Chapter # 12

CROSS-NATIONAL COMPARISON OF BEHAVIORAL IMMUNE SENSITIVITY IN JAPAN, MALAYSIA, AND THE PHILIPPINES*

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ABSTRACT
This study aimed to investigate the characteristics of the human behavioral immune sensitivity by comparing its attributes across three Asian countries: Japan, Malaysia, and the Philippines. A total of 1,055 university students completed paper-based questionnaires, including the Perceived Vulnerability to Disease Questionnaire (PVD-Q), the Death Anxiety Scale, and a self-assessment of current health status. Across all national groups, females scored significantly higher than males on the germ aversion subscale of the PVD-Q, which measures affective discomfort in contexts with heightened pathogen transmission risk. Furthermore, participants in tropical regions (Malaysia and the Philippines) exhibited significantly higher germ aversion scores compared to those in Japan, a country predominantly situated in a temperate climate zone. In contrast, no significant sex or regional differences were observed on the perceived infectability subscale of the PVD-Q, which assesses individuals' beliefs about their susceptibility to infectious diseases. Perceived infectability was strongly associated with current health status but only partially related to fear of death, whereas germ aversion was positively associated with fear of death but unrelated to health status. These patterns of association were generally consistent across the countries.

Keywords: behavioral immune system, disgust avoidance, death anxiety, subjective health, sex difference, geographic difference.

1. INTRODUCTION

Infectious disease has posed a significant threat to human reproductive fitness throughout evolutionary history (Schaller & Murray, 2010). While the activation of the physiological immune system constitutes an effective defense against infection, it is metabolically costly and provides only imperfect protection. Consequently, humans have evolved an additional psychological mechanism designed to mitigate pathogen exposure prior to actual infection. This prophylactic immune sensitivity, now commonly referred to as the behavioral immune system (BIS), detects cues to the presence of infectious pathogens in the immediate environment and triggers affective, cognitive, and behavioral responses designed to prevent contact with disease-causing agents (Schaller & Park, 2011).

BIS is a psychological adaptation acquired to cope with ancestral environments (Schaller & Murray, 2010), and it has been argued that, in modern contexts, it may at times engender maladaptive emotions and behaviors. For example, activation of the BIS can give rise to prejudice against outgroup individuals (e.g., immigrants) as potential pathogen carriers (Duncan & Schaller, 2009) or the overestimation of others' physical attractiveness as a signal of non-carrier status (White, Kenrick, & Neuberg, 2013). The COVID-19 pandemic further illustrates the maladaptive consequences of BIS activation: high stress among healthcare and essential workers has been associated with excessive alcohol and

drug use (McKay & Asmundson, 2020), while older adults at high risk for severe illness have experienced increased depressive symptoms (Joseph, O'Shea, Eastman, Finlay, & Kobayashi, 2022). These findings demonstrate that BIS processes continue to shape human emotions, cognition, and behavior even in our contemporary society.

A substantial body of literature has identified a range of factors associated with BIS. Among these, sex is perhaps the most extensively studied demographic variable. Numerous studies have consistently reported that females exhibit significantly higher disgust sensitivity than males (Curtis, Aunger, & Rabie, 2004; Haidt, McCauley, & Rozin, 1994; Prokop, Usak, & Fančovičová, 2010; Rozin, Haidt, McCauley, Dunlop, & Ashmore, 1999). Al-Shawaf, Lewis, & Buss (2018) proposed six evolutionary explanations for this heightened sensitivity in females: (a) reduced risk-taking due to females' critical role in gene propagation; (b) greater potential for females to transmit infections to offspring; (c) a more central role for females in shielding children from pathogens and in socializing disease-avoidant behavior; (d) ancestral responsibilities related to food cleaning and preparation; (e) lower male disgust sensitivity as a signal of immunological robustness conducive to short-term mating; and (f) elevated male thresholds for disgust in contexts involving blood, injury, and death due to selective pressures from hunting and warfare. These hypotheses, while not mutually exclusive, collectively suggest that humans—particularly females—have undergone adaptive responses to environments characterized by high pathogen threat.

Geographic context represents another critical factor. The disease prevalence hypothesis (Schaller & Duncan, 2007) posits that the salience of pathogen threat in one's environment amplifies BIS reactivity. Parasitic and infectious diseases, such as malaria and the Zika virus, are disproportionately concentrated in equatorial regions, thereby presenting elevated survival risks (van Lange, Rinderu, & Bushman., 2018). Supporting this hypothesis, Skolnick and Dzokoto (2013) found that individuals in Ghana—a country with a historically high prevalence of infectious disease—report greater sensitivity to disgust and contamination than those in the United States, where pathogen threats are comparatively lower. However, to date, few empirical studies have examined BIS-related differences across Asian countries with varying disease ecologies.

Beyond demographic and geographic determinants, individual-level characteristics also influence BIS functioning. One such determinant is physical health. According to the Health Belief Model (Becker, Drachman, & Kirscht, 1974), perceived vulnerability to illness functions as a distal factor that increases perceived threat, leading to more pronounced health-related behaviors (Schwarzer, 1994). For instance, individuals with hypochondriasis not only report poorer perceived health and greater physical impairment but also make more frequent use of healthcare services (Gureje, Üstün, & Simon, 1997). Similarly, patients with familial hypercholesterolemia modify their perceptions of vulnerability to heart disease in response to their illness experiences (Frich, Ose, Malterud, & Fugelli, 2006). These findings suggest that current health status may similarly modulate BIS sensitivity.

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Emerging research further suggests that psychological variables constitute key contributors to BIS activation. Terror management theory (Greenberg, Pyszczynski, & Solomon, 1986; Solomon, Greenberg, & Pyszczynski, 1991) posits that humans' awareness of their mortality produces existential anxiety—fear of death—which can influence a broad range of attitudes and behaviors. Stimuli reminding us of our animalistic nature—such as dead bodies, deformities (e.g., burn scars, birthmarks), poor hygiene (e.g., body odor), and sexual activity—frequently elicit the emotion of disgust (Rozin, Haidt, & McCauley, 2008). Goldenberg et al. (2001) demonstrated experimentally that mortality salience intensifies disgust responses to such stimuli, including animals (e.g., cockroaches), body products (e.g., unflushed feces), and sexual scenarios (e.g., age-discrepant relationships). Given the close association between these disgust-eliciting cues and pathogen threat, fear of death may constitute a psychological antecedent of BIS activation.

2. OBJECTIVES

The present study conducted a cross-national comparison of BIS–related characteristics using samples from Japan, Malaysia, and the Philippines. The first objective was to investigate differences in BIS activity, including demographic (sex) and geographic (cross-national) factors. Based on prior research, we hypothesized that females would exhibit higher BIS-related scores than males. Similarly, we predicted that individuals residing in the tropical regions of Malaysia and the Philippines—where the prevalence of infectious diseases is relatively high—would demonstrate more pronounced BIS activation compared to those residing in Japan, which is primarily located in a temperate climate zone. The second objective was to examine physical and psychological correlates of BIS activity, specifically current health status and fear of death. In line with theoretical expectations, we hypothesized that individuals in poorer health and those reporting stronger fear of death would exhibit heightened BIS sensitivity.

3. METHODS

3.1. Participants

Data were collected from university students living in three countries: Japan (Waseda University), Malaysia (Universiti Tunku Abdul Rahman), and the Philippines (De La Salle University). A total of 1,142 participants initially completed a set of questionnaires assessing BIS responses, fear of death, and current health status. Participants also provided demographic information, including sex, age, and nationality. To ensure sample consistency, individuals who were not undergraduate students (e.g., graduate students) and those whose nationality did not correspond to the country in which the survey was conducted (e.g., international students) were excluded from the final analysis. As a result, the final dataset comprised 1,055 valid undergraduate respondents: 410 from Japan, 346 from Malaysia, and 299 from the Philippines. Of these, 311 males and 744 females (29.5% male) participated, with ages ranging from 17 to 28 years ($M = 19.98$, $SD = 1.75$). All potential participants were first informed of the purpose of the study and that by completing the questionnaire, they would be considered to have given their consent to participate. The approval for the study protocol was granted by the Ethics Committee of Waseda University on behalf of the participating institutions (Approval No.:2015-104).

3.2. Materials

Participants from Japan completed the Japanese version of the study, while those from Malaysia and the Philippines completed the English version. All questionnaires employed in the study have been previously validated and utilized in multiple studies in both languages. The raw data supporting the conclusions of this manuscript will be made available by the author to any qualified researcher upon reasonable request and without undue restriction.

3.2.1. Behavioral Immune System (BIS)

We employed the Perceived Vulnerability to Disease Questionnaire (PVD-Q; Duncan, Schaller, & Park, 2009) to assess individual differences in BIS. For Japanese participants, we utilized the validated Japanese version of the scale (Fukukawa, Oda, Usami, & Kawahito, 2014), which is a translation of the original English instrument. The PVD-Q comprises two primary subscales. One is the Perceived Infectability subscale, which assesses beliefs regarding one's susceptibility to infectious diseases. It consists of seven items, including statements such as "I am more likely than the people around me to catch an infectious disease" and "My immune system protects me from most illnesses that other people get" (reverse-scored). Another is the Germ Aversion subscale, which measures emotional discomfort in situations perceived to involve a high risk of pathogen transmission. This subscale includes eight items, such as "It really bothers me when people sneeze without covering their mouths" and "I am comfortable sharing a water bottle with a friend" (reverse-scored). Participants rated the extent to which each item applied to them on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Reverse-scored items were recoded accordingly, and subscale scores were calculated by averaging the item responses, resulting in possible subscale scores ranging from 1 to 7, with higher scores indicating greater perceived vulnerability to infectious disease. Composite reliability estimates (Raykov, 1997) in the present study were 0.88, 0.67, and 0.87 for Perceived Infectability and 0.70, 0.43, and 0.69 for Germ Aversion for the Japanese, Malaysian, and Filipino samples, respectively. Except for Germ Aversion in the Malaysian sample, the internal consistency of these subscales was generally within an acceptable range.

3.2.2. Current Health Status

Participants' current health status was evaluated using a single-item self-assessment questionnaire. "In general, how would you rate your current health status?" Subjective health assessments have garnered substantial attention in population health research (Joe & Subramanian, 2017) and have been employed in cross-cultural studies as well (e.g., Jürges, 2007). In the present study, responses were recorded on a 5-point Likert scale ranging from 1 (very good) to 5 (very bad). For analytical purposes, scores were reverse scored so that higher values reflected better self-rated health.

3.2.3. Fear of Death

The Death Anxiety Scale (Templer, 1970) was employed to assess individual differences in fear of death. For Japanese participants, the validated Japanese version of the scale (Okamura, 1983), a translation of the original English instrument, was used. The scale comprises 15 items reflecting a broad spectrum of experience- related to dying, the finality of death, and death-related phenomena such as corpses and burial. Examples of items include: "The sight of a dead body is horrifying to me" (reverse-scored) and "It doesn't make me nervous when people talk about death." Participants responded to each statement with a dichotomous "true" or "false." Responses marked "true" were scored as 1, while

"false" responses were scored as 2. Following reverse scoring of applicable items, item scores were summed, yielding a total score range from 15 to 30, with higher scores indicating greater fear of death. The internal consistency (composite reliability) of the scale in the present sample was 0.71, 0.62, and 0.72 for the Japanese, Malaysian, and Filipino samples, respectively.

3.2.4. Statistical Analysis

Bayesian analyses were employed to test all hypotheses presented in this study. First, to examine demographic and geographic differences in PVD-Q subscale scores (i.e., perceived infectability and germ aversion), we conducted Bayesian versions of classical two-way analyses of variance (ANOVAs). In these models, scores on each PVD-Q subscale served as dependent variables, while sex and country functioned as independent variables. Second, to investigate the relationships between PVD-Q subscale scores and participants' physical and psychological characteristics, Bayesian regression analyses were performed separately for each country's sample. Specifically, individual regressions of current health status and fear of death were computed against scores on each PVD-Q subscale. All Bayesian analyses were conducted using Stan (Stan Development Team, 2017) via the R interface (R Core Team, 2018). To ensure convergence to normal posterior distributions, we employed Markov Chain Monte Carlo (MCMC) simulation with a Gibbs sampler, running four chains with 1,000 burn-in iterations, 20,000 total iterations, and thinning every third iteration. Prior distributions were specified as follows: the population mean parameter (μ) was assigned a normal distribution with mean 0 and standard deviation 10, and the population standard deviation parameter (σ) was assigned a wide half-Cauchy distribution with scale 5.

4. RESULTS

4.1. Descriptive Statistics

A chi-squared test indicated that the sex ratio did not differ among the three countries. A one-way ANOVA revealed statistically significant age differences among the countries, $F(2, 1052) = 813.9$, $p < .001$, $\eta^2 = .51$. The mean ages were 21.73 (SD = 1.56) for Malaysia, 19.37 (SD = 0.98) for Japan, and 18.81 (SD = 1.10) for the Philippines. Other one-way ANOVAs revealed no significant differences regarding current health status and fear of death. Overall, these results suggest minimal differences among the national groups in these variables.

4.2. Demographic and Geographic Differences of the BIS

The result of the Bayesian analyses indicated no violations of normality or homogeneity of variance in scores on the two PVD subscales—perceived infectability and germ aversion—across the six demographic and geographic groups (2 sexes × 3 countries). The effective sample sizes for each parameter (ranging from 15,953 to 25,224 for perceived infectability and from 16,499 to 25,336 for germ aversion) were sufficiently large, and all $\hat{R}$ values were below 1.1, indicating satisfactory convergence and adequate sampling.

The left half of Table 1 presents the expected a posteriori (EAP) estimates and corresponding posterior statistics for perceived infectability scores across the three countries. The estimated Markov Chain Monte Carlo (MCMC) p-values indicated no significant main effects of sex or country, nor any interaction between these variables ($p > .10$), suggesting no sex or regional differences in this PVD-Q subscale.

The right half of the table shows the analogous statistics for germ aversion. In contrast to perceived infectability, the MCMC p-value estimation revealed a significant main effect of sex ($p < .001$). The estimated difference in EAP scores between females and males was 0.32, with a 95% highest density interval (HDI) of [0.21, 0.43], excluding zero. This indicates that germ aversion was significantly higher in females than males, irrespective of country. A marginally significant main effect of country was also observed ($p < .06$). Post hoc comparisons revealed estimated EAP differences of 0.18 (95% HDI [0.04, 0.30]) between Malaysian and Japanese participants, and 0.30 (95% HDI [0.17, 0.44]) between Filipino and Japanese participants; both intervals excluded zero. Conversely, the estimated difference between Filipino and Malaysian participants was 0.13, with a 95% HDI including zero ([–0.01, 0.27]), indicating no significant difference between these two groups. These findings suggest stronger germ aversion among Malaysian and Filipino participants compared to Japanese participants. The interaction between sex and country was nonsignificant, indicating that the effects of sex and country on germ aversion were independent.

Table 1.
Posterior statistics on perceived infectability (left half) and germ aversion (right half) in each country.

	Perceived Infectability				Germ Aversion			
	Male		Female		Male		Female	
Country	EAP (SE)	95% HDI	EAP (SE)	95% HDI	EAP (SE)	95% HDI	EAP (SE)	95% HDI
Japan	3.80 (0.10)	[3.61, 4.00]	3.77 (0.06)	[3.65, 3.89]	3.74 (0.08)	[3.59, 3.89]	4.05 (0.05)	[3.96, 4.14]
Malaysia	3.72 (0.10)	[3.52, 3.92]	3.83 (0.07)	[3.70, 3.97]	3.96 (0.08)	[3.81, 4.12]	4.17 (0.05)	[4.07, 4.28]
Philippines	3.49 (0.11)	[3.28, 3.71]	3.62 (0.07)	[3.47, 3.76]	3.97 (0.09)	[3.80, 4.15]	4.42 (0.06)	[4.30, 4.53]

EAP, Expected A Posteriori; SE, Standard Error; HPD, Highest Density Interval.

4.3. Physical and Psychological Correlates of the BIS

As a result of the Bayesian analyses, the effective sample sizes for each parameter (ranging from 23,677 to 25,336 for perceived infectability and from 23,775 to 25,336 for germ aversion) were sufficiently large. Additionally, the potential scale reduction factors ($\hat{R}$) were all below 1.1, indicating adequate convergence and confirming that the sample size was sufficient.

Figure 1 depicts the regression analyses of current health status and fear of death on perceived infectability. For current health status (A), the estimated regression coefficients (β) were –0.37 (95% highest density interval [HDI]: –0.47 to –0.27), –0.19 (95% HDI: –0.32 to –0.06), and –0.43 (95% HDI: –0.58 to –0.28) for the Japanese, Malaysian, and Filipino samples, respectively. None of these 95% HDIs included zero, indicating a consistent negative association across countries whereby better health was related to lower perceived infectability. In contrast, the estimated coefficients for the effect of fear of death on perceived infectability (B) were 0.02 (95% HDI: –0.01 to 0.06), 0.01 (95% HDI: –0.03 to 0.05), and 0.06 (95% HDI: 0.02 to 0.10) for the Japanese, Malaysian, and Filipino samples, respectively. The 95% HDIs for the Japanese and Malaysian samples included zero, indicating no significant relationship, whereas for the Filipino sample, the HDI excluded zero, suggesting a positive association between fear of death and perceived infectability.

Figure 1.
Regression lines showing the associations of perceived infectability with (A) current health status and (B) fear of death in each of the three countries.

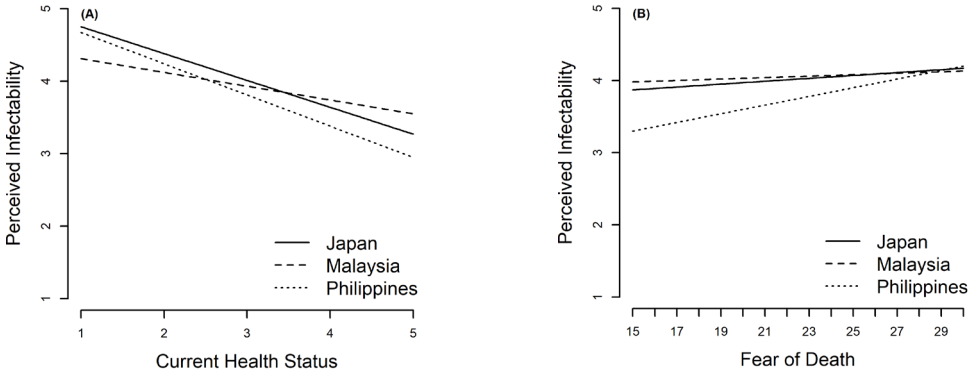
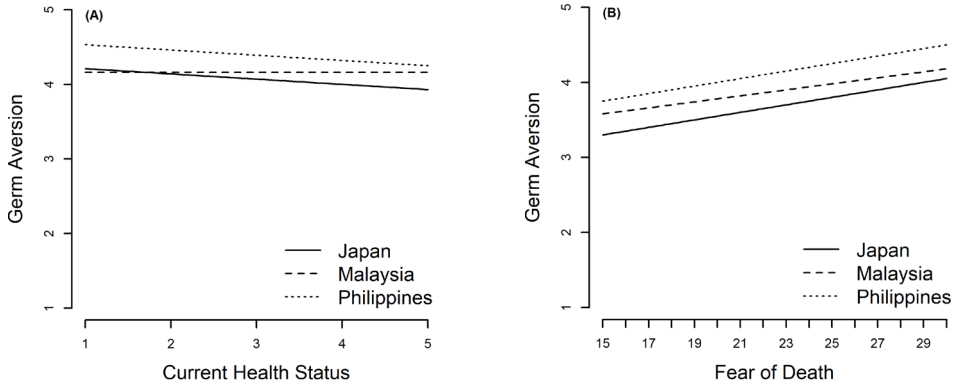


Figure 2 illustrates the regressions of current health status and fear of death on germ aversion. Regarding current health status (A), the estimated coefficients (β) were –0.07 (95% HDI: –0.16 to 0.01), 0.00 (95% HDI: –0.11 to 0.11), and –0.07 (95% HDI: –0.19 to 0.05) for the Japanese, Malaysian, and Filipino samples, respectively. All 95% HDIs included zero, indicating little to no relationship between health status and germ aversion across the samples. Conversely, the estimated coefficients for fear of death on germ aversion (B) were 0.05 (95% HDI: 0.02 to 0.08), 0.04 (95% HDI: 0.01 to 0.07), and 0.05 (95% HDI: 0.02 to 0.08) for the Japanese, Malaysian, and Filipino samples, respectively. None of these intervals included zero, indicating a significant positive association between fear of death and germ aversion in all three countries.

Figure 2.
Regression lines showing the associations of germ aversion with (A) current health status and (B) fear of death in each of the three countries.



5. DISCUSSION

The primary aim of this study was to examine demographic (sex) and geographic (cross-national) differences in behavioral immune system, as assessed by the Perceived Vulnerability to Disease Questionnaire (PVD-Q). Consistent with our hypotheses and prior research (Haidt, McCauley, & Rozin, 1994; Rozin et al., 1999; Prokop, 2010; Curtis et al., 2004), females scored significantly higher than males on the germ aversion subscale across all countries examined. This finding aligns with the widely observed trend that females generally exhibit greater disgust sensitivity than males (Curtis, de Barra, & Aunger, 2011), suggesting a potentially universal pattern. Oaten, Stevenson, and Case (2009) provide a plausible evolutionary explanation for this sex difference, proposing that (1) females face greater reproductive costs if they select an unhealthy mate who subsequently dies, potentially leaving them solely responsible for offspring care, and (2) as primary caregivers, females are under selective pressure to protect their offspring from infectious diseases. Given this heightened risk, it is unsurprising that females demonstrate elevated germ aversion. In contrast, no significant sex differences were observed for perceived infectability. While germ aversion pertains to emotional and behavioral avoidance of pathogen cues, perceived infectability reflects a cognitive appraisal of one's susceptibility to disease (Lieberman & Patrick, 2014). Notably, females generally mount stronger innate, humoral, and cellular immune responses to viral infections compared to males (Ruggieri, Malorni, & Ricciardi, 2016). This physiological advantage may contribute to females' comparatively lower perceived infectability, despite their heightened behavioral avoidance.

Consistent with our predictions, participants in Southeast Asian countries (Malaysia and the Philippines) scored higher in germ aversion than their Japanese counterparts. This finding supports the disease prevalence hypothesis (Schaller & Duncan, 2007), which posits that in regions where the threat of infectious disease is more salient, reactivity of BIS tends to be heightened. Although Japan benefits from a well-developed healthcare infrastructure, Southeast Asia is recognized as a global hotspot for the emergence of novel infectious diseases. Its tropical climate, socioeconomic factors, and abundant domestic animal reservoirs facilitate the persistence and transmission of a wide variety of pathogens (Cao, Zhou, & Kimura, 2017; Paris & White, 2017). In a cross-national study spanning 71 geopolitical regions, Schaller and Murray (2008) reported that populations from historically pathogen-rich environments tend to exhibit more restricted sexual behaviors and lower average levels of personality traits such as extraversion and openness. However, Asian countries were not represented in their analysis. To our knowledge, the present study is the first to examine geographic differences in attitudes and behaviors related to pathogen threat within this region. As with sex differences, no significant cross-national differences were observed in perceived infectability among the three countries. This aligns with prior findings by Skolnick and Dzokoto (2013), who reported that although individuals in Ghana exhibited higher germ aversion compared to those in the USA, no significant differences emerged in perceived infectability. These authors argued that perceived infectability reflects beliefs about one's own health status rather than disgust or contamination sensitivity, which may account for the absence of cross-national variation in this subscale.

The second aim of our study was to examine the relationships between physical and psychological correlates (current health status and fear of death) and BIS. We hypothesized that poorer health status and stronger fear of death would be associated with higher BIS scores. However, the results revealed a somewhat complex pattern. Germ aversion was positively associated with fear of death but showed no significant relationship with health status. Conversely, perceived infectability was positively associated with poorer health, but

not with fear of death—except in the Filipino sample. The reason why a significant association between perceived infectability and fear of death emerged only in the Filipino group remains unclear. According to terror management theory, fear of death is closely related to the cultural worldviews of the region in which people live, particularly religion (Solomon et al., 1991). Thus, to correctly interpret the results of the present study regarding the relationship between perceived infectability and fear of death, it may be necessary to examine differences between Christian views of death in the Philippines and those in Japan (Buddhism) and Malaysia (Islam). Although this observation warrants further empirical validation, overall, a clear inverse pattern emerged in the associations of health status and fear of death with the two PVD-Q subscales. Duncan et al. (2009) suggest that germ aversion reflects responses grounded in intuitive appraisals of pathogen transmission risk, whereas perceived infectability reflects responses informed by more deliberative appraisals. Supporting this distinction, germ aversion has been found to correlate more strongly with implicit negative associations toward individuals exhibiting physical abnormalities (Park, Faulkner, & Schaller, 2003), whereas perceived infectability correlates more strongly with implicit negative associations toward individuals perceived as immuno-compromised, such as the elderly (Duncan & Schaller, 2009). These differing cognitive mechanisms underlying the two PVD-Q subscales may have contributed to the asymmetric pattern of findings observed in the present study. Nevertheless, the dual nature of pathogen-avoidance cognitions remains incompletely understood, highlighting the need for further empirical research to substantiate and refine this theoretical framework.

6. FUTURE RESEARCH DIRECTIONS

In this study, a single-item measure of participants' current health status and a measure of fear of death were used as indicators of the psychophysiological correlates of BIS. However, caution is warranted regarding the appropriateness of selecting these measures. Future research could employ more comprehensive instruments, such as the SF-36, to assess the relationship between BIS and quality of life in a more detailed and accurate manner.

Second, future research should investigate the interplay between the physiological and behavioral immune systems. While the former maintains bodily health by preventing viral invasion, the latter mitigates viral impact via disgust. Importantly, disgust - a psychological manifestation of the behavioral immune system - affects salivary components and heart rate differently from fear (Gilchrist, Vrinceanu, Béland, & Ditto, 2016; Stevenson, Hodgson, Oaten, Barouei, & Case, 2011). This finding highlights the need to examine these mind–body correlations from a behavioral immune perspective (Ackerman, Hill, & Murray, 2018).

Finally, this study examined differences in BIS traits among university students. A series of studies by Schaller and colleagues suggests that adolescents' heightened BIS sensitivity can foster discrimination and prejudice toward outgroups, including the elderly, individuals with disabilities, obese persons, and foreigners (Duncan & Schaller, 2009; Faulkner, Schaller, Park, & Duncan, 2004; Park et al., 2003; Park, Schaller, & Crandall, 2007). Although such aggressive tendencies in adolescents may biologically function as adaptive strategies to overcome competition during the reproductive period, they are more likely to be perceived as antisocial intolerance in contemporary society. Future research on BIS targeting adolescents should yield insights that are crucial for professionals responsible for supporting adolescents across healthcare, education, and industry.

7. CONCLUSION

This paper identifies theoretically grounded patterns of association between BIS and demographic, geographic, physical, and psychological factors. The results suggest that perceived infectability is associated with individuals' current health status, as well as their history of infectious diseases. In contrast, germ aversion appears to be linked to sex-specific attitudes operating at a largely unconscious level, as well as to the climatic conditions of the individuals' residing region. Thus, it can be argued that perceived infectability reflects proximate health-related beliefs or conditions, whereas germ aversion represents ultimate evolutionary adaptations internalized in the mind—both serving as distinct proactive defenses against disease-causing pathogens. Further cross-national research is necessary to replicate these findings and to examine their broader implications.

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[*]References to sex in this study are standardized as male/female rather than men/women, regardless of the terminology used in the cited literature.