Subjective social status and trajectories of self-rated health status: a comparative analysis of Japan and the United States

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ABSTRACT

Background Japanese society is more egalitarian than the United States as is reflected by the lower degree of prevalence of social inequalities in health. We examined whether subjective socioeconomic status is associated with different trajectories of self-rated health (SRH), and whether this relationship differs between the United States and Japan.

Methods We analyzed the responses of 3968 Americans from the survey Midlife in the United States, 2004–06, and the responses of 989 Japanese from the survey Midlife in Japan, 2008. We conducted a multilevel analysis with three self-ratings of health (10 years ago, current and 10 years in the future) nested within individuals and nested within 10 levels of subjective social status. Age, sex, educational level and subjective financial situation were adjusted.

Results After making statistical adjustments for confounding variables, respondents in Japan continued to report lower average levels of health. However, the rate of expected decline in SRH over the next decade was strongly socially patterned in the United States, whereas it was not in Japan.

Conclusion The Japanese showed no disparity in the anticipated trajectory of SRH over time, whereas the Americans showed a strong social class gradient in future trajectories of SRH.

Keywords health status, Japan, social class, United States

Introduction

Self-rated health status and social class

Self-rated health (SRH) status is a robust predictor of future morbidity, mortality and other health outcomes.[1–8] SRH has also been effectively used in studies to document social inequalities in health.[9,10] Studies consistently indicate that SRH varies according to social class or socioeconomic status (SES), indexed by constructs such as educational attainment or income.[11–16] However, SRH status is influenced by individual and societal factors that may differ between countries or according to the cultural context.[7,17] For example, Amartya Sen indicated that while India's Kerala region enjoys the highest level of longevity in the country, they also report lower levels of SRH compared to the rest of the nation.[18,19] Japan currently enjoys one of the highest levels of average life expectancy in the world, as well as comparatively low levels of health inequality than other developed nations.[20,21] However, the Japanese have been previously noted for their comparatively low levels of SRH.[22] Conversely, Americans have one of the lowest levels of life expectancy of the countries in the Organization for Economic Co-operation and Development (OECD); yet, their levels of SRH are one of the few health indicators on which they rank above other nations.[23] In the present study, we sought to provide a cross-national comparison between the trajectories of SRH in Japan and the United States, two countries having the highest and one of the lowest average life expectancies in the OECD.

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Trajectories of health

Health, particularly functional health, declines with age;[24] thus, a sense of trend or change in symptoms over time was the subjective trajectory of health.[4] SRH is also recognized as a consistent predictor of functional health decline.[6] Health and quality of life are expected to decline over time, but the rate of decline over the course of life varies among individuals and social groups.[17,25] We sought to characterize differential trajectories of SRH according to the levels of subjective social status (SSS).

Subjective social status and health

SES has been measured both objectively (using such indicators as educational attainment and income) as well as using subjective perceptions, e.g. asking respondents to rate themselves on an imaginary hierarchical 'ladder' in which the topmost rungs represent individuals with the highest levels of wealth, status and prestige. Increasing evidence suggests that SSS predicts health status above and beyond objective SES, i.e. even after controlling for income and education, SSS remains associated with various health outcomes.[16,26–30]

SSS and health trajectories

Focusing on SRH trajectories, existing literature on the relationship between SSS and trajectories is limited. The SRH over age by lifetime SES declined, and lifetime SES was associated with poor late-life health in the Mexican longitudinal study.[31] A Swedish longitudinal survey showed that SRH trajectories slowly declined over time, and the rate of change was influenced by age and sex, with older people and women showing a slower rate.[32] Although several studies examined the relationship between SES and health trajectories, little is known about the relationship between the disparity of SSS and SRH status in some countries. We hypothesize that there is a disparity of SRH trajectories and difference in the steepness of SRH trajectories among SSS in each country. Therefore, we aimed to characterize the relationship between SSS and trajectories of SRH status in Japan and the United States.

Methods

Study participants and settings

We analyzed two large-scale cross-sectional studies in the United States and Japan. The survey used for the United States, the second wave of the Midlife in the United States (MIDUS II) survey, was conducted in 2004–06 as a longitudinal follow-up of the first national survey of Midlife in the United States (MIDUS I), conducted in 1995–96. MIDUS I was based on a nationally representative random-digit-dial sample of noninstitutionalized, English-speaking adults, aged 25–74, the number of respondents for which was 7108. The number of respondents for MIDUS II was 4963, and 4032 people completed a self-administered questionnaire survey (response rate for complete MIDUS II data adjusting for mortality was 60.8%). The survey used for Japan, the Midlife in Japan (MIDJA) survey, was modeled after the MIDUS I and II studies and was conducted in April–September 2008. The sample in MIDJA was selected from the Basic Resident Register Book for the Tokyo metropolitan area (23 wards), via two-stage stratified random sampling. Within each ward, five groups were created based on age (30–39, 40–49, 50–59, 60–69 and 70–79 years) and stratified by sex. Thus, 10 strata, based on sex and age were created. For each strata a total of 100 samples were allotted and proportionally distributed among each ward based on the number of registered residents. The number of respondents for MIDJA was 1 027 (response rate was 56.2%). The response rate of MIDJA was somewhat low. According to the description of the MIDJA study, males aged 40–49 years do not respond and this is one of the major reasons for uncollected data.[33] However, each strata had >100 people according to the sampling method, and the selection bias might be limited. We conducted cross-sectional and secondary data analysis using MIDUS II and MIDJA data.[16,31]

Measurements

MIDUS I and II included information on respondent characteristics, physical and mental health, well-being and lifestyles. Most survey items in MIDJA were translated into Japanese from the items of MIDUS I and II. Thus, all the measures from MIDUS II and MIDJA that we used in this study were directly comparable.

Self-rated health status

The study's main outcome was SRH, assessed by each respondent across three different time-points: the present, past, and future. Respondents rated their current health through the question 'how would you rate your health these days?' from 0 (the worst possible health) to 10 (the best possible health). Respondents also rated their health statuses 10 years in the past, as well as looking ahead 10 years into the future (i.e. future prediction). Idler and Benyamini[1] mentioned that SRH was a dynamic evaluation that judges not only current level of health but also trajectory. Ferraro and Wilkinson[34] empirically showed that future health expectations were more important than past health expectations for predicting the mortality risk: People with more negative future health expectations were less likely to survive.

Subjective social status

Our measure of SSS was the MacArthur Scale of Subjective Social Status community ladder.[26,35] The question incorporates a picture of an imaginary ladder with 10 rungs and asks the respondent the following question: 'Think of this ladder as representing where people stand in their communities. Where would you place yourself on this ladder?' Possible responses ranged from 1 (representing the top of the ladder, where people have the highest standing in their community) to 10 (the bottom rung, representing people who have the lowest standing in their community) (see Appendix 2 Supplemental Fig. 1).

Covariates

Age, sex, educational level and subjective financial situation were included as covariates. We classified educational attainment into three levels (high school or lower, graduated high school but did not graduate college, and university or higher). Respondents rated their subjective financial situation via the question 'how would you rate your financial situation these days?' from 0 (the worst possible financial situation) to 10 (the best possible financial situation). The responses were collapsed into five categories (Table 1).

Statistical analysis

After excluding participants missing responses on SSS and SRH status, we analyzed 989 Japanese (96.3%) and 3 968 Americans (98.2%). We compared the current health status of Americans and Japanese using the t-test and analysis of covariance (ANCOVA) in which age and sex were adjusted. In the statistical analysis of individual trajectories of SRH, we considered each the current health status of each respondent as the reference point (the intercept with value set to zero) and estimated the trajectory of change over 10 years as the slope coefficient (i.e. the line connecting past, present and future evaluations of health). We constructed a multilevel model with the three self-ratings of health (10 years ago, current and 10 years in the future) nested within individuals (level 2) and nested within 10 levels of SSS (level 3). To adjust for confounding by individual-level characteristics, we constructed a sequence of three models: Model 1 (not adjusted), Model 2 (age and sex adjusted) and Model 3 (age, sex, educational level and subjective financial situation adjusted). In these models, each intercept (current health status) and each slope (expected decline over 10 years) were calculated according to SSS. Regression coefficients (B) and 95% confidence intervals (CIs) were also calculated. Cases with missing values were deleted in the three models.

Table 1 Characteristics of participants analyzed

	Japan		The United States	
n	989	100%	3 968	100%
Sex (males), n%	487	49.2%	1 783	44.9%
Age, mean SD	54.0	14.0	56.2	12.3
Education, n%				
≤High school	417	42.6%	1 305	32.9%
<High school and <University	248	25.3%	1 137	28.7%
≤University	315	32.1%	1 521	38.4%
Missing	0	NA	5	NA
Subjective financial situation (0–10), n%				
0–1 (lowest)	71	7.2%	107	2.7%
2–3	156	15.9%	295	7.6%
4–6	438	44.5%	1 221	31.3%
7–8	263	26.7%	1 683	43.2%
9–10 (highest)	56	5.7%	591	15.2%
Missing	5	NA	71	NA
Self-rated health status, mean SD				
10 years ago	7.17	2.14	8.18	1.70
Current	6.23	1.96	7.37	1.59
10 years in the future	5.18	2.13	6.71	2.04

SD, standard deviation.

All analyses were performed using the R version 3.1.0. We used the lmer() function from the lme4 library of the R version to conduct a multilevel analysis. All P values were two-sided, with $P < 0.05$ considered to be statistically significant.

Ethics approval

We assessed that approval by an ethics review board was not required because this study was a secondary analysis using data publicly available online.[33]

Results

Characteristics/descriptive analysis

The demographic characteristics of the survey participants in Japan and the United States are presented in Table 1. The distributions of SSS are shown in Supplementary Fig. 1. Americans were more likely to assign themselves to higher SSS than were Japanese.

The average level of current SRH status was higher in the United States than in Japan (7.37 versus 6.23). The crude difference was 1.14 ($P < 0.001$). In ANCOVA, the adjusted difference was 1.25 ($P < 0.001$). The crude trajectories of SRH status according to SSS (ladder) are shown in Fig. 1. In both the United States and Japan, the slopes of SRH tend to decline over time (and age), as expected.

Multilevel analysis

The results of multilevel analysis are shown in Table 2. The unadjusted intercept (current SRH status) and slope (expected health decline over 10 years) were 7.22 [95% CI, 6.97–7.47] and −0.81 [−0.90 to −0.72] in the United States as compared to 6.09 [5.87–6.30] and −1.00 [−1.07 to −0.93] in Japan (Model 1). After statistical adjustment for confounding variables (Model 3), the intercepts and slopes were 7.28 [6.96–7.61] and −0.80 [−0.89 to −0.71] as compared to

5.58 [5.10–6.05] and −1.00 [−1.07 to −0.93], respectively. The range (and variance) across social status groups was greater in the United States than in Japan, i.e. 1.22 (0.14) compared to 0.50 (0.04). The range of the slopes across the 10 SSS levels was also greater in the United States than in Japan, i.e. 0.53 (0.03) compared to 0.02 (<0.001). The differences in intercepts and slopes according to SSS are illustrated in Fig. 2a and b.

Figure 2a indicates that the lower the SSS, the worse the health status in both countries. Even after adjusting for SES (Model 3), the maximum difference among SSS in the US was 1.22, whereas that in Japan was 0.50. Figure 2b indicates that there was no variation in the trajectories of SRH across SSS groups in Japan, i.e. every social group in Japan expects their health to decline at roughly the same rate. By contrast, there is a steep gradient in the expected trajectory of health decline across SSS groups in the United States, i.e. low-SSS Americans expect their health to decline much more steeply compared to high-status Americans.

The association between individual-level characteristics and SRH are also shown in Table 2. For example, both the Japanese and Americans expect their health to decline with age. Females reported better health than males in Japan (0.17, $P = 0.058$) as well as in the United States (0.10, $P = 0.009$). Higher educational levels were significantly related to better rated health status in the United States (university or higher compared to high school or lower: 0.20, $P < 0.001$), but this was not the case in Japan (0.01, $P = 0.48$). Higher subjective financial situations were significantly related to better rated health status in both United States (the highest compared to the lowest: 1.21, $P < 0.001$) and Japan (1.61, $P < 0.001$).

Discussion

Main findings of the study

Our cross-national comparison confirmed what has been shown previously, viz., the Japanese report a lower average level of SRH compared to the Americans, despite enjoying greater longevity. The average level of current SRH was higher in the United States than in Japan (7.37 versus 6.23, $P < 0.001$). After statistical adjustment for confounding variables, respondents in Japan continued to report lower average levels of health. However, the rate of expected decline in SRH over the next decade was strongly socially patterned in the United States, whereas it was not the same in Japan. SRH status was higher among Americans than the Japanese. However, the Japanese showed no disparity in the anticipated trajectory of SRH over time, whereas Americans showed a strong social class gradient in the future trajectories of SRH.
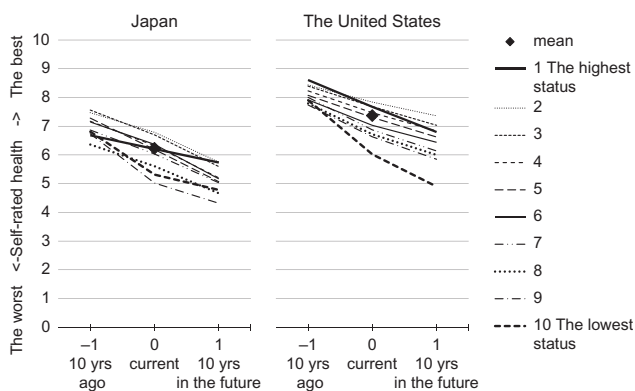

Fig. 1 Trajectories of self-rated health status by subjective social status.

Table 2 The result from multilevel analysis

Fixed effects	Japan						The United States					
	Model 1 (n = 989)		Model 2 (n = 989)		Model 3 (n = 975)		Model 1 (n = 3968)		Model 2 (n = 3968)		Model 3 (n = 3893)	
	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Intercept	6.09	5.87, 6.30	6.28	5.88, 6.68	5.58	5.10, 6.05	7.22	6.97, 7.47	7.97	7.65, 8.29	7.28	6.96, 7.61
Level 1 (measurement level)												
Slope	−1.00	−1.07, −0.93	−1.00	−1.07, −0.93	−1.00	−1.07, −0.93	−0.81	−0.90, −0.72	−0.81	−0.89, −0.72	−0.80	−0.89, −0.71
Level 2 (individual level)												
Age (continuous variable)			−0.01	−0.01, −0.00	−0.01	−0.01, 0.00			−0.01	−0.02, −0.01	−0.02	−0.02, −0.01
Sex [reference: males]												
Females			0.28	0.11, 0.45	0.17	−0.01, 0.34			0.08	0.01, 0.15	0.10	0.03, 0.17
Education reference: ≤ high school												
<High school and <University					0.13	−0.09, 0.34					0.12	0.04, 0.21
≤University					0.01	−0.20, 0.22					0.20	0.12, 0.28
Subjective financial situation reference: 0–1 (the lowest)												
2–3					0.14	−0.23, 0.51					0.22	−0.02, 0.45
4–6					0.80	0.47, 1.14					0.48	0.26, 0.69
7–8					1.32	0.96, 1.67					0.84	0.63, 1.05
9–10 (the highest)					1.61	1.14, 2.07					1.21	0.98, 1.43

Random effects	Var.	S.D.	Var.	S.D.	Var.	S.D.	Var.	S.D.	Var.	S.D.	Var.	S.D.
Level 2 (individual level)												
Intercept	2.11	1.45	2.08	1.44	1.90	1.38	1.56	1.25	1.50	1.23	1.36	1.17
Slope	1.10	1.05	1.09	1.05	1.09	1.05	1.03	1.01	1.03	1.01	1.02	1.01
Level 3 (social status level)												
Intercept	0.13	0.36	0.15	0.39	0.04	0.20	0.21	0.46	0.26	0.51	0.14	0.37
Slope	0.00	0.02	0.00	0.02	0.00	0.01	0.02	0.16	0.03	0.16	0.03	0.16
Residual	1.38	1.17	1.38	1.17	1.38	1.18	0.85	0.92	0.85	0.92	0.84	0.92

β, regression coefficient; CI, confidence interval; S.E., standard error; Var., variance; S.D., standard deviation.

Model 1, not adjusted; Model 2, age and sex were adjusted; Model 3, age, sex, educational level and subjective financial situation were adjusted.
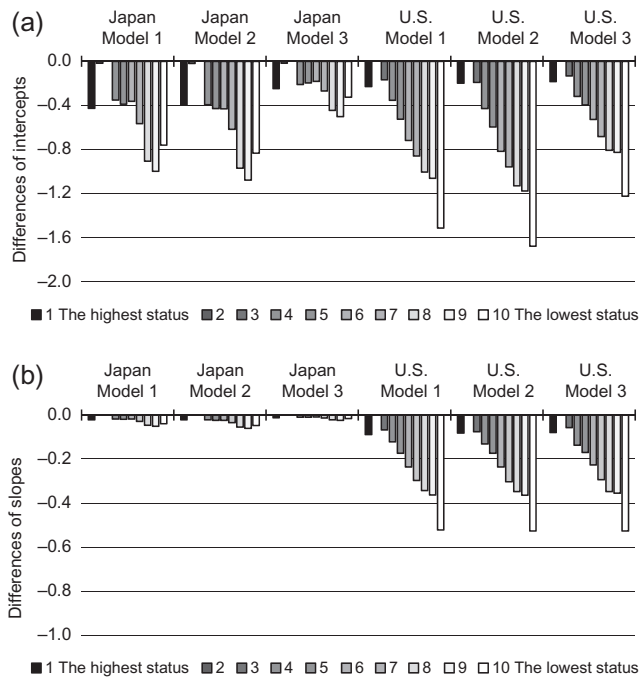
Fig. 2 (a) Differences of intercepts (current health status) by subjective social status and (b) differences of slopes (expected decline over 10 years) by subjective social status. The self-rated health status of the social status with the highest health status was treated as reference.

What is already known on this topic

According to OECD,[22] 30% of people in Japan report their health to be good, roughly comparable to the percentage of Koreans at 37%; both of these are lower than the OECD average of 68%, and substantially lower than the average American (90% of whom report their health as being good). This is despite the fact that the longevity of the Japanese is much higher (82.7 years) than that of the Americans (78.7 years). This highlights the discrepancy between the high SRH status and other objective indicators of health. Although SRH status is a robust predictor of future morbidity and mortality within groups, it is also sensitive to cultural contexts; hence, direct national comparisons need to be approached with caution.[36] It is known that variations in the perceptions of health and self-assessments of health status are partly related to different health expectations, and several studies used anchoring vignettes for the cross-cultural comparability of SRH.[37–39]

What this study adds

We adopted a novel approach, comparing the life-course trajectories of SRH across SSS groups in two countries. Our results revealed some notable cross-national differences. In terms of SSS, the Japanese were more likely to rank themselves at a lower status than Americans. The Japanese were generally likely to give a midpoint or close-to-the-middle response rather than expressing definite agreement or disagreement.[40] Hanibuchi et al.[21] mentioned that the wording of the response categories from 'Very good' to 'Very bad' with the qualifier 'very' may have biased the response toward the midpoint for Japanese respondents. We confirmed that differences of current SRH between the two countries were consistency with the OECD report. To examine the disparity of SRH trajectories among SSS, the reference of SRH should be clear. It is inappropriate to use this result for direct national comparisons.

Moreover, the results of our multilevel analysis suggested two novel findings. One was that although there were social class disparities in current SRH status in both countries, the disparity in the United States was much steeper than in Japan. The other novel finding was that the rate of expected decline in SRH over the next decade indicated clear social class disparities in the United States but not in Japan. Sacker et al.[24] reported that there were large discrepancies between the disadvantaged and 'average' individuals' health trajectories but only small differences between the trajectories of those in average and advantaged circumstances in the Western countries. This may assist in explaining the observed differences between the United States and Japan. The slopes of each class were almost parallel in Japan. By contrast, the slopes were spread out across SSS groups in the United States. The lower the SSS, the faster the respondent expects their health to decline in the future. It is possible that these differences in SRH trajectories and social class may be attributable to national differences in welfare policies.[24] Japan has a system of universal health coverage,[41] which provides assurance of access to future health care.

Limitations of this study

We acknowledge several limitations to this study. First, there is no information about household income in the surveys. We used instead respondents' subjective ratings of their financial situation. Second, the sampling framework was different between the two countries; MIDUS in the United States was based on a nationally representative random-digit-dial sample from the 48 states, while MIDJA in Japan was based on residents in the Tokyo metropolitan area.[16] Therefore, the social status of participants in MIDJA may be higher than the rest of the Japanese population. Third, the period of surveys was different; MIDUS II was conducted between 2004 and 2006, while MIDJA was conducted between April and September in 2008. Changes in economic conditions may have affected the relationship

between social status and health. However, as MIDJA was almost complete before the bankruptcy of Lehman Brothers Holdings Inc. on 15 September 2008, the impact is expected to have been limited. Finally, because this was a cross-sectional observational study, it was difficult to examine the causality and mechanisms. A much larger longitudinal project will be required in the future.

Conclusion

SRH status was higher among Americans than Japanese, despite the fact that the Japanese live longer than the average American. Social class gradients in current SRH status were apparent in both countries, although the steepness of the gradient was more marked in the United States than in Japan. Whereas the expected trajectories of health showed no social class gradient in Japan, Americans on the lowest rungs of SSS expected their health to decline much faster in the future than the Japanese. Future longitudinal studies are required to confirm these phenomena observed in our cross-sectional study.

Supplementary data

Supplementary data are available at the *Journal of Public Health* online.

Funding

Conflicts of interest

None.

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