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INTERNATIONAL COMPARISONS OF THE BEHAVIORAL IMMUNE SYSTEM IN JAPAN, MALAYSIA AND THE PHILIPPINES

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Abstract

The purpose of this study was to examine the characteristics of the human behavioral immune system (BIS) by comparing its properties in three Asian countries (Japan, Malaysia, and the Philippines). A total of 1,142 university students completed paper-and-pencil questionnaires, including the Perceived Vulnerability to Disease questionnaire (PVD-Q), the Death Anxiety Scale, and a rating of their current subjective health status. Bayesian analyses were conducted on the valid data provided by 1,055 undergraduate students. Women were found to score higher than men on the germ aversion subscale of the PVD-Q (unpleasant feelings induced in contexts of a high potential for pathogen transmission), regardless of their nationality. In addition, participants from the tropical countries (Malaysia and the Philippines) scored higher in germ aversion compared to those from Japan, which is mostly in the temperate climate zone. No such significant sex and regional differences were observed on the other PVD-Q subscale (perceived infectability: beliefs about the susceptibility to infectious diseases). Perceived infectability was strongly associated with current health status, but less closely associated with fear of death, whereas germ aversion was highly associated with fear of death but not associated with health status. These associations between fear of death or health status and the PVD subscales were generally consistent across all three countries. The implication of these findings is that perceived infectability reflects an individual's proximate health-related beliefs or condition, while germ aversion rather reflects the ultimate evolutionary process of adaptation internalized in his or her mind. Anyway, both functions of the BIS seem to provide proactive defenses against pathogens in different ways.

Keywords: *Behavioral immune system, disgust avoidance, death anxiety, sex difference, geographic difference.*

1. Introduction

Infectious disease has been an important threat to reproductive fitness in human evolutionary history. Activation of the physiological immune system is efficient, but costly, and its management of pathogenic threat is imperfect. Therefore, another defensive mechanism to reduce the threat of disease before the point of infection has evolved (Ackerman et al., 2018). The mechanism has been recently scrutinized under the name of the behavioral immune system (BIS; Schaller, 2006).

The literature documents a diverse array of factors that are associated with BIS. Sex is perhaps the best-studied demographic factor. For instance, women have consistently reported substantially higher disgust sensitivity than men (e.g., Curtis et al., 2004). A second prevailing factor relates to the region in which people live. It has been noted in the literature that if the threat of disease is highly salient, the reactivity of BIS is likely to be more pronounced (Schaller, 2006).

In addition to the demographic and geographic factors enumerated above, we can also deduce which additional personal characteristics might be important determinants of individual differences in the BIS. Health status is one of the most important of these determinants. Those who are vulnerable to disease are considered to feel more threatened than others (Schwarzer, 1994).

The present study had several aims based around examining the BIS-related characteristics of Asian cross-national samples recruited from Japan, Malaysia, and the Philippines. The first goal was to investigate demographic (sex) and geographic (cross-national) differences in the BIS among these countries. Based on previous findings related to this first purpose of the study, we hypothesized that women would score higher on measures of the BIS compared to their male counterparts. Similarly, we hypothesized that people who were living in the two tropical countries (Malaysia and the Philippines), in which the prevalence of infectious disease is high, would show tendencies to a more active BIS compared to those who were living in Japan, which is mostly in the temperate climate zone. The second goal was to investigate physical and psychological correlates (i.e., current health status and fear of death) of the BIS. Regarding the second

goal, we hypothesized that the worse an individual's health status, and the stronger their fear of death, the stronger their BIS would tend to be.

2. Methods

2.1. Participants and dataset

Data were collected from university students from three countries of Japan, Malaysia, and the Philippines. Altogether, 1,142 participants completed questionnaires measuring the BIS, fear of death, and current health status. Afterwards, participants supplied their demographic information, including sex and age. Participants who were graduate students, who were not of the same nationality as the country in which they were completing the survey (e.g., overseas students), and who did not answer all questions were excluded from the sample. Analyses were then conducted on the data from 1,055 valid undergraduate respondents. Of these, 410 were Japanese, 346 Malaysian, and 299 Filipino; 311 were men and 744 women (29.5% men); and ages ranged from 17 to 28 years (M = 19.98; SD = 1.75).

2.2. Instruments

Other than demographic measures (age, sex, etc.), participants completed the following measures:

1) Perceived Vulnerability to Disease questionnaire (PVD-Q; Duncan et al., 2009). The PVD-Q has two main subscales: Perceived infectability (beliefs about one's own susceptibility to the transmission of infectious diseases) and Germ aversion (emotional discomfort in contexts that connote a high potential for pathogen transmission). Participants rated how much these statements applied to themselves on a 7-point scale (1 = "strongly disagree"; 7 = "strongly agree"). The composite reliability estimates (Raykov, 1997) derived from this instrument in the present study were 0.83 (perceived infectability) and 0.61 (germ aversion).

2) Current health status. In this study, responses to the question ("In general, how would you rate your current health status?") were given on a 5-point Likert scale ranging from 1 = "very good" to 5 = "very bad." Responses were reversed-scored for analysis so that higher scores indicated better health.

3) Fear of Death. We used the Death Anxiety Scale (Templer, 1970) to measure individual differences in the fear of death, with a higher score indicating greater fear of death. The internal consistency of the scale reached an adequate level (0.67).

3. Results

3.1. Demographic and geographic differences of the BIS

Estimation of a posteriori and related posterior statistics for perceived infectability scores in each of the three countries implied that there was no significant main effect of sex or country, and no interaction between these two variables ($p > .10$), suggesting that there were no sex or regional differences in scores on this subscale of the PVD-Q. In contrast to perceived infectability, the same statistics for germ aversion estimation indicated a significant main effect of sex ($p < .001$). This implies that germ aversion was higher in women than in men, in all countries. A marginally significant ($p < .06$) main effect of the country was also detected. Post hoc comparisons revealed that Japanese participants indicated significant higher germ aversion score compared to Malaysian and Filipino participants.

3.2. Physical and psychological correlates of the BIS

Figure 1 illustrates the regressions of current health status and fear of death on perceived infectability. Regarding health status (upper panel), the estimated coefficients (B) were –0.37, –0.19, and –0.43 for the Japanese, Malaysian, and Filipino samples, respectively. The 95% HDI of all estimates did not include zero, suggesting, in all countries, the healthier the person, the lower their perceived infectability. In contrast, the estimated coefficients for the effect of fear of death on perceived infectability (lower panel) were 0.02, 0.01, and 0.06 for the Japanese, Malaysian, and Filipino samples, respectively. The 95% HDI of all estimates included zero except that of Philippines, suggesting that effect of fear of death to increase perceived infectability remained partial.

Figure 2 illustrates the regressions of health status and fear of death on germ aversion. Regarding health status (upper panel), the estimated coefficients (B) were –0.07, 0.00, and –0.07 in the Japanese, Malaysian, and Filipino samples, respectively. The 95% HDI of all estimates did include zero, suggesting current health status was not associated with germ aversion in all countries. In contrast, the estimated coefficients for the effect of fear of death on germ aversion (lower panel) were 0.05, 0.04, and 0.05 for the Japanese, Malaysian, and Filipino samples, respectively. The 95% HDI of all estimates did not include zero, suggesting, in every country, the higher an individual's fear of death, the stronger the person's germ aversion tended to be.

Figure 1. Regressions representing the association of health status (A) and fear of death (B) with perceived infectability in each of the three countries.

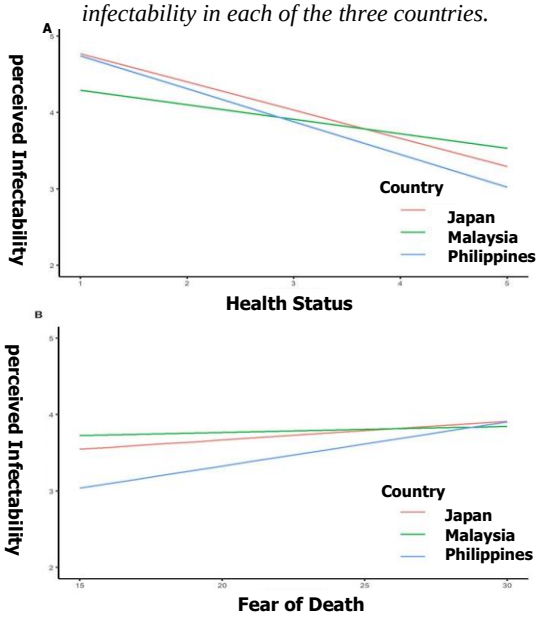
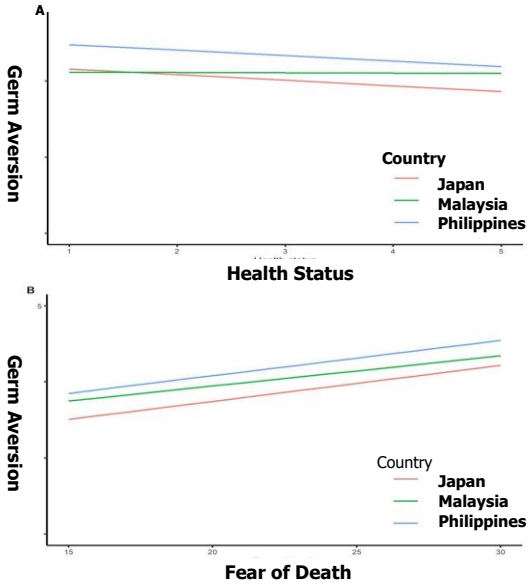


Figure 2. Regressions representing the association of health status (A) and fear of death (B) with germ aversion in each of the three countries.



4. Discussion

The results of the present study imply that perceived infectability tends to be associated with individuals' current health status. In contrast, germ aversion seems to be associated with their fear to death, as well as sex-specific attitudes and the region in which they live. In this sense, it might be possible to claim that perceived infectability reflects a person's proximate health-related beliefs or condition. Germ aversion, on the other hand, might reflect the ultimate evolutionary process of adaptation internalized in his or her mind. Anyway, both functions of the BIS seem to provide proactive defenses against pathogens in different ways.

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References

Ackerman, J. M., Hill, S. E., & Murray, D. R. (2018). The behavioral immune system: current concerns and future directions. *Social and Personality Psychology Compass, 12,* e12371. https://doi.org/10.1111/spc3.12371

Curtis, V., Aunger, R., & Rabie, T. (2004). Evidence that disgust evolved to protect from risk of disease. *Proceedings of the Royal Society B, 271,* S131-S133. https://doi.org/10.1098/rsbl.2003.0144

Duncan, L. A, Schaller, M., & Park, J. H. (2009). Perceived vulnerability to disease: development and validation of a 15-item self-report instrument. *Personality and Individual Differences, 47,* 541-546. https://doi.org/10.1016/j.paid.2009.05.001

Raykov, T. (1997). Estimation of composite reliability for congeneric measures. *Applied Psychological Measurement, 21,* 173-184. https://doi.org/10.1177/01466216970212006

Schaller, M. (2006). Parasites, Behavioral Defenses, and the Social Psychological Mechanisms through Which Cultures Are Evoked. *Psychological Inquiry, 17,* 96-101. http://www.jstor.org/stable/20447307

Schwarzer, R. (1994). Optimism, vulnerability, and self-beliefs as health-related cognitions: a systematic overview. *Psychology & Health, 9,* 161-180. https://doi.org/10.1080/08870449408407475

Templer, D. I. (1970). The construction and validation of a death anxiety scale. *The Journal of General Psychology. 82,* 165-177. https://doi.org/10.1080/00221309.1970.9920634