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The social gradient in life expectancy: the contrary case of Okinawa in Japan

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Abstract

This paper examines the social gradient theory of health and life expectancy presented by Evans and his colleagues [Evans, R.G., Barer, M.L. and Marmor, T.R. (Eds.), 1994. *Why are some People Healthy and others not? The Determinants of Health of Populations*. Aldine de Gruyter, New York]. They maintain that social hierarchy is the determining factor in the health of large populations largely because it promotes differences in stress or the ability to cope with stress. For example, as Japan has risen to the top ranks of the economic hierarchy of nations in the late 20th century, Japanese life expectancy improved dramatically. Evans [Evans, R.G., 1994. Introduction. In: Evans, R., Barer, M., Marmor T. (Eds.), *Why are some People Healthy and others not? The Determinants of Health of Populations*. Aldine de Gruyter, New York, pp. 3–26.] notes that *something* lies behind this rapid increase in longevity and the major change was the hierarchical position of Japan relative to the rest of the world. However, we reviewed life expectancy data within Japan and found that Okinawans traditionally rank at the top in health and life expectancy and at the bottom in socioeconomic indicators. We find that the social gradient thesis does not apply in Japan and suggest that what is more important for health are health lifestyles, especially diet and social support. More research is needed to assess the validity of the social gradient thesis if it is to be used on a cross-national basis. © 2000 Elsevier Science Ltd. All rights reserved.

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Introduction

Numerous studies show that health status is correlated with social status: The higher a person's socioeconomic status, the longer his or her life expectancy and, conversely, the lower the status, the less longer the life (Ross and Wu, 1995; Marmot, 1996; Wilkin-

son, 1996). An intriguing aspect of this relationship is the gradient across social strata linked to differences in hierarchy rather than deprivation (Marmot et al., 1984; Marmot et al., 1991; Marmot, 1996). Although health differentials between the upper and lower classes can be explained by wide disparities in material well-being, diet, housing, leisure-time exercise, smoking, alcohol and drug abuse and greater exposure to pollutants, infectious disease, violence and other risks — it is unlikely these factors account for the differences between the upper and the upper middle class. Both

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strata are relatively affluent, neither is deprived; yet, the highest strata lives longer than the next highest and so on down the social scale until the bottom of the class structure is reached.

This circumstance has persisted throughout the 20th century despite change in the major types of diseases from acute to chronic and improved access to medical care. A sophisticated effort to explain this situation is that of Evans and colleagues (Evans et al., 1994) who suggest that the social gradient in health and life expectancy is largely due to stress or the ability to cope with stress. Drawing upon studies of social hierarchies of both primates and humans, Evans (1994) found that those at the top of a society are less affected by stress and have fewer health problems including coronary heart disease. Greater anxiety, higher-level and more prolonged stress responses, along with poorer overall health and more heart disease were characteristic of those at the bottom. Social factors like self-esteem, self-direction in work, control over one's environment and sense of social support — all variables which declined in strength as one descends the social ladder — were identified as crucial to buffering and/or coping with stress and its physiological impact on the body.

However, while this argument has support in the research literature when applied to social classes, we suggest that its explanatory power weakens considerably when applied to nations and geographical areas. The case in point is Japan. Evans et al. (1994; Evans and Stoddard, 1994) highlight Japan as a primary example of the validity of the social gradient thesis by linking Japan's rise to the top ranks of the economic hierarchy of nations in the late 20th century with its dramatic rise in life expectancy. Russia, on the other hand, descended in the same hierarchy while experiencing a major decline in life expectancy. While this comparison has a logical appeal in support of the social gradient concept, we will show that within Japan the social gradient explanation of health and life expectancy does not apply. This is an important distinction because one would predict that Japan's higher status and most affluent prefectures (provinces) would have the highest life expectancy and therefore serve as the major catalyst for Japan's rise to the number one position in longevity in the world. If this is not the case, the effect of social gradients on life expectancy would appear to be confounded since it would seem necessary that the health effects of social rank operate on all levels of a hierarchy — not just some of them.

There are other exceptions to the social gradient thesis. For example, Kerala state in India is a relatively poor province with a much higher than expected life expectancy. Land reform, government investments in maternal and child care, primary health care, female education and a narrower gap between rich and poor in the province have been given as possible expla-

nations for this development (McKibben, 1996; Ratcliffe, 1978). At the national level, Costa Rica has achieved a long life expectancy despite relatively low per capita income (Caldwell, 1986). But Japan is an especially strong case study of the social gradient theory because of its rapid ascent up both the economic and longevity hierarchies of nations and chosen by Evans and his colleagues to support their argument. First, we will briefly review the Evans et al. comments on Japan and, secondly, discuss our findings on health and socioeconomic rank at the national and prefectural level. Our discussion will be centered on a comparison of Okinawa to Japan's other 46 prefectures because of Okinawa's traditionally high longevity. We will then discuss the implications of our findings for social gradient theory.

Japan as an example of the social gradient thesis

Japan has the highest life expectancy in the world for both males and females, with 1995 figures showing that Japanese males live 76.36 yr on average and females live 82.84 yr. In 1960 this was not the case as Japanese longevity for males and females was well below that of most European countries (Powell and Aneski, 1990). Evans points out that the Japanese in Japan have demonstrated in the last thirty years that the health status of an entire population can change very rapidly and pass Western levels of longevity in the process. He rejects improvements in medical care and home and work settings, along with changes in diet and social structure, as the principal causes of the rapid increase in life expectancy. "What *has* changed", states Evans (1994:18), "is the hierarchical position of Japanese society as a whole relative to the rest of the world".

Japan did move from a defeated and war-weary nation in 1945 to the very top echelon of the world's economic powers during this period. This was an extraordinary economic performance (Ishida, 1993; Waswo, 1996). At the same time, Japan surpassed the rest of the world in life expectancy, although its expenditures on health are relatively low (only 7.2% of the GDP in 1995, which was about half that of the United States). Evans and Stoddard (1994) maintain that the rapid economic growth and striking success in world trade promoted a strong sense of self-esteem which yielded health benefits. Although they emphasize that this conclusion has not been thoroughly tested, Evans and Stoddard (1994:58), nevertheless claim that "the consequent rapid growth in prosperity, particularly relative to their leading competitors, has greatly enhanced (already well-developed) national and individual self-esteem which has in turn contributed to a

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