Social Behavior and Personality
an international journal

Social Behavior and Personality, Volume 49, Issue 8, e8133
https://doi.org/10.2224/sbp.8133
www.sbp-journal.com

The influence of contagious disease threat on general risk-taking tendency

Muhammad Kasheer[1], Myungwoo Nam[2]

[1]Bahria Business School, Bahria University, Pakistan
[2]Scheller College of Business, Georgia Institute of Technology, United States

How to cite: Kasheer, M., & Nam, M. (2021). The influence of contagious disease threat on general risk-taking tendency. *Social Behavior and Personality: An international journal, 49*(8), e8133

We conducted two studies to investigate the effects of the threat of a contagious disease on people's tendency to engage in risk-taking behaviors that are not directly related to the disease, such as investment decisions. In Study 1 we demonstrated that individual differences in germ aversion influenced risk-taking tendency. Participants with relatively high germ aversion were less likely than were those with relatively low germ aversion to engage in risk-taking behaviors encompassing the ethical, investment, gambling, recreational, health, and social domains. In Study 2 we replicated the results of Study 1 in a different setting and examined the underlying process by which perceived disease threat inhibits risk taking. The findings suggest that the threat of disease-induced negative affect decreased risk-taking tendencies. This implies that precautionary behavior activated by disease-threat salience can extend beyond the health domain to a broader range of situations.

Keywords
disease threat; risk taking; risky behavior; behavioral immune system; affective state; negative affect; contagious disease

The spread of a viral disease often causes a significant economic slowdown. The COVID-19 outbreak decreased the gross domestic product in the United States of America by 3.5% in 2020 (United States Bureau of Economic Analysis, 2021). These costs arise not only from sickness and mortality but also from behavioral changes in consumption and investment because of alterations in people's perception of the risk of doing business (J. W. Lee & McKibbin, 2003).

The behavioral and social outcomes of contagious disease threat have recently received attention from researchers (Murray & Schaller, 2016). Epidemiological and survey data support that in geographical regions where pandemics have had historically higher prevalence, selection pressure has forced people to live in closely nested groups, giving birth to collectivistic cultures (Fincher et al., 2008). Along similar lines, chronic and situational vulnerability to disease have increased xenophobic attitudes (Faulkner et al., 2004). These behavioral changes under heightened disease threat are rooted in the basic human motivation to maintain good health by inhibiting actions that involve risk of germ transmission.

We built upon this literature by examining the effects of contagious disease threat on individuals' tendency to engage in risky behaviors. Specifically, we investigated how contagious disease threat affects people's engagement in risk-taking activities not directly related to disease transmission, such as investment, gambling, and career decisions. Prior research findings have shown that heightened disease threat might influence risk perceptions in other domains. S. W. S. Lee et al. (2010) found that individuals exposed to a heightened risk of influenza estimated a high risk of heart attack, accidents, and crime. These results suggest

CORRESPONDENCE Myungwoo Nam, Scheller College of Business, Georgia Institute of Technology, 800 West Peachtree NW, Atlanta, GA 30308, USA. Email: myung.nam@scheller.gatech.edu

that the heightened threat of an infectious disease may also decrease the likelihood of engagement in risky activities. Such risk-taking tendencies are often influenced by people's current feelings and affective states (Loewenstein et al., 2001), which allow the feelings induced by one threat to influence judgments about other threats (Schwarz & Clore, 2007). Negative affect elicited by disease cues (Blascovich et al., 2001) may govern the underlying process responsible for the generalization of disease threat to other domains. Therefore, we examined negative affect as a mediator of the negative relationship between disease threat salience and tendency to engage in risky behaviors in unrelated domains.

Theoretical Background

Contagious Disease Threat

Contagious diseases are caused by the transmission of pathogenic microorganisms from one person to another. These pathogens can include viruses, bacteria, fungi, or parasites (Tripathi et al., 2019). Other terms, such as infectious disease and communicable disease, are used in similar contexts. In addition to having adverse effects on physical fitness, these diseases may influence a wide range of social psychological phenomena, such as person perception, interpersonal attraction, and moral judgment (Murray & Schaller, 2016). Extant research has demonstrated that disease threat may instigate xenophobia and prejudice toward older adults, people with morphological anomalies, and immigrants (Duncan & Schaller, 2009; Park et al., 2003). People's perception of physical attractiveness is also influenced by the threat of infectious diseases: It has been shown that disease threat salience leads to an increased preference for symmetrical faces (Young et al., 2011) and physically attractive political leaders (White et al., 2013).

Conceptual and empirical evidence suggests that, as the first line of defense, the behavioral immune system has evolved as a distinct psychological avoidance system that is different from other avoidance mechanisms (Schaller & Park, 2011). Two fundamental principles—the smoke detector principle and the functional flexibility principle—govern the social psychological implications of the behavioral immune system. The *smoke detector principle* refers to the tendency of the behavioral immune system to overreact to potential dangers (Nesse, 2005). The name emerged from its similarity to smoke detectors installed to sound an alarm upon detecting smoke particles from a potential fire. Similarly, the behavioral immune system has evolved to detect and respond to stimuli that pose threats of infection. Analogous to smoke detectors, which minimize false negative errors at the expense of increased false positive errors, the hypersensitive behavioral immune system is subject to biased responses against superficial cues to prevent false negative errors. False positive errors might have potentially negligible costs. However, false negative errors can be extremely costly (e.g., death as a result of an infection caught from unprotected sexual intercourse). This difference in costs leads to a systematic bias (Murray & Schaller, 2016).

The *functional flexibility principle* implies that individuals deploy the costly behavioral immune system flexibly based on perceived vulnerability to disease infection (Murray & Schaller, 2016), consuming cognitive and caloric resources to engage in behavioral avoidance of disease infection. These resources can potentially be allocated to other tasks; therefore, humans choose to deploy resources depending on the severity and consequences of threats. For example, people who are more (vs. less) vulnerable to disease threats, such as women in the early stages of pregnancy, are more likely to show sensitivity to signs of potential risk (Schaller & Neuberg, 2012).

Several studies have illustrated that the activation of the behavioral immune system through contextual cues increases cautious behavior. Prokop et al. (2013) found that people who perceive themselves as vulnerable to disease are less likely to consume genetically modified foods. Galoni et al. (2020) showed that the threat of a contagious disease increased the preference for more versus less familiar products. These initial findings suggest that a chronic or contextual heightened risk of disease will decrease individuals' risk-taking tendency.

Contagious Disease Threat and Risk Taking

Risky behavior can be defined as "action (or inaction) that entails a chance of loss" (Furby & Beyth-Marom, 1992, p. 2). In the context of this study, *risk taking* entails a person's willful engagement in an activity that involves a certain degree of loss as well as gain.

Contagious disease threat activates specific negative emotions: disgust and fear. Disgust is associated with disease threat as a mechanism of avoiding potential infection (Oaten et al., 2009). Galoni et al. (2020) showed that contagious disease threat also evokes fear because of increased uncertainty and perceived lack of control.

Numerous scholars have observed that emotions influence people's risk-taking tendencies. Research on the effect of positive mood on decision making has found that people are more likely to make risky decisions when they are in a positive mood (Isen, 2008; Mittal & Ross, 1998). On the other hand, negative affect may decrease risk-taking tendencies. Yuen and Lee (2003) found that participants in a negative mood were more conservative in their risk-taking tendencies than were those in either a neutral or positive mood. In a similar study Drichoutis and Nayga (2013) found that inducing negative affect increased risk aversion. In addition, Wright and Bower (1992) found that participants in a negative-affect (vs. positive-affect) condition thought that negative events were more likely and positive events were less so. In sum, we proposed that the negative relationship between contagious disease threat and risk taking would be mediated by negative affect, and that disease threat would increase negative affect, which, in turn, would decrease risk-taking behavior.

Study 1

The purpose of Study 1 was to investigate the impact of chronic differences in perceived vulnerability to disease (PVD) on the likelihood of engaging in risk-taking behaviors. We predicted there would be a negative relationship between PVD and risk-taking behaviors, such that individuals who scored high on PVD would be less likely to be involved in risk-taking activities, even when those activities are not directly related to pathogen contamination.

Method

Participants

Participants were 98 individuals (54 women, 44 men; M_{age} = 37.38 years, *SD* = 11.56, range = 21–67) drawn from Amazon MTurk, who took part in the study for monetary compensation (USD 2.00).

Procedure

Participants were assigned two seemingly different tasks: First, they completed the Domain-Specific Risk-Attitude Scale (DOSPERT; Weber et al., 2002), which consists of 40 items designed to measure individuals' risk-taking tendencies across six domains: ethical, investment, gambling, health, recreational, and social. Participants indicate their likelihood of engaging in these activities on a 7-point scale (1 = *very unlikely*, 7 = *very likely*). Second, participants answered a PVD scale (Duncan et al., 2009) that consists of two subscales: The perceived infectability (PVD-PI) subscale is designed to measure individuals' explicit beliefs about susceptibility to pathogen infection (e.g., "I am more likely than are the people around me to catch an infectious disease"). Contrary to hypochondria measures, which assess various health issues at the time the measure is administered, the PVD-PI measures health anxiety specific to pathogenic infection in the future. The germ aversion (PVD-GA) subscale is designed to measure individuals' uneasiness in situations in which germ transmission is more likely (e.g., "It really bothers me when people sneeze without covering their mouth"). This subscale has shown strong correlations with measures used to gauge perceptive appraisal and emotional reactivity. The PVD-PI subscale predicts judgments based on rational assessment of stimuli connoting disease transmission, whereas the PVD-GA subscale predicts judgments based on an intuitive appraisal of these stimuli (Duncan et al., 2009).

Results and Discussion

Scores for the seven PVD-PI items (α = .89) and the eight PVD-GA items (α = .71) were averaged to form separate indices for both subscales. We also averaged the item scores representing ethical (α = .85), investment (α = .85), gambling (α = .91), health (α = .77), recreational (α = .86), and social (α = .67) domains to create an index of each domain in the DOSPERT scale. A composite DOSPERT score (α = .94) was also created by averaging responses to all 40 items. The analysis was conducted at two levels of dependent variables: a domain-level score and a composite DOSPERT attitude score.

We conducted a series of multiple regression analyses on each risk domain score, wherein PVD-GA and PVD-PI served as independent variables. There was a significant negative effect of PVD-GA on risk taking in investment (β = −.38, p = .027), gambling (β = −.33, p = .028), health (β = −.23, p = .048), recreational (β = −.28, p = .041), and social (β = −.33, p < .001) domains, whereas the negative effect on ethical risk taking was only marginally significant (β = −.21, p = .08). However, the effects of PVD-PI on risking-taking behaviors were nonsignificant for all six risk-taking domains (ps > .10). We also conducted a regression analysis of the PVD subscales on the composite DOSPERT score. The effect of PVD-GA was negative and significant for overall risk-taking behavior (β = −.29, p = .003). Individuals who scored comparatively higher on germ aversion were less likely to engage in risk-taking behaviors. The effect of PVD-PI on risk-taking behaviors was nonsignificant (p > .10).

The PVD-PI subscale did not predict people's tendency to engage in risky behaviors. This aligns with the findings of previous researchers, who suggested that the two subscales may determine different outcomes (Duncan & Schaller, 2009; Duncan et al., 2009). The PVD-GA subscale predicted variables indirectly related to risk taking (Duncan et al., 2009). Similarly, Murray and Schaller (2012) observed that chronically germ-averse individuals were more likely to conform to the majority opinion on whether to avoid risk. The PVD-PI subscale was not significantly correlated with these variables.

In Study 1 our results reveal that chronic differences in people's degree of germ avoidance affect their tendency to engage in risky behaviors. Individuals who scored relatively high (vs. low) on germ avoidance were less likely to engage in risky behaviors. This effect was consistent across the investment, gambling, health, and social risk domains. On the other hand, the results show that perceived infectability did not influence people's propensity to take risks. These findings further scholarly understanding about the behavioral consequences of the perceived threat of infectious diseases.

According to the functional flexibility principle, contextual information activates the behavioral immune system. In Study 2 we manipulated disease threat to test this principle. In addition, we investigated the underlying process that governs the effect of contagious disease threat on risk taking.

Study 2

Study 1 revealed a negative effect of chronic germ aversion on the risk-taking attitude of individuals in various domains. We designed Study 2 with two objectives: First, we wanted to replicate the negative effects of chronic PVD on risk taking in situations in which contagious disease threat is temporarily salient. Second, we examined the underlying process that governs this effect. We posited that disease threat salience would induce negative emotions, and that this, in turn, would decrease individuals' tendency to engage in risk-taking behaviors.

Method

Participants

The participants were 185 individuals (95 women, 90 men; M_{age} = 36.98 years, SD = 12.07, range = 21–72) drawn from Amazon MTurk, who participated in the study for monetary compensation (USD 2.00).

Procedure

At the beginning of the study participants completed a general mood scale (Swinyard, 1993) and reported their usual level of engagement in risky behaviors (1 = *never*, 9 = *very often*). The first task was meant for experimental manipulation. We followed the procedure of Ackerman et al. (2009) and Faulkner et al. (2004). In the disease-threat condition, participants watched a slideshow of images depicting various methods of pathogen transmission, with a brief description of each presented as text on the screen. Those in the control condition viewed images of simple architecture accompanied by a short text description (e.g., "A beautiful wooden house in the countryside"). At the end of the slideshow, participants in the disease-threat condition wrote about their prior experience of contracting any disease. In the control condition, participants reported their experience of having seen such buildings before. Next, participants completed the Positive and Negative Affect Schedule-Expanded Form (Watson & Clark, 1994), which comprises 10 items for negative affect (e.g., nervous, jittery, irritable, scared, hostile, ashamed) and 10 items for positive affect (e.g., proud, attentive, determined, inspired, strong). Participants indicate the extent to which they feel this way on a 5-point Likert scale (1 = *very slightly or not at all,* 5 = *extremely*).

The second task was designed to assess risk-taking tendencies. All participants were instructed to imagine that they had received a $15 coupon as compensation. We asked them to report their willingness to spend that coupon on lottery tickets, using a 9-point Likert scale (1 = *not at all willing to purchase,* 9 = *highly willing to purchase*). They also reported their perceived risk of spending $15 on lottery tickets.

Next, we presented participants with a job-choice dilemma initially developed by Wallach and Kogan (1961). These dilemmas have been widely used to test risk-taking tendencies (Forgas, 1982). Participants read about a job dilemma in which Mr John, an engineer, has to choose between his current job and a new job offered at a recently established firm. The new job entails high risk as the future of the company is uncertain, but it promises high returns in the form of salary and shares. His current job, in contrast, is secure but modestly paid. Participants are asked to imagine they are a job selection counselor giving their recommendation to Mr. John using a 10-point Likert scale (1 = *definitely stay with the old job*, 10 = *defin itely accept the new job*). They also indicate the chances of the new company becoming financially sound (1 = *1 in 10*, 10 = *10 in10*). These two items are averaged to measure risk-taking behavior (α = .71).

The final task was completing manipulation check items to assess participants' perception of disease threat (two items from the PVD Scale), as well as demographic questions.

Results

We averaged the two items used for the manipulation check (α = .68). An analysis of variance (ANOVA) of disease-threat manipulation showed that participants in the disease-threat condition perceived themselves as being more vulnerable to disease (M = 4.81, SD = 1.61) than did those in the control condition (M = 4.34, SD = 1.52), $F(1, 183) = 3.94$, $p < .05$; $\eta^2 = .021$. We also conducted one-way ANOVAs on mood score (α = .80), and participants' general risk-taking tendency.

Willingness to Purchase Lottery Tickets

A one-way ANOVA of threat manipulation on the willingness to purchase lottery tickets revealed a significant effect of disease manipulation, $F(1, 183) = 4.39$, $p = .037$; $\eta^2 = .023$. Participants in the disease-threat condition (M = 3.21, SD = 2.22) were significantly less willing to spend money on lottery tickets than were those in the control condition (M = 3.96, SD = 2.55), $t(183) = -2.10$, $p = .037$, $d = 0.34$. In addition, we found a marginally significant effect of disease threat on the perceived risk of spending $15 on lottery tickets, $F(1, 183) = 2.75$, $p = .09$; $\eta^2 = .015$. The results show that participants in the disease-threat condition (M = 6.94, SD = 2.38) perceived more risk than did those in the control condition (M = 6.33, SD = 2.53), t

(183) = 1.66, p = .09, d = 0.26. We subtracted the mean positive affect score (α = .91) from the mean negative affect score (α = .96) to obtain a net negative affect score. A one-way ANOVA of threat manipulation on the net negative affect showed there was a significant main effect, $F(1, 183) = 4.66$, p = .032; η^2 = .025.

Mediation Analysis

We conducted a mediation analysis to examine whether negative affect mediated the effects of contagious disease threat on risk-taking behaviors. Specifically, we anticipated that contagious disease threat would induce negative affect, which would lead to less willingness to take risks. Therefore, we included disease threat, negative affect, and risk-taking tendency in the model. Following Hayes (2013), we used bootstrapping analysis with 5,000 resamples to generate a 95% confidence interval of [−.3307, −.0079], indicating a significant mediation effect. An analysis of individual paths showed a significant effect of disease-threat manipulation on net negative affect (b = 0.37, t = 2.16, p = .032), and a significant effect of net negative affect on willingness to purchase lottery tickets (b = −0.34, t = −2.29, p = .022). The direct effect of disease-threat manipulation on risk taking was nonsignificant (b = −0.61, t = −1.73, p = .08).

Job Choice Dilemma

Two items used to measure participants' tendency to choose the risky job were averaged to form a single risk-taking index (α = .71), where a higher score represents a higher risk-taking tendency. A one-way ANOVA of the risk-taking score revealed a significant effect of disease-threat manipulation, $F(1, 183) = 4.02$, $p < .05$; η^2 = .021. Participants in the disease-threat condition were less willing to accept the risky job (M = 5.41, SD = 1.81) than were those in the control condition (M = 5.94, SD = 1.76), $t(183) = -2.01$, $p < .05$, d = 0.30.

Mediation Analysis

A mediation analysis was conducted to investigate whether negative affect mediated the relationship between disease threat perception and risky job-taking. A bootstrapping analysis with 5,000 resamples produced a 95% confidence interval of [−.3459, −.0160]. The point estimate of the indirect effect was −.1392. An analysis of individual paths revealed a significant effect of disease-threat manipulation on net negative affect (b = 0.37, t = 2.16, p = .032), and a significant effect of net negative effect on risk taking (b = −0.36, t = −3.42, p < .001). The direct effect of disease-threat manipulation on risk taking was nonsignificant (b = −0.38, t = −1.49, p = .14).

Discussion

In Study 2 we replicated the results of Study 1 by manipulating contagious disease threat. Participants who were primed with the disease threat reported a lower tendency to make risky choices compared with the participants in the control group. We also investigated the underlying mechanism through which contagious disease threat influenced subsequent risk-taking behavior in domains not related to disease. Disease-threat salience induced negative affect, which inversely impacted on people's tendency to be involved in risky activities.

General Discussion

We examined in two studies the effect of contagious disease threat on tendency to engage in risky behaviors. The results demonstrate that perception of disease threat decreased risk-taking behaviors in the context of chronic vulnerability to disease (Study 1) and temporarily activated disease threat (Study 2). Further, contagious disease threat reduced risk taking in a wide variety of domains, including investment, gambling, social, health, and career change.

Our results add to the literature on contagious disease threat by identifying the effect of this variable on risk taking. The focus in prior research has been on how contagious disease threat influences culture and personality, and on exploring adaptive behaviors to minimize potential disease infection (Murray & Schaller,

2016). Our findings suggest that contagious disease threat influences not only culture and personality, but also general risk-taking behaviors. It should be noted, however, that a reverse causal effect could be present between perception of disease threat and risk taking. In a recent investigation Byrne et al. (2020) found that general risk-taking behavior and greater temporal discounting were associated with reduced compliance with COVID-19 preventative behavior. Our findings also add to the stream of research positing that assessment of risk is an emotional reaction that originates from a person's affective state (Loewenstein et al., 2001). Finally, we have provided support for the idea that economic slowdown during the pandemic could be explained by people's reluctance to become involved in risk-bearing activities, such as new product adoption.

There are several important avenues for future research based on our findings. First, we believe it would be interesting to investigate the effects of contagious disease threat in other domains. For example, perception of disease threat may affect new product adoption because purchasing new and largely untested products entails risk. There are two potential mechanisms by which contagious disease threat negatively affects new product adoption: (a) perception of contagious disease threat may lead to individuals being more conservative because people under disease threat are more risk averse (Schaller, 2006), and (b) prior research has demonstrated that the adoption rate of a new product depends on social contagion over social ties, meaning that those who are better connected exercise more influence over those who are less connected (Iyengar et al., 2011). Second, contagious disease threat may influence managerial decisions by making managers risk-averse. It is possible that managers under contagious disease threat may refrain from making bold decisions to invest in new products, enter new markets, or make organizational changes. Third, future researchers could investigate an alternative underlying process of the relationship between contagious disease threat and risk taking. Our research shows that contagious disease threat generated negative emotions, which, in turn, decreased risk-taking tendencies. An alternative mediator of the effect of contagious disease threat on risk taking is conservatism or a preference for the norm. Past research has shown that people who are concerned about infectious diseases are more likely to show prejudice against people who appear morphologically anomalous or are members of outgroups (Faulkner et al., 2004). Therefore, it is plausible that contagious disease threat prompts individuals to be cautious and to prefer others who conform to the norm, which can make people more conservative and lead to them refraining from engaging in risky behaviors.

References

Ackerman, J. M., Becker, D. V., Mortensen, C. R., Sasaki, T., Neuberg, S. L., & Kenrick, D. T. (2009). A pox on the mind: Disjunction of attention and memory in the processing of physical disfigurement. *Journal of Experimental Social Psychology, 45*(3), 478–485. https://doi.org/10.1016/j.jesp.2008.12.008

Blascovich, J., Mendes, W. B., Hunter, S. B., Lickel, B., & Kowai-Bell, N. (2001). Perceiver threat in social interactions with stigmatized others. *Journal of Personality and Social Psychology, 80*(2), 253–267. https://doi.org/10.1037/0022-3514.80.2.253

Byrne, K., Six, S., Anaraky, R. G., Harris, M. W., & Winterlind, E. L. (2020). *Risk-taking unmasked: Using risky choice and temporal discounting to explain COVID-19 preventative behaviors*. PsyArXiv Preprints. https://psyarxiv.com/uaqc2/

Drichoutis, A. C., & Nayga, R. M., Jr. (2013). Eliciting risk and time preferences under induced mood states. *The Journal of Socio-Economics, 45,* 18–27. https://doi.org/10.1016/j.socec.2013.04.008

Duncan, L. A., & Schaller, M. (2009). Prejudicial attitudes toward older adults may be exaggerated when people feel vulnerable to infectious disease: Evidence and implications. *Analyses of Social Issues and Public Policy, 9*(1), 97–115. https://doi.org/10.1111/j.1530-2415.2009.01188.x

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*(6), 541–546. https://doi.org/10.1016/j.paid.2009.05.001

Faulkner, J., Schaller, M., Park, J. H., & Duncan, L. A. (2004). Evolved disease-avoidance mechanisms and contemporary xenophobic attitudes. *Group Processes & Intergroup Relations, 7*(4), 333–353. https://doi.org/10.1177/1368430204046142

Fincher, C. L., Thornhill, R., Murray, D. R., & Schaller, M. (2008). Pathogen prevalence predicts human cross-cultural variability in individualism/collectivism. *Proceedings of the Royal Society B: Biological Sciences, 275*(1640), 1279–1285. https://doi.org/10.1098/rspb.2008.0094

Forgas, J. P. (1982). Episode cognition: Internal representations of interaction routines. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 15, pp. 59–101). Academic Press. https://doi.org/10.1016/S0065-2601(08)60295-6

Furby, L., & Beyth-Marom, R. (1992). Risk taking in adolescence: A decision-making perspective. *Developmental Review, 12*(1), 1–44. https://doi.org/10.1016/0273-2297(92)90002-J

Galoni, C., Carpenter, G. S., & Rao, H. (2020). Disgusted and afraid: Consumer choices under the threat of contagious disease. *Journal of Consumer Research, 47*(3), 373–392. https://stanford.io/3gMp6S1

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. The Guilford Press.

Isen, A. M. (2008). Some ways in which positive affect influences decision making and problem solving. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotions* (Vol. 3, pp. 548–573). The Guilford Press.

Iyengar, R., Van den Bulte, C., & Valente, T. W. (2011). Opinion leadership and social contagion in new product diffusion. *Marketing Science, 30*(2), 195–212. https://doi.org/10.1287/mksc.1100.0566

Lee, J.-W., & McKibbin, W. J. (2003, 11–12 May). *Globalization and disease: The case of SARS* [Paper presentation]. Asian Economic Panel Meeting, Tokyo, Japan.

Lee, S. W. S., Schwarz, N., Taubman, D., & Hou, M. (2010). Sneezing in times of a flu pandemic: Public sneezing increases perception of unrelated risks and shifts preferences for federal spending. *Psychological Science, 21*(3), 375–377. https://doi.org/10.1177/0956797609359876

Loewenstein, G. F., Weber, E. U., Hsee, C. K., & Welch, N. (2001). Risk as feelings. *Psychological Bulletin, 127*(2), 267–286. https://doi.org/10.1037/0033-2909.127.2.267

Mittal, V., & Ross, W. T., Jr. (1998). The impact of positive and negative affect and issue framing on issue interpretation and risk taking. *Organizational Behavior and Human Decision Processes, 76*(3), 298–324. https://doi.org/10.1006/obhd.1998.2808

Murray, D. R., & Schaller, M. (2012). Threat(s) and conformity deconstructed: Perceived threat of infectious disease and its implications for conformist attitudes and behavior. *European Journal of Social Psychology, 42*(2), 180–188. https://doi.org/10.1002/ejsp.863

Murray, D. R., & Schaller, M. (2016). The behavioral immune system: Implications for social cognition, social interaction, and social influence. In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology* (Vol. 53, pp. 75–129). Elsevier Academic Press. https://doi.org/10.1016/bs.aesp.2015.09.002

Nesse, R. M. (2005). Natural selection and the regulation of defenses: A signal detection analysis of the smoke detector principle. *Evolution and Human Behavior, 26*(1), 88–105. https://doi.org/10.1016/j.evolhumbehav.2004.08.002

Oaten, M., Stevenson, R. J., & Case, T. I. (2009). Disgust as a disease-avoidance mechanism. *Psychological Bulletin, 133*(2), 303–321. https://doi.org/10.1037/a0014823

Park, J. H., Faulkner, J., & Schaller, M. (2003). Evolved disease-avoidance processes and contemporary anti-social behavior: Prejudicial attitudes and avoidance of people with physical disabilities. *Journal of Nonverbal Behavior, 27,* 65–87. https://doi.org/10.1023/A:1023910408854

Prokop, P., Ozel, M., Usak, M., & Şenay, I. (2013). Disease-threat model explains acceptance of genetically modified products. *Psihologija, 46*(3), 229–243. https://doi.org/10.2298/psi130416002p

Schaller, M. (2006). Parasites, behavioral defenses, and the social psychological mechanisms through which cultures are evoked. *Psychological Inquiry, 17*(2), 96–137.

Schaller, M., & Neuberg, S. L. (2012). Danger, disease, and the nature of prejudice(s). In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology* (Vol. 46, pp. 1–54). Academic Press. https://doi.org/10.1016/B978-0-12-394281-4.00001-5

Schaller, M., & Park, J. H. (2011). The behavioral immune system (and why it matters). *Current Directions in Psychological Science, 20*(2), 99–103. https://doi.org/10.1177/0963721411402596

Schwarz, N., & Clore, G. L. (2007). Feelings and phenomenal experiences. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 385–407). The Guilford Press.

Swinyard, W. R. (1993). The effects of mood, involvement, and quality of store experience on shopping intentions. *Journal of Consumer Research, 20*(2), 271–280. https://doi.org/10.1086/209348

Tripathi, L. P., Chen, Y.-A., Mizuguchi, K., & Morita, E. (2019). Network-based analysis of host-pathogen interactions. In S. Ranganathan, M. Gribskov, K. Nakai, & C. Schönbach (Eds.), *Encyclopedia of bioinformatics and computational biology* (pp. 932–937). Academic Press. https://doi.org/10.1016/B978-0-12-809633-8.20170-2

United States Bureau of Economic Analysis. (2021). *Gross domestic product, 4th quarter and year 2020.* Author. https://bit.ly/3e1HYe8

Wallach, M. A., & Kogan, N. (1961). Aspects of judgment and decision making: Interrelationships and changes with age. *Behavioral Science, 6*(1), 23–36. https://doi.org/10.1002/bs.3830060104

Watson, D., & Clark, L. A. (1994). *The PANAS-X: Manual for the Positive and Negative Affect Schedule-Expanded Form*. University of Iowa, IA, USA. https://doi.org/10.17077/48vt-m4t2

Weber, E. U., Blais, A.-R., & Betz, N. E. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making, 15*(4), 263–290. https://doi.org/10.1002/bdm.414

White, A. E., Kenrick, D. T., & Neuberg, S. L. (2013). Beauty at the ballot box: Disease threats predict preferences for physically attractive leaders. *Psychological Science, 24*(12), 2429–2436. https://doi.org/10.1177/0956797613493642

Wright, W. F., & Bower, G. H. (1992). Mood effects on subjective probability assessment. *Organizational Behavior and Human Decision Processes, 52*(2), 276–291. https://doi.org/10.1016/0749-5978(92)90039-A

Young, S. G., Sacco, D. F., & Hugenberg, K. (2011). Vulnerability to disease is associated with a domain-specific preference for symmetrical faces relative to symmetrical non-face stimuli. *European Journal of Social Psychology, 41*(5), 558–563. https://doi.org/10.1002/ejsp.800

Yuen, K. S. L., & Lee, T. M. C. (2003). Could mood state affect risk-taking decisions? *Journal of Affective Disorders, 75*(1), 11–18. https://doi.org/10.1016/S0165-0327(02)00022-8