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Do social comparisons explain the association between income inequality and health?: Relative deprivation and perceived health among male and female Japanese individuals

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ABSTRACT

Relative deprivation has been hypothesized as one of the pathways accounting for the link between income inequality and health. We tested this hypothesis in a large national sample of men and women in Japan. Our survey included a probability sample of 22,871 men and 24,243 women aged 25–64, from whom information was gathered on demographic variables, household income, occupation or employment status, and self-rated health. Our measure of relative deprivation was the Yitzhaki Index, which calculates the deprivation suffered by each individual as a function of the aggregate income shortfall for each person relative to everyone else with higher incomes in that person's reference group. We modeled several alternative reference groups, including others with the same occupation, others of the same age group, and others living in the same geographic area (prefecture), as well as combinations of these. Generalized estimating equations demonstrated that higher relative deprivation was associated with worse self-rated health. Even after controlling for absolute income as well as other sociodemographic factors, the odds ratio and its 95% confidence intervals (CI) for poor health ranged from 1.09 (95% CI: 1.02–1.16) to 1.18 (95% CI: 1.11–1.26) for men and from 1.10 (95% CI: 1.04–1.16) to 1.16 (95% CI: 1.09–1.23) for women per 1 million increase in the Yitzhaki Index. As such, relative income deprivation is associated with poor self-rated health independently of absolute income, and relative deprivation may be a mechanism underlying the link between income inequality and population health.

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Introduction

It is widely accepted that income poverty or lower absolute income adversely affects health (Lynch & Kaplan, 2000; Marmot & Wilkinson, 2005). Although controversial, many

papers have also suggested that income inequality or relative income affects health (Subramanian & Kawachi, 2004; Wilkinson & Pickett, 2006). The empirical evidence linking income inequality to health outcomes is strongest in the case of U.S. state level analyses (Backlund, Rowe, Lynch, Wolfson, Kaplan, & Sorlie, 2007; Lochner, Pamuk, Makuc, Kennedy, & Kawachi, 2001). Outside the United States, the evidence showing a link between income inequality and population health is less secure, with some positive studies (Larrea & Kawachi, 2005; Subramanian, Delgado, Jadue, Vega, & Kawachi, 2003; Subramanian, Kawachi, & Smith, 2007), but also several null studies (Blakely, Kawachi, Atkinson, & Fawcett, 2004; Gerdtham & Johannesson,

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2004; Osler, Prescott, Gronbak, Christensen, Due, & Engholm, 2002). In Japan, Shibuya, Hashimoto, and Yano (2002) previously reported that prefectural level income inequality in that country was not associated with poor self-rated health (“prefecture” refers to the geographical/administrative unit of local government in Japan). On the other hand, they found that a measure of relative income (calculated as the difference between an individual’s income and median prefectural income) was associated with worse health status. The problem, however, is that this measure of relative income is collinear with absolute income.

Until relatively recently, few studies have attempted to tease out the mechanisms underlying the relationship between income inequality and health. Two distinct pathways have been proposed through which income inequality is believed to affect population health: a macro policy-related pathway and an individual-level psychosocial pathway (Kawachi, Fujisawa, & Takao, 2007). At the societal level, income inequality is believed to erode social cohesion, cooperation, and support for the provision of public goods (Kawachi & Kennedy, 2006). Recent evidence from experimental economics – in which income inequality was manipulated in the context of trust games – supports this mechanism (Anderson, Mellor, & Milyo, 2004). Alternatively, the psychosocial pathway posits that income inequality will heighten individuals’ sense of relative deprivation, resulting in frustration, shame, stress, and adverse health consequences (Wilkinson, 2001). The theory of social comparison, initially proposed by Festinger (1954), supports this hypothesized mechanism. Empirical support for this pathway was provided recently by studies in the United States, which examined individual relative deprivation as a predictor of increased risks of mortality, as well as smoking, obesity, and mental health services utilization (Eibner & Evans, 2005; Eibner, Sturn, & Gresenz, 2004). However, few other studies have been reported on the association between relative deprivation and health outside the United States (Gravelle & Sutton, in press; Jones & Wildman, 2008). Evidence is particularly sparse among Asian countries, even though the region has experienced widening income inequalities since the 1990s (Khang, Lynch, Yun, & Lee, 2004; Kondo, Subramanian, Kawachi, Takeda, & Yamagata, in press).

In the present study, we sought to provide a test of the association between relative deprivation and health in Japan. Although previous studies have not found an association between aggregated measures of prefecture-level income inequality and health in Japan (Nakaya & Dorling, 2005; Shibuya et al., 2002), this may be due to the timing of these studies, i.e., they may have presented a limited snapshot at an early stage of the surge in income inequality in Japan. The situation may change in the future. Meanwhile, we are not aware of a previous study that has formally tested the association between individual-level sense of relative deprivation and health in Japanese society.

Methods

Data

Data on demographic variables, household income, occupation, and perceived health status were obtained

from the 2001 Comprehensive Survey of the Living Conditions of People on Health and Welfare (CSLC) conducted by the Japanese government (Ministry of Health, Labour and Welfare, 2001). Trained investigators visited households and interviewed all household members within census tracts which were randomly selected from all prefectures in the nation ($N = 47$). A health-related questionnaire was mailed to participants and collected by investigators at the time of home visiting. The survey was conducted across 5240 census tracts including 247,278 households (response rate = 87.4%), from which 31,871 households were further randomly selected and surveyed regarding income and savings (response rate = 79.5%). The total sample size available for our analyses was 22,871 men and 24,243 women, aged 25–64. Participants who completed the income questionnaire were on average 0.5 years older, 0.6% more likely to be women, and 1.0% more likely to be married compared to the group who did not provide income data (including both selected and not selected for income survey). This study was based on the secondary analysis of the data in which any individual identifiers were removed.

Relative deprivation

Following the recently adopted method by Eibner and colleagues (Eibner & Evans, 2005; Eibner et al., 2004), relative deprivation was operationalized in the present study using the Yitzhaki Index (Yitzhaki, 1979), which is itself based on the theory of relative deprivation articulated by Runciman (1966). In brief, relative deprivation for each individual is calculated as the aggregated shortfall in income between that individual and everyone else with higher incomes in that person’s reference group.

$$\text{Yitzhaki Index}_i = \frac{1}{N} \sum_j (y_j - y_i) \quad \forall y_j > y_i$$

where the amount of relative deprivation for individual i is the sum of the income gap between individuals i and j ($y_j - y_i$, where j has higher income than i) divided by the total number of people in the reference group (N).

Since we cannot know the reference group for each individual (i.e., to whom each person compares him/herself), our approach is to fit alternative definitions of reference groups. For the present study, we used three different reference groups – others with the same occupation, others in the same age group, and others living in the same geographical area (prefecture) – as well as combinations of these. Occupations were categorized into the following groups: professional/technician, manager/administrator, sales/service/clerical workers, security/transportation/laboring workers, farming/fishery/forestry workers, and unknown jobs, as well as economically inactive including homemaker (female only) and unemployed. We categorized each subject into one of four age groups: 25–34, 35–44, 45–54, and 55–64 years old.

Self-rated health

The CSLC elicited respondents’ self-rated health with the single item: “What is your current health status: excellent, very good, good, fair, or poor?”. From this question, we

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