterns are not comparable then this is indicative of validity issues. These validity issues, in turn, would be biasing any subgroup comparisons that rely on the dichotomous-SRH as a measure of health.
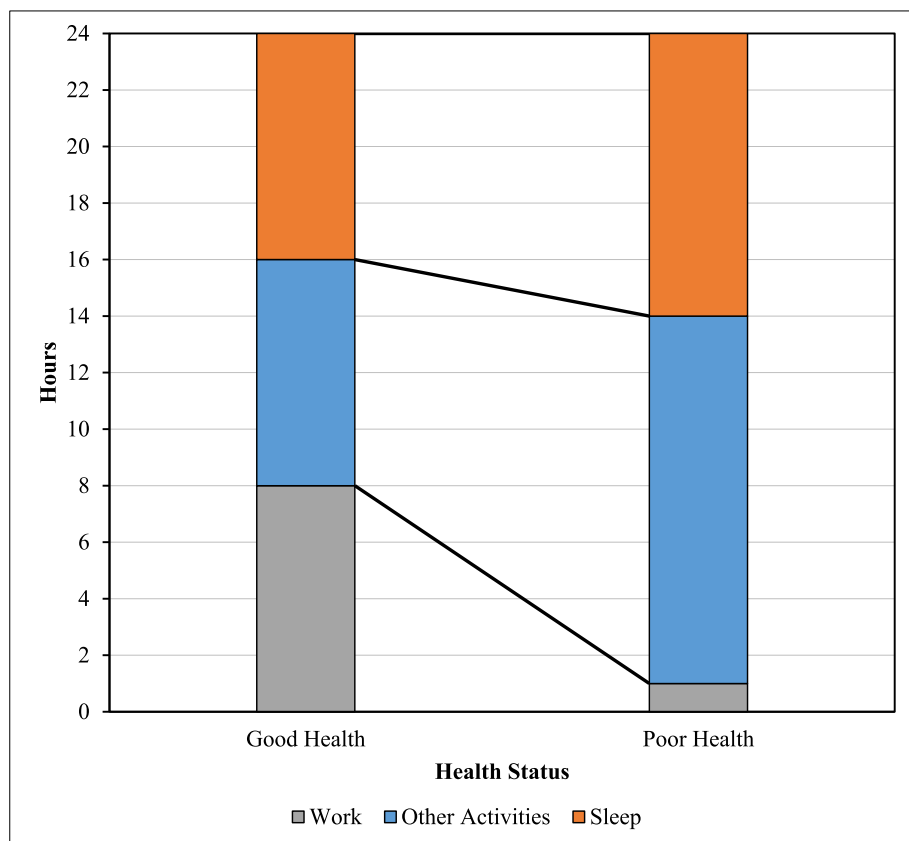
Fig. 1. Hypothetical time-use patterns for the population by health status. In this scenario, those who are classified as in "good health" (Excellent/Very Good/Good) are expected to have a time distribution similar or close to that of the gold-standard time-use patterns of 8 h of work, 8 h of sleep and 8 h doing leisure or other activities (Johnson & Lipscomb, 2006). Those classified as in "bad health" (Poor/Fair) are expected to deviate from this patterns with less time for work and more time devoted to the other two types of activities. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

In this short communication, we calculate averages of time-use allocation in different categories of SRH across different ethnic groups, and by language of interview for Hispanics. We use data from the 2013 to 2016 American Time Use Study (ATUS) to shed light on these questions, pooling across years to increase our sample size and to produce reliable estimates of the differences of interest (Marquez-Velarde, 2020; Mokdad et al., 2003). The distribution of respondents was relatively balanced with each year contributing approximately 25% of the analytic sample. This main contribution of this study is that it demonstrates the effectiveness of the use of time-use allocation measure to validate a subjective measurement like SRH. By doing so, we open the doors for future research that wants to employ time-use to validate other subjective measures.

2. Data and methods

Our analysis uses the American Time Use Survey (ATUS) for 4 years, from 2013 to 2016 (Hofferth, Flood, Sobek, & Backman, 2020). These samples included the question "In general would you say that your health is excellent, very good, good, fair, or poor?". We followed the usual dichotomization of health status, where respondents who rate their health as "Excellent", "Very Good" and "Good" have "good health"; and respondents who rated their health as poor or fair have "bad health"(Manor, Matthews, & Power, 2000). Using the Racial and Ethnic background variables, we classify respondents into one of three race/-ethnicity group: Non-Hispanic white, non-Hispanic black, and Hispanics. Given the well-established association between language of interview and SRH, we also consider whether Hispanics answered the questions in either English or Spanish (Bzostek et al., 2007).

The ATUS collected one day of diaries from each respondent via telephone. Respondents were asked to recall their activities from the day before the interview beginning at 4 a.m. to the interview day at 4am. It is important to note that while the most recent time data may not be a reflection of the average time-use allocation for every single respondent, for the sample as a whole it is a more accurate representation of time-use distribution, especially in comparison to asking people what they typically do which is more likely to be affected by desirability and recall bias. The source variable is measured in minutes; we recalculated each category by dividing the original variables by 60 to transform it into hours of the day (h).

We consider seven time use categories: personal care, housework, paid work, leisure, volunteering/travel, caregiving, and education. Personal care includes activities such as sleeping, grooming, and health-related self-care. Housework includes purchasing, household activities such as household administration, related organizational activities, and household service such as cleaning, cooking and maintenance. Leisure includes activities such as sports, exercise, drinking, eating, attending social events and religious activities, and using the phone. Volunteering/Travel includes activities such as volunteering for social causes through social organizations, traveling, or using government services, fulfilling government-required duties, and participating in activities that assist or impact government processes. Caregiving activities include taking care of someone regardless of whether or not that person forms part of the households. Finally, education includes activities such as taking a class for personal interest (e.g., attending bible study, or taking a dance, driving, or parenting class); attending classes for a degree, certification or licensure; and time spent researching or doing activities related education (homework, administrative procedures, or studying).

2.1. Statistical analysis

We accessed the ATUS for 2013–2016 with an initial sample size of 44,375 respondents. We restricted our analysis to mid-age adults 25 to 64 years, who identified as non-Hispanic whites, non-Hispanic Blacks, or Hispanics and who had valid information for SRH. Consistent with previous approaches, the age restriction was established to study

individuals before retirement age (Johnson-Lawrence, Zajacova, & Sneed, 2017). Our final analytical sample consisted of 27,608 individuals. First, we produced descriptive statistics for poor/fair SRH, race/ethnicity, language of interview, age and sex (Table 1). Second, we analyzed differences in time-use by activity for the overall population, and each racial/ethnic group. We further analyzed Hispanics by language in which they answered the survey (Table 2). All analyses were weighted following ATUS methodological guidelines (Hofferth et al., 2020). We tested for differences in time-use by SRH by calculating one-way ANOVAs for each activity by race/ethnicity. For Hispanics we also fit one-way ANOVAs stratified by language of interview. ATUS data was obtained from the IPUMS Time Use (Hofferth et al., 2020). Sensitivity analyses were performed and are included in the Supplemental Materials.

3. Results

In Table 1, we present weighted descriptive statistics for poor/fair SRH, race/ethnicity, language of interview, age, and sex. Approximately 15.76% of respondents reported poor/fair SRH. The racial/ethnic composition of our analytic sample was: 70% were non-Hispanic whites, 12.53% were non-Hispanic Blacks, and 16.73% were Hispanic. Among the Hispanic population, 10.19% answered the ATUS in English and 6.54% answered the ATUS in Spanish (see note in Table 1). The average age of respondents was 44.57 years and 48.99% of the sample were males.

Table 2 presents average hours by seven broad time-use categories and health status for the overall population, and by race/ethnicity. For the overall population, we found those with poor/fair health devoted more time to personal care and leisure; and less time in paid work, volunteering/travel car, caregiving and education. No difference was found for house work. Moreover, we find differences in time-use patterns by health status and race/ethnicity. In comparison to those who have excellent/very good/good SRH, non-Hispanic whites with poor/fair SRH spent approximately one more hour in personal care, 1.81 more hours in leisure activities, and 2.16 less hours in paid work. They also allocated lower time to volunteering/travel, caregiving, and education. In comparison to those in "good health", non-Hispanic Blacks who reported poor/fair SRH spent approximately one more hour in personal care, as well as 1.77 less hours devoted to paid work and 1.4 more hours in leisure activities. In addition, we found that non-Hispanic Blacks who reported poor/fair SRH spent less time in volunteering/travel, caregiving, and education. These differences were consistent with those found for non-Hispanic whites.

Differences by health status for Hispanics diverge from the general pattern discussed above. In the case of personal care, we find a smaller difference (approximately 20 min); while for non-Hispanic whites and

Table 1
Descriptive statistics for self-reported health, race/ethnicity, language and age, ATUS 2013–2016 (n = 27,068).

	Percent (%)
Poor/Fair Self-Reported Health	15.76
Race/Ethnicity	
Non-Hispanic whites	70.74
Non-Hispanic Blacks	12.53
Hispanics	16.73
English respondents[a]	10.19
Spanish respondents[a]	6.64
Age (mean)	44.57
Sex	
Male	48.99
Female	51.01
Sample Size (n)	27,068

[a] Represents the percent of Hispanic respondents by language of interview relative to the overall sample. Among Hispanics, this represents 60.91% answering in English and 39.09% in Spanish.

Table 2
Weighted averages of time-use among mid-age adults (25–64 years), by race/ethnicity and health status, American Time Use Survey 2013–2016 (n = 27,068).

	Overall				Non-Hispanic White				Non-Hispanic Black			
	Excellent/Very Good/ Good	Poor/ Fair	Difference		Excellent/Very Good/ Good	Poor/ Fair	Difference		Excellent/Very Good/ Good	Poor/ Fair	Difference	
Personal Care	9.16	10.04	0.88	*	9.03	9.97	0.94	*	9.43	10.47	1.04	*
House Work	2.27	2.22	−0.05		2.31	2.32	0.01		1.71	1.61	−0.10	
Paid Work	4.57	2.73	−1.84	*	4.67	2.51	−2.16	*	4.34	2.57	−1.77	*
Leisure	5.51	7.02	1.51	*	5.53	7.34	1.81	*	6.07	7.47	1.40	*
Voluteering/ Travel	1.44	1.08	−0.36	*	1.45	1.01	−0.44	*	1.45	1.12	−0.33	*
Caregiving	0.73	0.63	−0.10	*	0.73	0.60	−0.13	*	0.56	0.46	−0.10	*
Education	0.13	0.08	−0.05	*	0.11	0.07	−0.04	*	0.25	0.09	−0.16	*
Sample Size (n)	22,810	4,258	–		16,270	2,296	–		3,097	988	–	
	Hispanics				Hispanics (English Survey)				Hispanics (Spanish Survey)			
	Excellent/Very Good/ Good	Poor/ Fair	Difference		Excellent/Very Good/ Good	Poor/ Fair	Difference		Excellent/Very Good/ Good	Poor/ Fair	Difference	
Personal Care	9.58	9.88	0.30	*	9.51	10.01	0.50	*	9.71	9.74	0.03	
House Work	2.52	2.48	−0.04		2.34	2.29	−0.05		2.84	2.69	−0.15	
Paid Work	4.30	3.41	−0.89	*	4.44	3.30	−1.14	*	4.04	3.53	−0.51	*
Leisure	5.05	5.88	0.83	*	5.16	6.20	1.04	*	4.85	5.54	0.69	*
Voluteering/ Travel	1.40	1.20	−0.20	*	1.43	1.15	−0.28	*	1.35	1.26	−0.09	
Caregiving	0.86	0.84	−0.02		0.80	0.86	0.06		0.95	0.82	−0.13	
Education	0.13	0.10	−0.03		0.16	0.01	−0.15	*	0.07	0.18	0.11	*
Sample Size (n)	3,443	974	–		2,336	527	–		1,107	447	–	

non-Hispanic Blacks, this difference is approximately 1 h. Similarly, in paid work we find a difference of less than 1 h for Hispanics; whereas this difference is of more than 1 h for non-Hispanic whites (more than 2 h) and non-Hispanic Blacks (slightly more than 1.5 h). In comparison to those with good health, Hispanics who reported poor/fair SRH had less than 1 h difference in leisure time; whereas the difference for non-Hispanic whites and non-Hispanic Blacks was more than 1 h. Hispanics in poor/fair SRH spent less time in Volunteering/Travel activities. No difference is observed for caregiving or education by health status, despite Hispanics in good health exhibiting higher levels of caregiving than the other two groups.

In addition, we analyzed differences in time-use for Hispanics by focusing on language of interview. We find that Hispanics who answered the ATUS in English have patterns partially comparable to non-Hispanic whites and non-Hispanic Blacks with higher time devoted to personal care and leisure; and lower time in paid work, volunteering/traveling, and education. On the other hand, we find that Hispanics who answered in Spanish diverge from the pattern found for non-Hispanic whites, non-Hispanic Blacks and Hispanics who answered in English. No differences are found for personal care, house work, volunteering/travel, or caregiving. Finally, this is the only group where those with poor/fair health devoted more time to educational activities.

3.1. Sensitivity analyses

Despite the descriptive nature of our study, we sought to assess whether our main conclusions were affected by the incorporation of confounders employing OLS regression (see Supplemental Materials). In Table S1 we present the results of corresponding regression models that account for age, sex, and race/ethnicity (for the overall population). In Table S2 we present the corresponding regression models that account for age and sex for each racial/ethnic group. Finally, in Table S3, we present the corresponding regression models for Hispanics, accounting for age and sex and stratifying by language of interview. Our main conclusions are not affected by the incorporation of these confounders into our models. As an additional check related to the sample composition, we performed a sensitivity analysis using single-years of ATUS and the results are consistent with those derived from the pooled sample.

4. Discussion

The objective of this study was to investigate the utility of time-use measures to validate SRH, a subjective health measure, with emphasis in racial/ethnic comparisons. Our findings suggest that time-use differences by health status exist within the US population and that these vary by race/ethnicity. On average, those who report poor/fair SRH allocate more time to personal care, and leisure; and less time in paid work, volunteering/travel, caregiving, and education. These patterns are similar for non-Hispanic white, and non-Hispanic Black. Using time-use data, we demonstrate that SRH measurements gathered for these two groups are comparable and, therefore, valid. Comparability issues emerge for Hispanics, and when the analysis considers language of interview.

Differences in time allocation across SRH status for Hispanics are not as large as those observed for non-Hispanic whites and non-Hispanic Blacks. Time-use differences by health status for Hispanics also vary when language of interview is considered. The differences in time-use patterns by health status for Hispanics who answer the interview in English are akin with the pattern found for non-Hispanic whites and non-Hispanic Blacks. For instance, Hispanics who answer in English and report poor/fair SRH allocate more time to personal care and leisure and less time to paid work, volunteering/travel, and education. On the other hand, Hispanics who answered in Spanish reported slight differences in paid work, and leisure. This is the only group in which those who reported poor/fair SRH also reported a higher time-use allocation for educational activities. Previous studies indicate that the translation of the category "Fair" to "Regular" may cause respondents to be classified as in poor health, when their intention was to indicate an intermediary health level (Sanchez & Vargas, 2016; Santos-Lozada & Martinez, 2017; Viruell-Fuentes et al., 2011). While there is a clearer contrast in time-use patterns for most of the groups considered in this study, this is not the case for Hispanics who answer in Spanish.

That being said, findings also show support for the concerns regarding the validity of self-reported health when surveys are administered to diverse populations and in more than one language. Altogether, the similarity in time-use patterns by health status for non-Hispanic whites, non-Hispanic Blacks and Hispanics who answer the survey in English indicates that SRH, and its dichotomization, may be accurately capturing health for these populations. For Hispanics who answered in Spanish, the pattern indicates that the dichotomization of

SRH may not capture health status accurately for populations with different native languages. Further research could explore the use of time-use diaries and its relations to self-related health, and more objective measurements of physical and mental health (e.g. allostatic loads, other biomarkers, and depression/anxiety tests), especially across different racial/ethnic groups. In the meantime, the dichotomization of SRH should be used with caution across different ethnic groups, especially in multilingual groups.

4.1. Strengths and limitations

This current study provides a number of contributions. Strengths include the use of multiple waves of the ATUS with homogeneous measurement of time-use and health status, which make our results generalizable to the U.S. population for 2013–2016. Furthermore, this is, to the best of our knowledge, the first study to leverage time-use patterns to explore the validity of a subjective health measure that is often employed to establish differences by race/ethnicity. Given the analytical innovation of this article, we provide only a descriptive approach to the line of inquiry we are proposing with the hopes that future studies may conduct more comprehensive analyses. Notwithstanding, this study has several limitations. The first limitation is that the ATUS suspended the collection of SRH in 2016, which precludes us from analyzing more recent data. Thus, we are analyzing the most recent data available on this matter. Second, because of the innovative nature of this line of inquiry, previous literature is very scarce. Therefore, we are unable to compare our findings with other studies. Third, this study is based on cross-sectional data. The nature of the data and the study design is not intended to infer causality.

5. Conclusion

Despite these limitations, our findings have important implications for the study of health disparities across different racial/ethnic groups. This study contributes to the growing body of literature that assesses the validity of self-reported measures for the study of health disparities in the US. This study found that time-use patterns are useful tools for validating subjective ratings across different population subgroups. In this case, for the dichotomous SRH, we found non-Hispanic white and non-Hispanic Black respondents have comparable differences in time-use patterns. However, responses differed for Hispanics, with more notable differences for those who answered in Spanish.

These results contribute to the validation of SRH for diverse populations. SRH is many times used to signal health disparities across different racial/ethnic groups, but to be a valid measure for comparisons SRH has to equally capture the same construct for everyone. Simply said, they must be a reflection of similar levels of health-related behavior and health. Health status is related to how people use their time. The fact that the Hispanics reporting certain health status allocate their time differently from other racial/ethnic groups hints that the dichotomous SRH measure is not measuring the same construct for this population, so comparability may be limited, and therefore, any policy decision made with this information is also biased.

If SRH and other health measures are not tailored for diverse populations or comparable across languages (i.e. English vs. Spanish, Mandarin or Cantonese vs. English) we risk understating inequities in the United States. The conclusions derived from such measures may not be the best evidence when discussing the health of Hispanic/Latinx populations or minorities in the United States and policy efforts may not be efficient in addressing such disparities.

Author Statement

The authors contributed equally. Marco Antonio Faytong-Haro: Conceptualization, Methodology, Investigation, Resources, Writing - Original Draft, Writing - Review & Editing. Alexis R. Santos-Lozada:

Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization.

Availability of data and materials

Data and materials are publicly available.

Code availability

The analysis was completed using SAS 9.4, and the replication code is available upon request to the Corresponding Author.

Compliance with ethical standards

The analysis was conducted on de-identified, publicly available data and did not involves human subjects research as defined at 45 CFR 46.102.

Declaration of competing interest

The authors declare that they have no conflict of interest.

Acknowledgments

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2021.100882.

References

Bauman, A., Bittman, M., & Gershuny, J. (2019). A short history of time use research; Implications for public health. *BMC Public Health, 19*(Suppl 2), 1–7. https://doi.org/10.1186/s12889-019-6760-y

Bird, C. E., & Fremont, A. M. (1991). Gender, time Use, and health. *Journal of Health and Social Behavior, 32*(2), 114–129.

Bzostek, S., Goldman, N., & Pebley, A. (2007). Why do Hispanics in the USA report poor health? *Social Science & Medicine, 65*(5), 990–1003. https://doi.org/10.1016/j.socscimed.2007.04.028

Chandola, T., & Jenkinson, C. (2000). Validating self-rated health in different ethnic groups. *Ethnicity & Disease, 5*(2), 151–159.

Dowd, J. B., & Zajacova, A. (2007). Does the predictive power of self-rated health for subsequent mortality risk vary by socioeconomic status in the US? *International Journal of Epidemiology, 36*(6), 1214–1221. https://doi.org/10.1093/ije/dym214

Dowd, J. B., & Zajacova, A. (2010). Does self-rated health mean the same thing across socioeconomic groups? Evidence from biomarker data. *Annals of Epidemiology, 20*(10), 743–749. https://doi.org/10.1016/j.annepidem.2010.06.007

Erving, C. L., & Zajdel, R. (2021). Assessing the validity of self-rated health across ethnic groups: Implications for health disparities research. *Journal of Racial and Ethnic Health Disparities*. https://doi.org/10.1007/s40615-021-00977-x

Finch, B. K., Hummer, R. a, Reindl, M., & Vega, W.a. (2002). Validity of self-rated health among Latino(a)s. *American Journal of Epidemiology, 155*(8), 755–759. https://doi.org/10.1093/aje/155.8.755

Hofferth, S. L., Flood, S. M., Sobek, S., & Backman, D. (2020). *American time use survey data extract builder.* College Park, MD: University of Maryland and Minneapolis. https://doi.org/10.18128/D060.V2.8

Johnson-Lawrence, V., Zajacova, A., & Sneed, R. (2017). Education, race/ethnicity, and multimorbidity among adults aged 30–64 in the National Health Interview Survey. *SSM - Population Health, 3*(November 2016), 366–372. https://doi.org/10.1016/j.ssmph.2017.03.007

Johnson, J. V., & Lipscomb, J. (2006). Long working hours, occupational health and the changing nature of work organization. *American Journal of Industrial Medicine, 49*(11), 921–929. https://doi.org/10.1002/ajim.20383

Jylha, M. (2009). What is self-rated health and why does it predict mortality? Towards a unified conceptual model. *Social Science & Medicine, 69*, 307–316. https://doi.org/10.1016/jsocscimed.2009.05.013

Kandula, N. R., Lauderdale, D. S., & Baker, D. W. (2007). Differences in self-reported health among Asians, Latinos, and non-Hispanic whites: The role of language and nativity. *Annals of Epidemiology, 17*, 191–198. https://doi.org/10.1016/j.annepidem.2006.10.005

Lara, M., Gamboa, C., Kahramanian, M. I., Morales, L. S., & Bautista, D. E. H. (2005). Acculturation and Latino health in the United States: A review of the literature and its sociopolitical context. *Annual Review of Public Health, 26*, 367–397. https://doi.org/10.1146/annurev.publhealth.26.021304.144615

Manor, O., Matthews, S., & Power, C. (2000). Dichotomous or categorical response? Analysing self-rated health and lifetime social class. *International Journal of Epidemiology, 29*(1), 149–157. https://doi.org/10.1093/ije/29.1.149

Marquez-Velarde, G. (2020). The paradox does not fit all: Racial disparities in asthma among Mexican Americans in the U.S. *PloS One, 15*(11 November), 1–15. https://doi.org/10.1371/journal.pone.0242855

McGee, D. L., Liao, Y., Cao, G., & Cooper, R. S. (1999). Self-reported health status and mortality in a multiethnic US cohort. *American Journal of Epidemiology, 149*(1), 41–46. https://doi.org/10.1093/oxfordjournals.aje.a009725

Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., et al. (2003). Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA : The Journal of the American Medical Association, 289*(1), 76–79. https://doi.org/10.1001/jama.289.1.76

Pepin, J. R., Sayer, L. C., & Casper, L. M. (2018). Marital status and mothers' time Use: Childcare, housework, leisure, and sleep. *Demography, 55*(1), 107–133. https://doi.org/10.1007/s13524-018-0647-x

Sanchez, G. R., & Vargas, E. D. (2016). Language bias and self-rated health status among the Latino population: Evidence of the influence of translation in a wording experiment. *Quality of Life Research*. https://doi.org/10.1007/s11136-015-1147-8

Santos-Lozada, A. R., & Howard, J. T. (2018). Using allostatic load to validate self-rated health for racial/ethnic groups in the United States. *Biodemography and Social Biology, 64*(1), 1–14. https://doi.org/10.1080/19485565.2018.1429891

Santos-Lozada, A. R., & Martinez, M. J. (2017). How have you been? or ¿Como estás?: Does language of Interview Influences self-rated health among Hispanic subgroups? *Journal of Immigrant and Minority Health*. https://doi.org/10.1007/s10903-017-0606-4

Sayer, L. C., & Fine, L. (2011). Racial-ethnic differences in U.S. Married women's and men's housework. *Social Indicators Research, 101*(2), 259–265. https://doi.org/10.1007/s11205-010-9645-0

Shetterly, S. M., Baxter, J., Mason, L. D., & Hamman, R. F. (1996). Self-rated health among Hispanic vs non-Hispanic White adults: The San Luis Valley health and aging study. *American Journal of Public Health, 86*(12), 1798–1801. https://doi.org/10.2105/AJPH.86.12.1798

Viruell-Fuentes, E. a, Morenoff, J. D., Williams, D. R., & House, J. S. (2011). Language of interview, self-rated health, and the other Latino health puzzle. *American Journal of Public Health, 101*(7), 1306–1313. https://doi.org/10.2105/AJPH.2009.175455

Woo, H., & Zajacova, A. (2016). Predictive strength of self-rated health for mortality risk among Older adults in the United States: Does It differ by race and ethnicity? *Research on Aging.*, Article 0164027516. https://doi.org/10.1177/0164027516637410

Zajacova, A., & Dowd, J. B. (2011). Reliability of self-rated health in US Adults. *American Journal of Epidemiology, 174*(8), 977–983. https://doi.org/10.1093/aje/kwr204