

THE EFFECTS OF DISEASE THREAT ON
ETHNOCENTRIC ATTITUDES

A Thesis Presented to the Faculty
of
California State University, Stanislaus

In Partial Fulfillment
of the Requirements for the Degree
of Master of Science in Psychology

By
Janessa L. Jimenez
November 2016

CERTIFICATION OF APPROVAL

THE EFFECTS OF DISEASE THREAT ON
ETHNOCENTRIC ATTITUDES

by
Janessa L. Jimenez

Signed Certification of Approval Page is on
file with the University Library

Dr. Victor Luèvano
Associate Professor of Psychology

Date

Dr. Jessica Lambert
Assistant Professor of Psychology

Date

Dr. Rosanne Roy
Professor of Child Development

Date

© 2016

Janessa L. Jimenez
ALL RIGHTS RESERVED

DEDICATION

To Sergio Jimenez— Thank you for raising me on love and faith.

ACKNOWLEDGEMENTS

I am endlessly thankful for the work that my wonderful committee members put into this collaborative project. Each member was an integral part of the process and their guidance allowed me to flourish. Dr. Victor X. Luévano's expertise in the study of evolutionary psychology has inspired me since my undergraduate studies and was an important piece in my understanding. The content of his courses ignited a sense of curiosity within me that rivaled the curiosity I had for counseling studies. I am honored to have had him as my mentor and Thesis Chair.

Dr. Jessica Lambert's and Dr. Rosanne Roy's professional talents allowed me to successfully navigate this project. Not only did they offer me excellent feedback, but they also were educational role models. Throughout the entire process, they demonstrated professional qualities that I would like to mirror in my future work. Finally, I would like to thank my entire committee for teaching me the pure excitement that can only be found in discovery and research.

TABLE OF CONTENTS

	PAGE
Dedication	iv
Acknowledgements	v
List of Tables	viii
List of Figures	ix
Abstract	x
Introduction.....	1
The Biological and Behavioral Immune System	3
Disease Threat and Prejudicial Attitudes	7
Disease Threat and Ethnocentric Attitudes.....	9
Limitations in the Literature	10
Research Questions and Hypotheses	11
Method	13
Participants.....	13
Measures	13
Research Design.....	17
Procedure	18
Results.....	20
Correlations of PVD scores and Ethnocentrism Scores.....	20
Experimental Stimuli and Self-Reported Ethnocentric Attitudes.....	20
Correlations of Health Philosophy Scores and Ethnocentrism Scores	21
Exploratory Analyses.....	22
Discussion.....	24
Perceived Vulnerability to Disease and Ethnocentrism.....	24
Threatening Primes and Ethnocentrism	25
Disease-Connoting Prime, Health Philosophy, and Ethnocentrism.....	27
Sex Differences	30

Limitations and Implications for Future Research.....	31
Clinical Implications.....	34
Conclusion	35
References.....	38
Appendices	
A. Health Philosophy Scale	45
B. Perceived Vulnerability to Disease Scale	46
C. Experimental Stimuli	48
D. Generalized Ethnocentrism Scale	52
E. Demographics Questionnaire.....	54
F. Consent Form.....	55
G. Debriefing Form.....	56
H. Pleasant Sideshow.....	57

LIST OF TABLES

TABLE	PAGE
1. Independent Variables and Levels Used in the Current Study	17

LIST OF FIGURES

FIGURE	PAGE
1. Mean Ethnocentrism Scores Across Experimental Conditions	21

ABSTRACT

Throughout history, humans have engaged in ethnocentrism. Previous research suggests that ethnocentrism is an evolved mechanism that reduces the likelihood of a human contracting a contagious disease. The present study explored the effects that contagion and threat have on ethnocentric attitudes. Participants first completed measures designed to assess health philosophy and perceived vulnerability disease. Participants were then randomly assigned to view one of four series of photographs: Disease Threat, Threats Control, Contagion Control, or Neutral Condition. After viewing the photographs, participants completed a generalized ethnocentrism measure. As predicted, ethnocentrism scores were highest when participants felt vulnerable to disease. However, the results from the experimental portion of the study were not consistent with the hypothesis in that there was no significant difference in ethnocentrism scores between participants in the four groups. Participants who endorsed an Eastern health philosophy had lower ethnocentrism scores than those who did not subscribe to an Eastern health philosophy. The findings provide additional evidence that ethnocentrism is associated with perceived vulnerability to disease and health beliefs; however, this effect may not be very substantial.

INTRODUCTION AND LITERATURE REVIEW

For millions of years, infectious disease has been an enduring hazard to the survival of animal organisms such as human beings. The debilitating and life-threatening symptoms that result from disease can compromise one's well-being and reduce the likelihood that one's genes will be passed on to the next generation. Furthermore, the threat of disease has immensely influenced human evolution (Kurzban, & Leary, 2001). Arguably, infectious disease can be considered the most dangerous threat to human existence (Van Blerkom, 2003; Wolfe, Dunavan, & Diamond, 2007).

Groups who exhibit high levels of cohesiveness share evolved similarities in immune system functioning (Fincher & Thornhill, 2008). These similarities develop as a result of the group's unique geographical location. In other words, groups of people develop immunological characteristics that protect them against dangerous diseases that are found in their immediate environment. Exclusion and avoidance of outsiders can help a group survive; these behaviors reduce the probability of coming in contact with unfamiliar pathogens that the in-group's antibodies do not recognize. Thus, interactions with an out-group member may pose a significant risk to fitness (Fincher & Thornhill, 2008; Kurzban, & Leary, 2001; Navarrete & Fessler, 2006). Examples of exclusion and avoidance of outsiders can be found throughout the history of immigration. Additionally, the dangers of coming in contact with outsiders can be seen in the history of colonization.

Throughout the history of immigration, ethnic out-groups have been associated with the spread of disease. For example, during the 1890's, a series of laws were passed that prohibited immigrants with contagious diseases from immigrating into the United States. These laws also enforced steamship companies to disinfect all incoming immigrants with chemicals. Additionally, when a typhus epidemic struck Mexico in 1915, Mexicans immigrating to the United States were labeled filthy and diseased. During the late 1980's, HIV-positive immigrants were banned from making the United States their permanent home. These individuals were only allowed to have a temporary stay in the country. Consequently, these condemnatory accusations have led to the labeling and stereotyping of foreigners (Markel & Stern, 2002).

However, contact, even with those not visibly infected with a disease, can be dangerous. European colonization is a harrowing example of how contagious disease can be detrimental to a group of people who are lacking particular antibodies. European travelers unknowingly brought an array of contagious diseases to the New World. These diseases (e.g., pertussis, tuberculosis, influenza) killed a significant portion of the Native American population. Unfortunately, the Native Americans were vulnerable to these diseases because they did not possess the proper antibodies that would help eliminate the pathogens (Diamond, 1999). The significant threat that disease poses has influenced social interactions and psychological adaptations. Humans developed protective adaptations that aid in detecting and avoiding individuals that possess physiological characteristics that deviate from the morphological norm and individuals who are culturally different (Park & Schaller, 2009). In the current study,

the author intends to test the influence that disease threat has on ethnocentrism. A brief explanation about the biological and behavioral immune system will help conceptualize the rationale behind the current study.

The Biological and Behavioral Immune System

The biological immune response is a complex system that consists of organs, tissues, and cells designed to protect the body against foreign material. The system's purpose is to detect and eliminate harmful materials, such as bacteria, from the body in order to maintain optimal health (Lewis, 2014). The biological immune system evolved as organisms were moving through and adjusting to new habitats. Each habitat possessed a unique set of pathogens that the roaming organisms had to adapt to for survival purposes (Langman, 1989).

The biological immune system is imperfect and prone to overgeneralizations. The system can detect foreign materials and classify them as dangerous when they are in fact harmless. Miller and Maner (2012) eloquently explained that allergies are a common example of immune system bias.

Allergic reactions are often a result of non-threatening foreign material coming in contact with the body. Although allergies demonstrate error within the system, there is a definite advantage in having a temperamental immune system. This bias, from an error management viewpoint, is highly adaptable to the survival and health of human beings (Haselton & Buss, 2000). In other words, it is better to assume that something harmless is threatening, than that something harmful is safe.

Behavioral Immune System

The behavioral immune system was first described by Mark Schaller (2006), and includes a myriad of psychological processes that aid in detecting and avoiding objects or organisms that are potential disease carriers. This fitness-enhancing system has the power to influence behavior, emotion, and cognitions. The behavioral immune system uses perceptual cues and heuristics to help detect unfamiliar or dangerous stimuli. Once the potential carrier of disease is detected, it can be physically avoided (Schaller, 2006). The behavioral immune system is the first system to actively defend an individual from disease transmission, while the biological immune system is the second (Schaller & Park, 2011).

This first line of defense is highly adaptable. The biological immune system is effective; however, it expends a large amount of metabolic resources. This further leads to fatigue and vulnerability. The behavioral immune system is meant to detect superficial cues that may signal disease so that the potential danger can be physically avoided. This type of early detection can prevent the expenditure of metabolic resources from the biological immune system (Park & Schaller, 2009).

There are potential health costs associated with interpersonal communication since infectious diseases are primarily spread through interactions with other individuals. When disease threat is made salient, the behavioral immune system minimizes this threat by fostering unsocial behavior. For example, those who feel vulnerable to disease are less likely to rate themselves as extroverted compared to those who do not feel vulnerable to disease (Mortensen, Vaughn Becker, Ackerman, Neuberg, & Kenrick, 2010). Much like the biological immune system, the behavioral

immune system is also prone to overgeneralizations. Again, these overgeneralizations are highly adaptive. The behavioral immune system responds cautiously to any stimuli that deviates from the morphological or behavioral norm and classifies it as threatening (e.g., skin lesions, coughing). This response remains constant even if the deviations are nonthreatening (e.g., birthmark, amputation). Again, the costs associated with assuming that someone is carrying a contagious and dangerous disease (e.g., social avoidance, exclusion) are far less harmful than assuming someone is not dangerous and contagious when he or she actually is (Schaller & Park, 2011).

The Biological and Behavioral Immune System Work Together

Although the biological and behavioral immune system are two distinct entities, empirical research has evidenced that these two systems function together. In two studies by Miller and Maner (2011), recent activation of the biological immune system stimulated the behavioral immune system. In the first study, participants completed a visual dot probe task in which the target stimuli were either photographs of disfigured faces or photographs of typical faces. After the probe task procedure, participants were asked to rate whether or not they had been recently ill on continuous and categorical measures. The researchers found that individuals with an activated immune system (i.e., recent illness) demonstrated an attentional bias towards disfigured faces. In other words, participants with vulnerable immune systems paid more attention to faces with physical abnormalities compared to participants without a vulnerable immune system.

In the second study (Miller and Maner, 2011), participants were assigned to either a bias-congruent condition or a bias-incongruent condition. Participants in the bias-congruent condition were asked to push a joystick away from themselves when presented with a photograph of a disfigured face and pull the joystick towards themselves when presented with a photograph of a normal face. Participants in the bias-incongruent condition were asked to push a joystick away from themselves when presented with a photograph of a normal face and pull the joystick towards themselves when presented with a photograph of a disfigured face. As in Study 1, participants were then given the recent illness measures. It was found that, regardless of the experimental condition (i.e., bias-congruent, bias-incongruent), participants who were recently ill made avoidance movements faster than participants who had not been recently ill when presented with photograph of disfigured faces. These studies illustrated that recent immune system activation propel attention biases and avoidance of disfigured faces.

A study tested whether or not disease connoting stimuli can influence an inflammatory response from the biological immune system (Schaller, Miller, Gervais, Yager, & Chen, 2010). Participants had blood samples drawn before they were assigned to an experimental condition. Participants were randomly assigned to one of three slideshows: disease, guns, and neutral. The disease slideshow depicted photographs of disease connoting stimuli (e.g., coughing, rashes). The guns slideshow was used to control for effects induced by threatening stimuli; this slideshow contained photographs of men holding guns. Lastly, the neutral condition featured

photographs of furniture. Following the slideshows, all participants had blood drawn once more. Researchers assessed participants' immune response by measuring levels of cytokine interleukin-6 (IL-6) in the blood samples after injecting the blood with E. coli because IL-6 is released when the immune system is activated. It was found that the blood of participants who were presented with disease connoting stimuli responded more aggressively to E. coli, which was evidenced by the production of IL-6. In other words, the biological immune system of participants in the disease threat condition had a stronger response compared to participants in the gun and neutral conditions (Schaller et al., 2010).

Disease Threat and Prejudicial Attitudes

Empirical research has demonstrated that the threat of disease has the power to exacerbate prejudicial attitudes. Prejudice is an unfavorable opinion towards members of a particular group. This opinion is not necessarily based on facts or reason and it can lead to discrimination, social exclusion, and stereotyping. In other words, prejudice is a negative opinion formed without evidence (Dorschel, 2000). As mentioned previously, the behavioral immune system often overgeneralizes for protective reasons. Research has evidenced that it will respond to a variety of physical anomalies that deviate from the norm, even if these anomalies are disease-irrelevant (Park & Schaller, 2009).

In a study by Duncan and Schaller (2009), East Asian and European participants were given the perceived vulnerability to disease scale which has two subscales: germ aversion and perceived infectability. These participants were then

randomly assigned to either a pathogen salient slideshow (e.g., photos of bacteria) or an accidents salient slideshow (e.g., photos of car accidents). Two implicit association tasks (IAT) followed the slideshows. The IAT's measured association with general negative semantics and disease connoting semantics; both tasks featured target photographs of both younger and older men and women. It was found that European participants who felt especially vulnerable to disease (i.e., high perceived infectability scores) and were exposed to pathogen-related material implicitly associated elderly people with negative semantics. However, the findings among East Asian participants were non-significant, despite the fact that these participants scored higher on the germ aversion scale when compared to European participants (perhaps due to a different health philosophy). During another study in which disease transmission was made salient, it was found that participants were especially likely to associate obese people with the word "disease" (Park, Schaller, & Crandall, 2007). Furthermore, in a study by Park, Faulkner, and Schaller (2003), it was found that participants who felt especially vulnerable to disease implicitly associated people that have physical disabilities with disease. Additionally, a study by Navarrete and Fessler (2006) also demonstrated that disease influences ethnocentric attitudes. It was found that participants' who felt especially vulnerable to disease were more likely to have negative attitudes towards a foreign author compared to those who did not feel vulnerable to disease.

Disease Threat and Ethnocentric Attitudes

Empirical research has also evidenced that the threat of disease increases ethnocentrism (Faulkner, Schaller, Park, & Duncan, 2004). Ethnocentrism is essentially the idea that one's culture is superior and that outsiders should be judged by its standards and expectations. Ethnocentrism fosters a critical "us vs. them" point-of-view which can serve as a defense.

Ethnocentrism encourages in-group cohesion and discourages contact with foreigners who inevitably carry unfamiliar germs (Brewer & Campbell, 1976). Researchers investigated whether or not women in their first trimester of pregnancy would demonstrate higher levels of ethnocentrism compared to women who were further along in their pregnancy (Navarrete, Fessler, & Eng, 2007). This was predicted since the biological immune system is very vulnerable during the first trimester of pregnancy. More specifically, it decreases the number of immune responses in order to prevent the mother's body from expelling the foreign embryo. Unfortunately, the immune system's safety tactic leaves the mother and embryo vulnerable to the threat of dangerous pathogens. American women in the study used an interpersonal judgement scale to rate an essay from a foreigner and an essay from an American citizen. It was found that women in their first trimester were more likely than women further along in their pregnancy to rate the foreign author negatively and the American author positively (Navarrete et al., 2007).

Two studies by Huang, Sedlovskaya, Ackerman, and Bargh (2011) found that protective health practices (i.e., getting vaccinated, washing hands) can influence

attitudes towards foreigners. The first study was conducted in 2009 when the swine-flu was a widespread pandemic. The researchers asked participants whether or not they had received the H1N1 vaccination and it was found that participants who had the H1N1 vaccination reported less anti-immigrant attitudes on a racism scale than those who did not receive the vaccination. In the second study, participants were randomly assigned to a control condition or protection condition. Those in the protection condition wiped their hands with an antibacterial wipe while those in the control condition did not. Researchers found that participants who had cleaned their hands self-reported more positive impressions towards nine social groups compared to those who had not washed their hands.

Through a series of six studies, Faulkner et al. (2004) tested whether or not disease-avoidance mechanisms influence ethnocentric attitudes. The results collectively demonstrated that participants who felt especially vulnerable to disease were more likely to self-report ethnocentric attitudes compared to participants who did not feel as vulnerable to disease. Among these studies, two included an experimental manipulation of disease salience (e.g., disease slideshows) to test whether or not it would influence attitudes. Both studies found that participants in the experimental condition in which disease threat was salient were more likely to have negative attitudes towards foreign immigrant groups.

Limitations in the Literature

There are several limitations in the research testing the effects of disease threat on negative attitudes. I would like to address those limitations in the current

study. First, in the study by Duncan and Schaller (2009) that explored the influence of disease threat on ageist attitudes, it was found that ageist attitudes were moderated by perceived vulnerability to disease in European participants. However, this effect was not found in East Asian participants. The authors suggested, but did not assess, that this was due to differences in whether participants believed that disease etiology is influenced by external or internal factors. For instance, Eastern health belief systems tend to view the causes of disease from an internal perspective (e.g., imbalanced energy). Western belief systems, on the other hand, generally view the causes of disease from an external perspective (e.g., germs in the environment) (Ohnuki-Tierney, 1984; Pachuta, 1996).

Second, in order to gain more insight as to what types of stimuli activate the behavioral immune system, researchers have provided an additional experimental condition in their studies. This additional condition consists of photos of guns (Murray, Jones, & Schaller, 2013; Schaller, Miller, Gervais, Yager, & Chen, 2010). The purpose of this condition is to test if physical threat has the same stress-inducing effect that disease threat has on various variables (e.g., mating orientation, IL-6 production). However, no study has explored whether or not a non-threatening contagious condition (e.g., yawning) will have an effect on the behavioral immune system. Lastly, to the author's best knowledge, no study has explored whether or not disease threat has a significant effect on levels of generalized ethnocentrism.

Research Questions and Hypotheses

Question I: How does perceived vulnerability to disease correlate with reported levels of ethnocentrism? I predict that, regardless of experimental condition, perceived vulnerability to disease scores will positively correlate with ethnocentrism.

Question II: How do ethnocentric attitudes differ between individuals who are exposed to threatening material (i.e., disease and guns) and individuals who are not exposed to any particularly threatening material (i.e., furniture and yawning)? I predict that threatening stimuli will produce a main effect on levels of ethnocentrism. Specifically, individuals who are exposed to threatening material will self-report significantly higher levels of ethnocentric attitudes compared to individuals who were exposed to non-threatening material.

Question III: How do ethnocentric attitudes differ between individuals who are exposed to stimuli that connote contagious disease and all other conditions (i.e., guns, yawning, and furniture)? I predict that there will be an interaction between contagious and threatening stimuli. Specifically, the effect of threat on ethnocentrism will be greatest in the contagious conditions.

Question IV: How does health philosophy correlate with reported levels of ethnocentrism among those in the disease threat group? I predict that, among those in the Disease Threat condition, ethnocentrism will negatively correlate with an Eastern health philosophy.

METHODOLOGY

Participants

A sample of 507 participants (40.8% men and 59.0% women who ranged in age from 18 to 79, $M = 37.5$, $SD = 12.9$) years were recruited through Amazon's Mechanical Turk (AMT). AMT is an online marketplace that allows individuals to crowdsource for business and research purposes (Mason & Suri, 2011). The study was open to individuals in the United States 18 years or older. All participants were given \$.50 for their participation through AMT's built-in payment system.

The ethnicities of the participants included 78.3% White, 8.1% Black/African Heritage, 5.9% Hispanic/Latino, 3.6% Asian, 0.8% Native American Indian/Alaska Native, 0.4% declined to state, and 3% other. Information about the participants' recent illness was also collected; 14.8% of the participants had experienced an illness within the past two weeks (e.g., cold, flu) while 85.2% did not.

Materials

Health Philosophy Scale

The health philosophy scale was created by the author under the supervision of her thesis chair. The scale consists of a total of 10 statements which are rated on a 6-point Likert scale (1 = *strongly disagree*, 2 = *moderately disagree*, 3 = *slightly disagree*, 4 = *slightly agree*, 5 = *moderately agree*, and 6 = *strongly agree*). The scale was created by using information from books exploring health philosophies (Ohnuki-Tierney, 1984; Pachuta, 1996). A pilot study was conducted to examine the scale's reliability. Participants for the pilot study were recruited from SONA, an online

psychology research participant pool at CSU Stanislaus. A total of twenty-nine college students participated in the study and their ethnicities included 68.9% Hispanic, 13.7% Caucasian, 10.3% Asian/Pacific Islander, and 6.9% African American. The scale originally consisted of 21 statements; however, items with item-total correlations less than .30 were removed from the final scale. The final, 10-item scale had an acceptable internal consistency ($\alpha = .75$). When used in the current study, the scale had an acceptable internal consistency ($\alpha = .70$). Each statement is designed to assess the extent to which participants subscribe to an Eastern health philosophy (Appendix A). Scores on the scale can range from 10 to 60. Higher scores represent a strong endorsement of Eastern health philosophies while lower scores represent a weak endorsement of Eastern health philosophies. Items from the scale include “Individuals who experience disharmony are more prone to becoming ill” and “The physician is the most important tool for a client’s recovery.” This scale was used in the current study to assess participants’ endorsement of Eastern health philosophies.

Perceived Vulnerability to Disease Scale (PVD)

The PVD scale was designed by Duncan, Schaller, and Park (2009) and it consists of 15 self-report items designed to measure one’s overall perceived vulnerability to disease. Participants rate each statement on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). The PVD scale has two subscales: perceived infectability and germ aversion. The overall score and the subscales are each created

by taking the mean rating across the items. Thus scores on the scale (and subscales) can range from one to seven.

Perceived infectability is measured through seven items in the scale that are designed to assess how susceptible one feels to infectious disease. This subscale contains statements such as, “My past experiences make me believe I am not likely to get sick even when my friends are sick.” The items in this scale correlate with measures assessing healthy anxiety.

Germ aversion is measured through eight items in the scale. These items are designed to assess one’s discomfort in situations that are associated with pathogen transmission. The germ aversion subscale contains statements such as, “It really bothers me when people sneeze without covering their mouths.” The items in this scale correlate with measures assessing sensitivity to disgust.

An analysis of the 15-item PVD scale revealed a high level of internal consistency. Cronbach’s alpha for the scale includes: overall $\alpha = .84$, perceived infectability subscale $\alpha = .90$, and germ aversion subscale $\alpha = .75$. Scores on the scale can range from 15 to 105 (Appendix B).

Experimental Stimuli

Participants in the Disease Threat condition were presented with a slideshow consisting of ten photographs (Appendix C). The photographs included men and women with behavioral and morphological features that suggested contagious disease (e.g., sneezing, rash). Participants in the Threats Control condition were presented with a slideshow consisting of ten photographs. These photographs depicted young

boys and men with guns. All guns are pointed towards the viewer to in order to make the threat as salient as possible. The photographs from the Disease Threat condition and Threats Control condition have been employed successfully in previous research (Schaller et al., 2010).

Participants in the Contagion Control condition were presented with a slideshow consisting of ten photographs that depicted men and women yawning. Participants in the neutral condition were presented with a slideshow consisting of ten photographs that featured miscellaneous pieces of furniture (e.g., chair, shelves). During all four slideshows, each photograph was presented for a total of 8 seconds and 4 seconds of blank space followed each photograph (Appendix C). This photograph timing method was used in previous research (Schaller et al., 2010).

Generalized Ethnocentrism Scale (GENE)

The generalized ethnocentrism scale was developed by Neuliep and McCroskey (1997) and it comprises 22 statements that are rated on a 5-point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, and 5 = *strongly agree*). Ethnocentrism scores are calculated by summing 15 scale items, the remaining seven items are considered distractors. Scores on the scale can range from 15 to 75. The items on the scale are phrased in such a way that it can be administered to participants of any cultural background. Items from the GENE scale includes statements such as “Other cultures should try to be more like my culture” and “I dislike interacting with people from different cultures.”

The GENE scale demonstrated high internal consistency $\alpha = .92$. This scale was used in the current study to assess the effects that the experimental stimuli had on the participants' beliefs about their own culture (Appendix D) (Neuliep, 2002).

Demographics Questionnaire

The demographics questionnaire was created by the author for the current study. The questionnaire's purpose was to elicit basic information about each participant. Participants reported their age, sex, and ethnicity. Additionally, participants were asked whether they had been recently ill (Appendix E).

Design

The current study utilized a 2x2 between-subjects factorial design. The study consisted of two independent variables (i.e., threat, contagion) with two levels each. Participants were randomly assigned to one of four experimental conditions (see Table 1).

Table 1

<i>Independent Variables and Levels Used in the Current Study</i>		
	<i>(IV) Threat</i>	
<i>(IV) Contagion</i>	Threatening	Nonthreatening
Contagious	Disease	Yawning
Noncontagious	Guns	Furniture

The dependent variable is to what extent the participant self-reports ethnocentric attitudes (as evidenced by the generalized ethnocentrism scale). Before the experimental manipulation, participants also completed two scales (the health

philosophy scale and perceived vulnerability to disease scale) to assess relevant individual differences.

Procedure

Participants were recruited for the online study through Amazon's Mechanical Turk. Individuals who were interested in participating were first presented with information about the study in the consent form through Qualtrics (Appendix F). Prospective participants clicked "yes" to indicate that they were choosing to participate in the study. Once the participant offered his or her consent, they were directed to the health philosophy scale (Appendix A) and the PVD scale (Appendix B), which were presented in a counter-balanced order.

Once the scales were completed, participants were randomly assigned to one of four experimental conditions (Appendix C). Participants viewed the slideshow for the condition to which they were assigned. Upon completion of the slideshows, all participants completed the generalized ethnocentrism scale (Appendix D). Participants then completed the demographics questionnaire (Appendix E). Next, all participants watched a slideshow of five pleasant photographs (e.g., ducklings, flowers) (Appendix H). Each pleasant photograph was presented for 8s and was followed by 4s of blank space. The purpose of the pleasant slideshow was to eliminate any negative emotions that may have resulted from watching the disease slideshow. Previous research has found that mental imagery tasks can lead to positive mood ratings (Renner, Schwarz, Peters, & Huibers, 2014). Finally, participants were

presented with the debriefing form (Appendix G) and they were thanked for their participation in the study.

RESULTS

Correlations of PVD Scores and Ethnocentrism Scores

It was hypothesized that there would be a significant positive correlation between scores on the perceived vulnerability to disease scale (Duncan, Schaller, & Park, 2009) and scores on the generalized ethnocentrism scale (Neuliep & McCroskey, 1997). Hence, feeling especially vulnerable to the threat of disease would be significantly related to evaluating other cultures according to the standards of one's own culture. The results from the bivariate correlations were consistent with the hypotheses. A significant positive correlation between PVD scores and ethnocentrism scores, $r(505) = .16, p < .001$ was found. There was a positive correlation between ethnocentrism scores and the germ aversion subscale, $r(505) = .16, p < .001$; as well as the perceived infectability subscale, $r(505) = .10, p = .02$.

Experimental Stimuli and Self-Reported Ethnocentric Attitudes

A 2 (threat) x 2 (contagious) ANOVA was used to test the first two hypotheses of the study. Results revealed that viewing threatening material did not produce a main effect on levels of ethnocentrism $F(1, 503) = 1.79, p = .18$, partial $\eta^2 = .004$. There was no main effect of contagiousness, $F(1, 503) = 0.12, p = .72$, partial $\eta^2 = .000$. In addition, there was no significant interaction between contagious and threatening stimuli $F(1, 503) = 0.50, p = .49$, partial $\eta^2 = .001$. (See Figure 1 for mean ethnocentrism scores across experimental conditions)

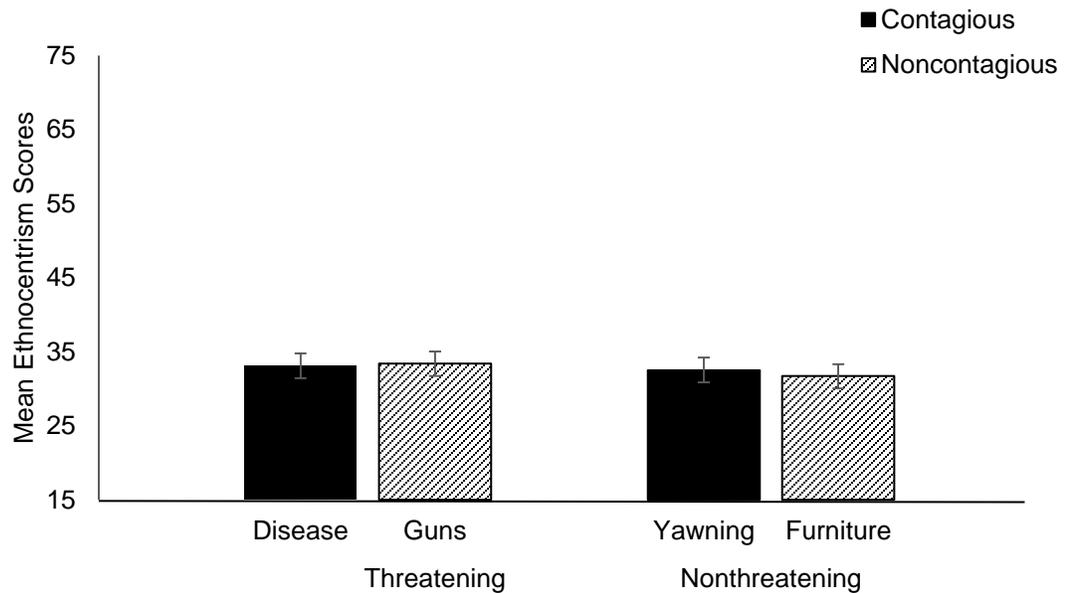


Figure 1. Mean ethnocentrism scores across experimental conditions, with 95% confidence intervals.

Correlations of Health Philosophy Scores and Ethnocentrism Scores

It was hypothesized that, among those in the disease threat condition, low ethnocentrism scores would negatively correlate with Eastern health philosophies. Hence, participants who tend to believe in internal etiologies of disease will have relatively low ethnocentrism scores when faced with the threat of disease. The results from a bivariate correlation were consistent with the hypothesis. Among those in the Disease Threat condition, health philosophy scores negatively correlated with ethnocentrism scores, $r(124) = -.21, p = .02$. Similarly, health philosophy scores negatively correlated with ethnocentrism scores among those in the Threats Control condition, $r(127) = -.25, p = .005$, and the Contagion Control condition, $r(126) = -.22, p = .01$, but not the Neutral Condition $r(130) = -.03, p = .70$. Lastly, a significant, negative correlation was found across all conditions, $r(505) = -.19, p < .001$.

Participants who endorsed an Eastern health philosophy generally had lower ethnocentrism scores than those who did not subscribe to Eastern health philosophy. Health philosophy was not correlated with perceived vulnerability to disease scores, $r(504) = .05, p = .27$.

Exploratory Analyses

Further analyses were utilized to explore the data. Independent *t*-tests were used to examine differences between those that reported a recent illness and those that did not on PVD scores and ethnocentrism scores. Those who had reported an illness within the past week ($n = 75, M = 63.40, SD = 14.58$) reported higher levels of perceived vulnerability to disease than those who had not been recently ill ($n = 431, M = 55.19, SD = 13.19$); $t(504) = 4.89, p < .001, d = 0.59$. However, those who had reported an illness within the past week ($n = 75, M = 32.04, SD = 9.43$) did not report higher levels of ethnocentrism when compared to those who had not been recently ill ($n = 431, M = 32.76, SD = 9.55$); $t(504) = -.606, p = .54, d = 0.07$.

Sex differences were also examined with independent *t*-tests. Scores on the PVD scale were higher for women ($M = 58.78, SD = 14.03$) than for men ($M = 53.07, SD = 12.56$), $t(472.0) = -4.78, p < .001, d = 0.42$. Levene's test indicated unequal variances ($F = 4.24, p = .04$), degrees of freedom were adjusted from 504 to 472.0. Scores on the ethnocentrism scale were higher for men ($M = 35.43, SD = 9.26$) than for women ($M = 30.71, SD = 9.22$), $t(504) = 5.65, p < .001, d = 0.51$.

A 2 (threat) x 2 (contagious) ANOVA was used to examine whether those randomly assigned to each condition happened to differ in PVD. There was a

marginally significant main effect of contagious stimuli on PVD scores, $F(1, 503) = 3.01, p = .08$. Those in the noncontagious conditions ($M = 57.49, SD = 14.26$) had higher PVD scores than those who were in the contagious conditions ($M = 55.38, SD = 13.06$). There was not a significant effect of threatening stimuli on PVD scores, $F(1, 503) = 0.01, p = .93$. Lastly, there was no significant interaction between threatening and contagious stimuli on PVD scores, $F(1, 503) = .003, p = .95$.

Because PVD scores varied across assigned conditions, a 2 X 2 ANCOVA was used to investigate whether or not the predicted effects of contagious and threatening stimuli on ethnocentrism were present when controlling for PVD. The covariate, PVD, was significantly related to ethnocentrism scores, $F(1, 502) = 13.18, p < .001, \text{partial } \eta^2 = .026$. Even when controlling for PVD, there was not a significant effect of contagious stimuli, $F(1, 502) = 0.39, p = .52, \text{partial } \eta^2 = .001$, of threatening stimuli, $F(1, 502) = 1.86, p = .17, \text{partial } \eta^2 = .004$, or a significant interaction between contagious and threatening stimuli, $F(1, 502) = 0.48, p = .48, \text{partial } \eta^2 = .001$, on ethnocentrism scores.

DISCUSSION

Perceived Vulnerability to Disease and Ethnocentrism

It was predicted that feeling vulnerable to infectious disease would be positively associated with unfavorable feelings towards members of a different culture (i.e., outgroup members). The results from the analyses were consistent with the hypothesis. Participants who personally felt vulnerable to the threat of disease tended to self-report negative attitudes towards individuals from other cultures. These findings were consistent with the findings from four studies conducted by Faulkner et al. (2004) and one study by Navarrete and Fessler (2006). In addition, the findings from the present study also revealed that scores from the both germ aversion and perceived infectability subscales were positively associated with self-reported ethnocentric attitudes. Previous findings from Huang et al. (2011) also revealed that germ aversion scores from the PVD scale uniquely predicted unfavorable attitudes towards outgroup members. However, Huang et al. (2011) did not find an association between perceived infectability scores and PVD. It is worth mentioning that the slideshow used in the Disease Threat condition failed to produce an experimental effect on ethnocentrism. The purpose of the disease slideshow was to induce feelings of disease vulnerability; however, it did not affect ethnocentrism scores.

The findings from the current study and previous studies suggest that disease-avoidance mechanisms influence negative attitudes towards outgroup members. The body's immune system is very vulnerable during sickness; therefore, it is wise to avoid outside individuals who carry foreign pathogens. In other words, ethnocentrism

serves as a protective mechanism against dangerous pathogens. It is important to consider that although this finding was significant, the effect size was small. A high percentage of the variability in ethnocentrism scores cannot be explained by PVD

Threatening Primes and Ethnocentrism

During the experimental portion of the study, participants were randomly assigned to watch either a disease, guns, yawning, or furniture slideshow. Participants then completed a brief scale in which they were instructed to indicate to what extent they endorse a set of ethnocentric statements. It was predicted that participants who were exposed to either the threatening disease or guns slideshows would generally endorse ethnocentric attitudes when compared to participants who were presented with the nonthreatening yawning or furniture slideshows. It was also predicted that participants who were exposed to both threatening and contagious stimuli (i.e., disease slideshow) would report the highest levels of ethnocentrism when compared to participants from all other conditions. Contrary to the predicted outcome, participants who viewed the threatening slideshows did not report significantly higher levels of ethnocentric attitudes when compared to those who viewed the nonthreatening slideshows. Similarly, the results revealed that the interaction between threat and contagion did not produce a significant effect on levels of ethnocentrism. In fact, not one of the slideshows had a unique impact on levels of ethnocentrism.

It is important to note here that Schaller et al. (2010) found an effect of the biological immune system using the same gun and disease photos that were used in the present study. As a brief reminder, the researchers found that participants who

viewed disease-connoting photos had higher levels of IL-6 in their bloodstream compared to those who did not view the photos (Schaller et al., 2010). Perhaps it is not the content of the photos that led to the current findings but rather the environment in which the survey was completed. Participants in the aforementioned research completed the study at an in-person lab while participants in the present study completed the study at their personal computers. It is possible that participants who completed research in their homes did not pay as much attention when compared to those at the in-person lab.

Furthermore, the findings from the present study are incongruent with the findings from two studies by Faulkner et al. (2004) in which participants who were presented with a disease slideshow reported more negative attitudes towards foreign immigrant groups compared to participants who watched a control slideshow. The differing results from the present study and the two previous studies may have been a result of the content from the present study's disease slideshow. The slideshow used in the present study simply featured men and women demonstrating behavioral disease symptoms while the slideshow used in the two previous studies featured common, everyday life scenarios that spread bacteria. For example, one photo titled "The Horrors of the Kitchen Sponge and Family Pets" featured a woman attempting to kill germs in a kitchen. The slideshow used in the study by Faulkner et al. (2004) may have been more effective than the one used in the present study because it contained examples that are relevant to everyday experiences which were paired with vivid title descriptions. In other words, the slideshow used in the previous studies

may have had a notable effect because participants could relate to the presented experiences. Additionally, the explicit title descriptions could have made the participants feel as if the threat was especially salient.

The nonsignificant findings were unexpected because disease slideshow manipulations have successfully predicted ageist attitudes (Duncan & Schaller, 2009) and prejudicial attitudes towards obese individuals (Park et al., 2007). However, much like the disease slideshow used in the study by Faulkner et al. (2004), the slideshows in the studies by Duncan and Schaller (2009) and Park et al. (2007) emphasized the process of bacteria and pathogen transmission. Once again, the nature of the disease slideshows used in the previous studies are different from the one used in the present study.

Lastly, it is important to consider that photographic stimuli may generally be an insufficient experimental manipulation. To a certain extent, the threat of disease in everyday life is far more sophisticated than viewing a set of photographs on a computer screen. When one sees a sign of disease, it may also be accompanied by the involvement of another sense (e.g., hearing a cough). Thus, the nature of the manipulation used in the current study may have not been sufficient to induce differing outcomes across slideshow conditions.

Disease-Connoting Prime, Health Philosophy, and Ethnocentrism

In the study by Duncan and Schaller (2009), participants with a European heritage who watched a disease slideshow were more likely to associate older adults with negative semantics; however, despite watching the same slideshow, this effect

was not found in participants with an East Asian heritage. This finding was especially peculiar because the differences in the results between the ethnic heritages could not be explained by differences in perceived vulnerability to disease. In other words, European participants did not report more ageist attitudes because they personally felt susceptible to the threat of disease. In fact, results from a preliminary analysis revealed that East Asian participants had significantly higher scores on the germ aversion subscale when compared to European participants (Duncan & Schaller, 2009). The authors speculated that the lack of implicit ageism among East Asian participants in the disease condition could have been a result of cultural differences, namely health philosophies.

In order to address the credibility of the health philosophy speculation, the authors suggested that future researchers should attempt to assess to whether participants tend to endorse Eastern or Western health philosophies. The author of the present study created a brief health philosophy scale using the recommended texts from the study mentioned above to test if participants' health philosophy moderated the effects of disease threat on ethnocentrism. In sum, information from the recommended texts revealed that Western medicine generally supports the idea that the outside environment changes are responsible for the cause and even treatment of diseases. In contrast, Eastern medicine generally maintains the idea that disease is a result of the disruption of one's own internal balance (Ohnuki-Tierney, 1984; Pachuta, 1996; Tseui, 1978). These specific cultural beliefs may help explain why the disease prime did not produce the expected effect between disease threat and ageist

attitudes among East Asian participants (Duncan & Schaller, 2009). Specifically, Duncan and Schaller (2009) explained that the disease slideshow used in the study contained photographs that demonstrated examples in which disease is spread in one's immediate environment (e.g., bacteria on a sponge). All of the photographs in the slideshow featured examples of how disease is spread externally; external pathogen transmission is a common cultural belief among Western cultures. Therefore, the disease slideshow may have not have been an effective manipulation since East Asian culture tends to endorse internal causes of disease.

In the present study, it was predicted that, among those in the disease condition, participants with low ethnocentrism scores would tend to endorse an Eastern health philosophy while participants with high ethnocentrism scores would be less likely to endorse an Eastern health philosophy. The results were consistent with the hypothesis. Participants in the Disease condition who had low ethnocentrism scores tended to support Eastern health beliefs while participants who had high ethnocentrism scores were less likely to support Eastern health beliefs. Unexpectedly, however, this same effect was found among those in the Threat Control condition and the Contagion Control condition. To the author's best knowledge, the present study is the first study to have examined the moderating effect of health philosophy on self-reported ethnocentric attitudes; therefore, the rationale behind the explanation of these findings can only be considered pure speculation.

Although a direct test of health philosophy was utilized in the current study, very few people with an Asian heritage participated. Eastern health beliefs are

certainly not exclusive to those with an Asian heritage; however, a more diverse sample could have produced distinct findings. Further, health philosophy alone may not be the only factor contributing to the negative relationship with ethnocentrism. A wide variety of other cultural factors could influence the way one perceives others (e.g., political views).

The disease, guns, and yawning slideshows shared few obvious similarities, yet they all managed to produce a negative relationship between ethnocentric attitudes and an Eastern health philosophy. The most evident shared characteristic between the aforementioned slideshows are the fact that they all featured people. It is possible that viewing photographs of people, regardless of the specific context, caused participants to be especially mindful about health. This explanation appears somewhat plausible given the fact that previous research has found that the human face can reveal very telling information about one's health (Zaidel, Aarde, & Baig, 2005). Alternatively, an Eastern health philosophy may be negatively related to ethnocentrism in general, regardless of what stimuli is presented or what situation an individual is in. It is also possible that these peculiar findings could simply be a result of chance. Future researchers should attempt to assess whether other variables have the possibility of influencing the relationship between health beliefs and ethnocentrism.

Sex Differences

Although sex differences were not included in the hypotheses, exploratory analyses revealed significant sex differences in perceived vulnerability to disease

scores and generalized ethnocentrism scores. Specifically, men scored lower on the PVD scale when compared to women. Similar sex differences in PVD scores were also found in the psychometric evaluation of the scale (Duncan et al., 2009). The authors explained that these gender differences can also be found when assessing disgust sensitivity (Duncan et al., 2009). However, the mechanism behind these gender differences is unknown; it is a topic that warrants future research.

Further, men scored higher on the ethnocentrism scale when compared to women. Previous research has also found that men tend to be more ethnocentric than women (Lin, & Rancer, 2003; Neuliep, Chaudoir, & McCroskey, 2001). These gender differences in ethnocentrism can be attributed to different personality traits. Generally, women are more trusting than men. The trusting characteristics found in women seem to buffer against ethnocentric beliefs (Neuliep et al., 2001).

These significant gender differences in PVD and ethnocentrism scores were not expected. It was predicted that participants with higher PVD scores would generally have higher ethnocentrism scores. The results from the exploratory analyses revealed that these sex differences went in opposite directions. These unexpected findings demonstrate that disease threat alone cannot be responsible for inducing ethnocentric attitudes. Ethnocentrism is a complex phenomenon that cannot be reduced down to a single variable.

Limitations and Implications for Future Research

The limitations in the current study should be considered for improvements in future research. The ethnic background of the participants was a limitation. Most

participants had a Caucasian heritage. A more diverse sample could help researchers gain insight into various cultural beliefs, such as health philosophy. Future researchers should recruit participants from more than one source in order to avoid responses from a uniform sample.

The presentation of the photographs used during the experimental manipulation offer a unique set of limitations. The experimental stimuli were the primary focus in explaining outcome variable differences across participants; therefore, the method in which these photos were presented should be considered. First, participants in the present study viewed each slideshow for a total of two minutes. In the study by Schaller et al. (2010), the same photographs (i.e., disease, guns) were shown multiple times to create a slideshow lasting a total of ten minutes. Perhaps the length of the slideshow in the current study was not sufficient to produce an effect on ethnocentrism. In addition, an effect on ethnocentrism may have not been present because the current study was completed online. Participants in the Schaller et al. (2010) and the Faulkner et al. (2004) studies completed the slideshow tasks at an in-person lab while participants in the current study completed the study online. Although it is not clear whether the studies by Park et al. (2007) and Duncan and Schaller (2009) were completed in-person, it is very likely that they were. The fact that the present study was conducted online makes it difficult to ensure that participants actually viewed the slideshow. The author of the study compiled the photographs from the Contagion Control condition and Neutral condition via a web search, and were not formally evaluated. Future research should formally evaluate

whether the photographs are inducing the intended state. Second, the varying details featured in the content of the photographs are a limitation. The slideshows contained obvious differences such as gender and ethnicity. For example, the Disease condition featured photographs of both men and women demonstrating disease-connoting behaviors while the Threat Control condition exclusively featured men holding guns. The obvious differences between the slideshow contents could have cancelled out the effect that disease threat had on participants. Future research should utilize photographs that are designed to control for these varying reactions. Lastly, the photographs do not accurately translate into the way threats are perceived in everyday life. Evidence of disease threat in everyday life is far more complex than a series of photographs. The study was limited to participants visually perceiving disease connoting stimuli; however, real-life threats may also include smelling or hearing specific cues (e.g., sound of a sneeze). Future researchers should design a study that offers a realistic portrayal of the specific manipulation. For example, a researcher may instruct a “sick” confederate to distribute the study in person.

Furthermore, the placement of the PVD scale before the experimental stimuli could have biased the results. Items from the scale include “In general, I am very susceptible to colds, flu, and other infectious diseases” and “I am more likely than the people around me to catch an infectious disease.” Given the nature of the items, the scale could have primed all participants to be sensitive to the threat of disease. In spite of this limitation, the PVD scale was placed before the manipulation to detect individual differences in perceptions of disease susceptibility that could influence the

results. Future research should assess whether or not placing the PVD scale before or after the experimental manipulation affects the results. A limitation that should be considered is the time it took for participants to complete the study. The mean time was 657 seconds (10 min and 95 s) and the median time was 566.5 seconds (9 min and 4 s). Given this information, it is difficult to determine whether or not the findings reflect the variables measured.

Despite these methodological limitations, a series of strengths were also present. First, participants were pooled from AMT. This sample is larger and more diverse than the commonly used college student population. Furthermore, a previous study has revealed that AMT participants answer questions in a manner similar to participants from a representative U.S. sample (Berinsky, Huber, & Lenz, 2012). The study was unique in that it assessed the relationship between one's health philosophy and self-reported ethnocentric attitudes. In addition, the study utilized a control for contagious stimuli in order to further understand what specifically activates the behavioral immune system.

Clinical Implications

The results from the current study have implications for those working in clinical settings. Participants who felt vulnerable to infectious disease generally self-reported more ethnocentric attitudes than those who did not feel particularly vulnerable to disease. Ethnocentrism ultimately influences the ways in which people perceive and evaluate others. Clinicians who practice psychotherapy are cognizant of the fact that client and therapist perceptions can have serious implications for the

process of therapy. Clients and therapists who feel vulnerable to the threat of contagious disease may hold ethnocentric beliefs. Therapists should be mindful of their feelings regarding disease vulnerability as these have the possibility of being associated with negative appraisals of their client. Therapists should also consider client perceived vulnerability to disease when exploring client attitudes.

Conclusion

Although ethnocentrism can have beneficial implications for human survival, it can also lead to distorted assumptions about other people. The present study explored the effects of disease threat on ethnocentric beliefs, and whether or not those effects are moderated by health philosophy. The results of the study revealed that participants who endorsed an Eastern health philosophy reported less ethnocentric beliefs when compared to those who did not endorse an Eastern health philosophy. Participants who felt vulnerable to threat of disease tended to report more ethnocentric beliefs than those who did not feel vulnerable. However, being primed to disease-connoting material did not have an effect on ethnocentric beliefs. Lastly, males generally reported feeling less susceptible to the threat of disease than women. These findings suggest that multiple variables (e.g., sex, perceived vulnerability to disease) are associated with ethnocentric beliefs. They also suggest that people who endorse an Eastern health philosophy do not report ethnocentric beliefs as often as those who do not have an Eastern health philosophy. Future research should assess whether or not photographs effectively prime the threat of disease. It would also be

beneficial to assess the driving mechanisms behind sex differences and perceived vulnerability to disease.

REFERENCES

REFERENCES

- Berinsky, A. J., Huber, G. A., & Lenz, G. S. (2012). Evaluating online labor markets for experimental research: Amazon.com's Mechanical Turk. *Political Analysis*, 20, 351-368. doi:10.1093/pan/mpr057
- Brewer, M. B., & Campbell, D.T. (1976). *Ethnocentrism and Intergroup Attitudes: East African Evidence*. Beverly Hills, United States: Sage Publications.
- Diamond, J. M. (1999). *Guns, Germs, and Steel: The Fates of Human Societies*. New York: Norton.
- Dorschel, A. (2000). *Rethinking Prejudice*. Aldershot, England: Ashgate.
- 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, 97-115. doi:10.1111/j.1530-2415.2009.01188
- 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. doi: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 and Intergroup Relations*, 7, 333-353. doi:10.1177/1368430204046142
- Fessler, D. T., Eng, S. J., & Navarrete, C. D. (2005). Elevated disgust sensitivity in the first trimester of pregnancy: Evidence supporting the compensatory

prophylaxis hypothesis. *Evolution and Human Behavior*, 26, 344-351.

doi:10.1016/j.evolhumbehav.2004.12.001

Fincher, C. L., & Thornhill, R. (2008). Assortative sociality, limited dispersal, infectious disease and the genesis of the global pattern of religion diversity.

Proceedings of the Royal Society B, 275, 2587–2594. Retrieved from

<http://rspb.royalsocietypublishing.org/>

Haselton, M. G., & Buss, D. M. (2000). Error management theory: A new perspective on biases in cross-sex mind reading. *Journal of Personality and Social Psychology*, 78, 81-91. doi:10.1037/0022-3514.78.1.81

doi:10.1037/0022-3514.78.1.81

Haselton, M. G., & Nettle, D. (2006). The paranoid optimist: An integrative evolutionary model of cognitive biases. *Personality and Social Psychology Review*, 10, 47-66. doi:10.1207/s15327957pspr1001_3

doi:10.1207/s15327957pspr1001_3

Huang, J. Y., Sedlovskaya, A., Ackerman, J. M., & Bargh, J. A. (2011). Immunizing against prejudice: Effects of disease protection on attitudes toward out-groups. *Psychological Science*, 22, 1550-1556.

doi:10.1177/0956797611417261

Kurzban, R., & Leary, M. R. (2001). Evolutionary origins of stigmatization: The functions of social exclusion. *Psychological Bulletin*, 127, 187-208.

doi:10.1037/0033-2909.127.2.187

Langman, R. (1989). *The Immune System: Evolutionary Principles Guide Our Understanding of This Complex Biological Defense System*. San Diego, California: Academic Press.

- Lewis, S. (2014). Altered immune responses and transplantation. In *Medical-Surgical Nursing: Assessment and Management of Clinical Problems* (9th ed., Vol. 1, pp. 203-225). St. Louis: Mosby.
- Lin, Y., & Rancer, A. S. (2003). Sex differences in intercultural communication apprehension, ethnocentrism, and intercultural willingness to communicate. *Psychological Reports, 92*(1), 195-200.
doi:10.2466/PRO.92.1.195-200
- Markel, H., & Stern, A. M. (2002). The foreignness of germs: The persistent association of immigrants and disease in American society. *Milbank Quarterly, 80*, 757-788. doi:10.1111/1468-0009.00030
- Mason, W., & Suri, S. (2011). Conducting behavioral research on Amazon's Mechanical Turk. *Behavior Research Methods, 44*, 1-23. doi:10.3758/s13428-011-0124-6
- Miller, S. L., & Maner, J. K. (2011). Sick body, vigilant mind: The biological immune system activates the behavioral immune system. *Psychological Science, 22*, 1467-1471. doi:10.1177/0956797611420166
- Miller, S. L., & Maner, J. K. (2012). Overperceiving disease cues: The basic cognition of the behavioral immune system. *Journal of Personality and Social Psychology, 102*, 1198-1213. doi:10.1037/a0027198
- Mortensen, C. R., Vaughn Becker, D. D., Ackerman, J. M., Neuberg, S. L., & Kenrick, D. T. (2010). Infection breeds reticence: The effects of disease salience on self-perceptions of personality and behavioral avoidance

tendencies. *Psychological Science*, *21*, 440-447.

doi:10.1177/0956797610361706

Murray, D. R., Jones, D. N., & Schaller, M. (2013). Perceived threat of infectious disease and its implications for sexual attitudes. *Personality and Individual Differences*, *54*, 103-108. doi:10.1016/j.paid.2012.08.021

Navarrete, C. D., & Fessler, D. T. (2006). Disease avoidance and ethnocentrism: The effects of disease vulnerability and disgust sensitivity on intergroup attitudes. *Evolution and Human Behavior*, *27*, 270-282.

doi:10.1016/j.evolhumbehav.2005.12.001

Navarrete, C., Fessler, D. T., & Eng, S. J. (2007). Elevated ethnocentrism in the first trimester of pregnancy. *Evolution and Human Behavior*, *28*, 60-65.

doi:10.1016/j.evolhumbehav.2006.06.002

Neuliep, J. W. (2002). Assessing the reliability and validity of the Generalized Ethnocentrism Scale. *Journal of Intercultural Communication Research*, *31*, 201-215. Retrieved from <http://www.immi.se/intercultural/>

Neuliep, J. W., Chaudoir, M., & McCroskey, J. C. (2001). A cross-cultural comparison of ethnocentrism among Japanese and United States college students. *Communication Research Reports*, *18*, 137-146.

Ohnuki-Tierney, E. (1984). *Illness and culture in contemporary Japan*. Cambridge, UK: Cambridge University Press.

Pachuta, D. M. (1996). Chinese medicine: The law of five elements. In A. A. Sheikh, & K. S. Sheikh (Eds.), *Healing East and West* (pp. 64–90). New York: Wiley

- 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. doi:10.1023/A:1023910408854
- Park, J. H., & Schaller, M. (2009). Parasites, minds and cultures. *The Psychologist*, *22*, 942-945. Retrieved from <http://thepsychologist.bps.org.uk/>
- Park, J. H., Schaller, M., & Crandall, C. S. (2007). Pathogen-avoidance mechanisms and the stigmatization of obese people. *Evolution and Human Behavior*, *28*, 410-414. doi:10.1016/j.evolhumbehav.2007.05.008
- Park, J. H., Van Leeuwen, F., & Chochorelou, Y. (2013). Disease-avoidance processes and stigmatization: Cues of substandard health arouse heightened discomfort with physical contact. *The Journal of Social Psychology*, *153*, 212-228. doi:10.1080/00224545.2012.721812
- Renner, F., Schwarz, P., Peters, M. L., & Huibers, M. J. (2014). Effects of a best-possible-self mental imagery exercise on mood and dysfunctional attitudes. *Psychiatry Research*, *215*, 105-110. doi:10.1016/j.psychres.2013.10.033
- Ryan, S., Oaten, M., Stevenson, R. J., & Case, T. I. (2012). Facial disfigurement is treated like an infectious disease. *Evolution and Human Behavior*, *33*, 639-646. doi:10.1016/j.evolhumbehav.2012.04.001
- Schaller, M. (2006). Parasites, behavioral defenses, and the social psychological mechanisms through which cultures are evoked. *Psychological Inquiry*, *17*, 96-137. doi:10.1207/s15327965pli1702_2

- Schaller, M., Miller, G. E., Gervais, W. M., Yager, S., & Chen, E. (2010). Mere visual perception of other people's disease symptoms facilitates a more aggressive immune response. *Psychological Science, 21*, 649-652.
doi:10.1177/0956797610368064
- Schaller, M., & Park, J. H. (2011). The behavioral immune system (and why it matters). *Current Directions in Psychological Science, 20*, 99-103.
doi:10.1177/0963721411402596
- Tseui, J. J. (1978). Eastern and Western approaches to medicine. *The Western Journal of Medicine, 128*, 551-557
- Van Blerkom, L. M. (2003). Role of viruses in human evolution. *Yearbook of Physical Anthropology, 46*, 14-46. Retrieved from
<http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%291096-8644>
- Wolfe, N. D., Dunavan, C. P., & Diamond, J. (2007). Origins of major human infectious diseases. *Nature: International Weekly Journal of Science, 447*, 279-283. doi:10.1038/nature05775
- Zaidel, D. W., Aarde, S. M., & Baig, K. (2005). Appearance of symmetry, beauty, and health in human faces. *Brain and Cognition, 57*, 261-263.
doi:10.1016/j.bandc.2004.08.056

APPENDICES

APPENDIX A

HEALTH PHILOSOPHY SCALE

Instructions: Each of the following items are statements regarding your beliefs about health. Rate to what extent you agree or disagree with each of the following statements. There is no right or wrong answer.

1= Strongly Disagree

6= Strongly Agree

(R)= Reverse Scored

1. A patient's attitude can influence his health improvements.
2. Pharmaceutical drugs are the most effective form of treatment. (R)
3. A physician's emotional and spiritual well-being does not significantly influence his ability to treat illness in others. (R)
4. Acupuncture, meditation, and herbal remedies are more effective than prescription medications.
5. Individuals who experience disharmony are more prone to becoming ill.
6. One's thoughts do not influence whether or not one becomes physically ill. (R)
7. The important thing in treating an illness is to examine how the environment is associated with the illness.
8. Clients should be treated differently despite having the same symptoms.
9. Medicine should be an art rather than a science.
10. The physician is the most important tool for a client's recovery. (R)

APPENDIX B

PERCEIVED VULNERABILITY TO DISEASE SCALE

Instructions: For each item, please indicate to what extent you endorse each statement. Response format: 1 = Strongly Disagree 7 = Strongly Agree.

(R)= Reverse Scored

1. It really bothers me when people sneeze without covering their mouths.
2. If an illness is 'going around', I will get it.
3. I am comfortable sharing a water bottle with a friend. (R)
4. I don't like to write with a pencil someone else has obviously chewed on.
5. My past experiences make me believe I am not likely to get sick even when my friends are sick. (R)
6. I have a history of susceptibility to infectious diseases.
7. I prefer to wash my hands pretty soon after shaking someone's hand.
8. In general, I am very susceptible to colds, flu, and other infectious diseases.
9. I dislike wearing used clothes because you don't know what the past person who wore it was like.
10. I am more likely than the people around me to catch an infectious disease.
11. My hands do not feel dirty after touching money. (R)
12. I am unlikely to catch a cold, flu, or other illness, even if it is going around. (R)
13. It does not make me anxious to be around sick people. (R)
14. My immune system protects me from most illnesses that other people get. (R)

15. I avoid using public telephones because of the risk that I may catch something from the previous user.

Subscale 1 (Perceived Infectability): Items 2, 5, 6, 8, 10, 12, 14

Subscale 2 (Germ Aversion): Items 1, 3, 4, 7, 9, 11, 13, 15

APPENDIX C
EXPERIMENTAL STIMULI

Disease Threat Condition



Threats Control Condition



Contagion Control Condition



Neutral Condition



APPENDIX D

GENERALIZED ETHNOCENTRISM SCALE

Instructions: Below are items that relate to the cultures of different parts of the world.

Work quickly and record your first reaction to each item. There are no right or wrong answers. Please indicate the degree to which you agree or disagree with each item using the following five-point scale:

Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5

(R)= Reverse Scored

- _____ 1. Most other cultures are backward compared to my culture.
- _____ 2. My culture should be the role model for other cultures.
- _____ 3. People from other cultures act strange when they come to my culture.
- _____ 4. Lifestyles in other cultures are just as valid as those in my culture. (R)
- _____ 5. Other cultures should try to be more like my culture.
- _____ 6. I am not interested in the values and customs of other cultures.
- _____ 7. People in my culture could learn a lot from people in other cultures. (R)
- _____ 8. Most people from other cultures just don't know what's good for them.
- _____ 9. I respect the values and customs of other cultures. (R)
- _____ 10. Other cultures are smart to look up to our culture.
- _____ 11. Most people would be happier if they lived like people in my culture.
- _____ 12. I have many friends from different cultures.
- _____ 13. People in my culture have just about the best lifestyles of anywhere.
- _____ 14. Lifestyles in other cultures are not as valid as those in my culture.

- _____ 15. I am very interested in the values and customs of other cultures.
- _____ 16. I apply my values when judging people who are different.
- _____ 17. I see people who are similar to me as virtuous.
- _____ 18. I do not cooperate with people who are different.
- _____ 19. Most people in my culture just don't know what is good for them.
- _____ 20. I do not trust people who are different.
- _____ 21. I dislike interacting with people from different cultures.
- _____ 22. I have little respect for the values and customs of other cultures.

The following statements are distractor items: 3, 6, 12, 15, 16, 17, and 19

APPENDIX E

DEMOGRAPHICS QUESTIONNAIRE

Instructions: Please answer the following questions.

1. What is your sex?

Male Female Other Decline to state

2. What is your age? _____

3. What is your ethnicity?

Asian Heritage

Black/African Heritage

Caucasian (White/Non-Hispanic)

Hispanic/Latino

Native American Indian/Alaska Native

Native Hawaiian/Pacific Islander

Other (Please indicate _____)

Decline to state

4. When was the last time you were sick (e.g., cold, flu)?

Today

A couple days ago

A week ago

A couple weeks ago

A few months ago

A year or more ago

APPENDIX F

CONSENT FORM

You are being asked to participate in a research study that will examine the effects that certain pictures have on attitudes. If you decide to take part in this research study, you will be asked to watch a slideshow of a series of photographs and provide responses to various scales about health and culture. Some slideshows may feature content that some people find disturbing (e.g., adults and children who look sick). If you find this type of content disturbing, please refrain from participating in this study.

If you agree to participate, the study will take about 20-25 minutes. You have the right to withdraw from the study at any time or skip any questions that make you uncomfortable without being penalized. You will be compensated for your participation by being given \$.50 through AMT's built-in payment system. Besides this compensation, your participation in the study does not guarantee any specific benefits. Nevertheless, participation in this study offers an opportunity to learn about the research process.

Your MTurk ID number will not be associated with your responses in our data to preserve confidentiality.

This research study is being conducted by Janessa Jimenez. The faculty supervisor is Dr. Victor X. Luévano, Associate Professor, Department of Psychology and Child Development, California State University, Stanislaus. If you have questions or concerns about your participation in this study, you may contact the researcher through Dr. Luévano at vluevano@csustan.edu.

If you have questions about your participation in this research study you may contact Campus Compliance Officer of California State University Stanislaus at IRBadmin@csustan.edu.

By clicking "yes", you are acknowledging that you are at least 18 years or older. Additionally, by clicking "yes" you are offering your voluntary consent to participate in this study.

APPENDIX G

DEBRIEFING FORM

Thank you for participating in our study. We are interested in how the threat of disease effects beliefs about one's culture. Results from other studies suggest that people who feel that they can get sick easily tend to have a strong liking for their own culture and judge others based on their own cultural ideas (e.g., religion, behavior). Not only are we interested in how disease threat influences attitudes about one's culture, but we are also interested how beliefs and one's own health (e.g., beliefs about catching a disease) influence the results. We think that participants who view disease photographs will report a strong liking for their culture compared to participants who did not view the disease photos. We think that participants who personally feel vulnerable to disease will tend to believe that their culture is better than others compared to those who do not feel as vulnerable to the threat of disease. Lastly, we think that participants who believe that disease comes from within one's body are less likely to believe their culture is best compared to those who believe disease comes from the environment. All data that we collect from the study will be kept in a safe location and it will not be used for inappropriate purposes. Additionally, your confidentiality will be maintained because there will be no way of identifying your personal responses from the dataset. We are not interested in specific responses from participants. Instead, we are interested in the overall pattern from the participants' responses. In order to maintain the quality of our research conclusion, we ask that you do not discuss the content of the study (e.g., pictures, questions) with other who may later participate in it. If you experience any psychological distress as a result of participating in this study please contact your local counseling services.

If you would like to learn more about this study, please contact me at jjimenez9@csustan.edu or contact my research supervisor, Dr. Victor Luévano at vluviano@csustan.edu. If you have questions about your rights as a research participant, you may contact the Campus Compliance Officer of CSU Stanislaus at IRBadmin@csustan.edu. Furthermore, if you would like to learn more about this research topic, we suggest the following references:

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

Navarrete, C., & Fessler, D. T. (2006). Disease avoidance and ethnocentrism: the effects of disease vulnerability and disgust sensitivity on intergroup attitudes. *Evolution and Human Behavior*, 27, 270-282.
doi:10.1016/j.evolhumbehav.2005.12.001

APPENDIX H
PLEASANT SLIDESHOW

