

LIFE HISTORY, DISEASE SALIENCE, AND THE BEHAVIORAL IMMUNE SYSTEM

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To what extent might disease avoidant behavior be shaped by early life experiences? Do the conditions under which a person grows up lead them to be more or less wary of disease related threats in their immediate environment? The current work employs an in-person between-subjects study and a behavioral dependent variable in order to try to answer these questions. Participants were given the impression that they would be meeting a second participant and listened to a prerecorded introduction. This recording, a recording of a confederate of the researcher rather than an actual participant, either included no coughing (control condition) or frequent coughing (disease salience condition). The participants determined how proximate they would be to the other participant by arranging chairs for a purported meeting with this person. Finally, they were asked to complete questionnaires measuring disease avoidance, time perspective, life history, and unpredictability of the childhood environment. The objective of this study was to expand the current knowledge and understanding of the impact childhood experiences have on personality traits that influence disease-avoidant behaviors. Individuals with greater levels of childhood unpredictability, present fatalistic time perspective, and mate seeking motives were hypothesized to distance themselves less from a partner who displayed signs of illness. Our results did not provide evidence in support of our hypotheses. Possible explanations for this outcome are explored and potential remedies are discussed.

### **Life History, Disease Salience, and the Behavioral Immune System**

Historically, humans have navigated through numerous diseases threatening progress toward survival and reproductive goals (Oaten et al., 2009). Through natural selection, humans developed behavioral responses offering a preliminary line of defense against potentially fatal diseases. This development, the behavioral immune system, enables people to perceive signals implying that an infectious pathogen might be a salient threat in their current environment. This system leads individuals to avoid sources of potential infection through behaviors and decision-making that ultimately protect them from sickness (Schaller & Park, 2011). In an evolutionary attempt to stay healthy, humans will make decisions that aim to decrease our exposure to germs (Miller & Maner, 2012). These behaviors are referred to as disease avoidance and are prompted by the innate desire to protect oneself from contagious pathogens. Emotions and personality traits each play a role in the individualized expression of disease avoidance (Oaten et al., 2009).

The behavioral immune system, which can be triggered unconsciously by disease-relevant stimuli in social situations, influences a person's treatment of individuals they may perceive as potential sources of contagion. In believing that another person may transmit harmful contagious pathogens, a person's concern for their own health can elicit a relevant behavioral immune response (Miller & Maner, 2012). This response can lead to decisions that aim to mitigate the risk of encountering disease. However, there are trade-offs involved in short and long-term risk-taking, decisions that can be influenced by the immune system (McDade, 2003). Depending on age, environment, and accessible resources, individuals may participate in risky behaviors and immerse themselves in settings where they are more susceptible to infectious diseases. For example, those more cautious in protecting their immunity may be less likely to partake in large social gatherings for fear of getting sick. Variance in this response offers

populations specific exposure to and immunity from harmful pathogens (Martinez et al., 2022; McDade, 2003).

Life History Theory also provides a framework that psychologists use to understand trade-offs organisms make throughout life to successfully survive and reproduce. Two measures of life history, childhood unpredictability, and harshness, provide comprehensive information about how a child's environment may influence their adult behaviors. Childhood harshness can be characterized as a shortage of available resources, while unpredictability is an unstable and inconsistent household environment (Martinez, 2022). Childhood unpredictability can negatively impact a person's functional abilities well into adulthood. Stability enables the development of healthy adult attributes and social skills. Conversely, adults who grew up in unstable environments experience more difficulty adaptively developing physical, emotional, and social behaviors (Maner et al., 2022). Studies on levels of childhood unpredictability suggest that high levels of stress and unpredictable environments in one's childhood home can influence personality development. A childhood characterized by an unpredictable environment can lead an individual to become less cautious and more interested in short-term rewards when seeking satisfaction later in life (Martinez et al., 2022).

Enduring an unpredictable childhood may lead individuals to approach certain situations differently than peers who were reared in more predictable environments. The fact that there are individual differences in how humans respond to threats may be partially attributed to the impact of the childhood environment on the development of personality traits (Martinez et al., 2022). Childhood unpredictability correlates to various measures, such as familial stability and household disposition (Maranges et al., 2022). While there is variance in what individuals perceive to be stable and consistent home lives, measures of unpredictability attempt to

understand the impact regular inconsistencies in one's childhood can potentially have on an adult. In correlation with harshness, environments can become stressful and negatively impact the social and behavioral development of a child (Martinez et al., 2022). Negative childhood experiences such as instability at home can lead to poor health in adulthood, due to a learned sense of lack of control over an environment. This incurs higher levels of risk-taking, specifically health-related, because an individual may prioritize other social motives above their long-term health (Maner et al., 2022).

If a child learns from a young age that they cannot trust their environment, the result may be lower levels of disease avoidance (Zimbardo & Boyd, 1999). Their learned behavioral responses are due to instability during critical formative years. Previous studies conclude that growing up with high levels of unpredictability in the home plays a significant role in behavioral and physiological development and impacts various aspects of adulthood (Maner et al., 2022). Disease avoidance, a conscious and subconscious behavioral response, incorporates an individual's understanding of risk-taking and its correlation to future reward. The disease avoidant social motive, combined with personality traits associated with risk-taking, impacts health-related decisions (Zimbardo & Boyd, 1999). For example, childhood unpredictability can influence the desire to participate in risk-taking behavior, even if it compromises a person's health. The possibility of missing out on short-term benefits may minimize potential mate acquisition, which some prioritize over their health (Martinez et al., 2022). Mate acquisition and retention, aspects of the fundamental social motives, also influence decision-making as individuals seek sexual partners. Those who experienced harsh conditions from a young age may act more spontaneously or impulsively with their health (Maner et al., 2022).

Each person also has an individualized view of time, called Time Perspective (Zimbardo & Boyd, 1999). Zimbardo's Time Perspective Theory offers researchers insight into the individualized view of time and how their past has impacted their present and future decision-making skills. Physiological time is an evolutionary function that permits people to comprehend past experiences and plan for the future (Zimbardo & Boyd, 1999). Time Perspective Theory measures past positive and negative experiences, present hedonism and fatalism, and how each view of time impacts an individual's outlook on the future (Zimbardo & Boyd, 1999). Time Perspective is vital for planning, protecting oneself, and deepening one's understanding of cause and effect, which can sharpen decision-making skills. People unconsciously frame their life based on their orientation of time and its overall impact on their life, which in turn determines how much they perceive to have control over (Boyd & Zimbardo, 1997). Time perspective theory considers the decision-making process in which individuals weigh short-term and long-term impacts on the choices they make (Zimbardo & Boyd, 1999).

Within time perspective theory, several frames of thought attempt to explain how a person's understanding of time influences their thoughts, feelings, and actions. Each person is thought to have a dominant time perspective based on six categories: past negative, present hedonistic, future, past positive, and present fatalistic (Zimbardo & Boyd, 1999). Each of these influences how people perceive their past, present, and future and affect how they approach their goals and objectives (Boyd & Zimbardo, 1997). According to Zimbardo, individuals who primarily focus on the past are more likely to be nostalgic, depressed, and pessimistic about their future. Those who focus on the present tend to be more impulsive, short-sighted, and live in the moment (Zimbardo & Boyd, 1999). Zimbardo also divides positive and negative perspectives, comparing individuals who focus primarily on before or after death through transcendentalism

and fatalism (Boyd & Zimbardo, 1997). By understanding the different perspectives of time, individuals can better understand their attitudes and behaviors and those of others.

Along with avoiding disease, people develop distinct behavioral responses based on previous life experiences, which impact their decision-making when protecting themselves and their immune systems (McDade, 2003). In addition to basing decisions on life experience and time perspective, underlying social motives also factor into decision-making. Understanding the fundamental social motives offers psychologists insight into the primary goals that have guided humans toward the ultimate ends of survival and reproduction throughout the history of the species (Kaplan & Gangestad, 2015). These factors, which include “self-protection, disease avoidance, affiliation, status-seeking, mate acquisition, mate retention, and kin-care,” reflect possible motives for decision-making and survival (Pick et al., 2022, p. 1). The fundamental social motives reflect various traits that have historically been relevant to survival and reproductive success. This instrument accounts for different possible social settings and can be used to examine the goals and behaviors present within each social interaction (Neel et al., 2016).

Each social motive can elicit individual, relevant, goal-oriented behaviors when paired with a specific emotion. For example, individuals high in disease avoidance motivation would be more likely to feel a need to protect themselves from getting sick. Upon encountering a possible contagion, the emotion of disgust typically prompts disease avoidant behavior, such as steering clear of places and people that carry a risk of contamination (Oaten et al., 2009, Pick et al., 2022). Self-protection, another social motive driven by fear, prompts individuals to protect themselves from danger by isolating themselves from potentially dangerous people (Pick et al., 2022). Mate acquisition motivation drives an individual to search for a dating or sexual partner,

provoked by sexual arousal. The mate retention motive ensures one's partner they have already acquired stays loyal to them and links to feelings of jealousy (Pick et al., 2022).

The goal of the current research is to test the hypothesis that personality variables related to life history interact with disease salience cues and fundamental social motives to impact disease-avoidant behavior. Specifically, we are interested in childhood unpredictability and how this variable might interact with disease-avoidance motivation and other proximate social motives during social interaction. In an in-person laboratory study, participants will be randomly assigned to listen to either an audio recording of a purported "partner" introducing themselves while coughing frequently (disease salience condition) or, in a control condition, participants will hear the same person introducing themselves in the same manner but without coughing. Participants will be asked to set up two chairs in which they and the person they heard on the voice recording will sit and then will complete questionnaires regarding time perspective, fundamental social motives, and childhood unpredictability. After each of these steps are complete, we will then measure the distance between the chairs to test if those in the experimental condition will set their chairs up further apart than those in the control condition.

We predict that individuals will exhibit disease avoidance behaviors in response to the disease salience manipulation through a greater distance between the two chairs set up by participants. Farther chair distance reflects an individual's apprehension of encountering a possible threat to their health. Furthermore, a participant's disease-avoidant behavior is expected to be related to their social motives, degree of childhood unpredictability, and time perspective. Each variable is thought to reflect how individuals were reared and the environment in which they grew up. Upon encountering a situation in which a person must make a decision, they evaluate the level of risk they are willing to take and how certain decisions may impact their



health in the short and long term (Zimbardo & Boyd, 1999). People who experienced higher levels of unpredictability in their childhood environment will have more of a past negative or present hedonistic time perspective (Boyd & Zimbardo, 1997). Individuals will make tradeoffs with their health based on how concerned they are about their future. Those who are less concerned about the future are more likely to sacrifice long-term health for immediate or short-term rewards (Martinez et al., 2022).

Possible interactions between variables include individual levels of unpredictability in childhood and time perspective influencing levels of disease avoidance when presented with the disease salience condition (Figueredo et al., 2006; Maner et al., 2022; Zimbardo & Boyd, 1999). There are three key predictions about how individual differences would interact with the experimental manipulation. First, when a person is high in present fatalism, the time perspective in which individuals believe themselves to be “helpless” and having little control over the outcome of their life, they are predicted to present low levels of disease avoidance in the experimental condition (Zimbardo & Boyd, 1999, p. 5). Participants low in present fatalism who are placed in the experimental condition are expected to display high levels of disease avoidant behavior. Secondly, participants who have high levels of mate seeking motivation and are placed in the experimental condition are expected to have low levels of disease avoidance, due to their prioritization of mating over health (Neel et al., 2016). We might thus expect participants low in mate seeking motivation, who are placed in the experimental condition, to exhibit high levels of disease avoidant behavior. Lastly, participants with high levels of childhood unpredictability are predicted to present low levels of disease avoidance when placed in the high disease salience condition (Martinez et al., 2022).

Life history reveals levels of childhood unpredictability by assessing how strongly an individual believes their decisions impact the outcome of their behavior (Maner et al., 2022). When children learn that positive results are not a guaranteed outcome of their behavior, they may restructure their decision-making in adulthood. A childhood environment characterized by consistently unreliable caregiving, deprivation of important resources, and unmet needs can lead an individual to assume that both safe and risky decisions lead to the same undesirable outcome (McDade, 2003). High levels of childhood unpredictability can increase one's willingness to indulge in risky behavior, as their life history has taught them that short-term decisions yield positive results (Maner et al., 2022). Those familiar with unpredictability will more likely opt for a short-term, quick payout and prefer to see fast results, even if they come from a risky decision due to their tendency to discount future costs as well as benefits. This can impact disease avoidant behavior when individuals choose to risk their health in favor of prioritizing other social motives (Neel et al., 2016). If an individual has learned that avoiding a short-term risk may not produce long-term benefits, they may devalue the future and focus on "present pleasure with little concern for future consequences" (Zimbardo & Boyd, 1999, p. 5).

Adults who grew up in consistently unpredictable and harsh environments are more likely to experience sickness later in life. Childhood unpredictability leads to the perception of having less control over one's own health, causing the prioritization of other aspects of life above health (Maner et al., 2022). For example, when someone views themselves as having little control over their long-term health may pursue short-term relationships and neglect to form relationships with individuals who will care for them long-term (Umeda et al., 2015). An individual's life history offers insight into their perceived level of childhood unpredictability which can impact their fundamental social motives. These motives, which are trait-like in nature, influence the short and

long-term goals that people choose for themselves (McDade, 2003). Life history and social goals can interact to impact disease-avoidant behaviors. For example, people who are highly motivated toward social interaction and less motivated toward protecting themselves from harm might ignore signs of sickness in order to attend a gathering with friends (Maner et al., 2005; Neel et al., 2016).

Time perspective also correlates with life history because of a person's inclination to make short or long-term decisions based on their understanding of time. Individuals who view themselves as having little control over their future, such as those who experienced an unpredictable childhood and learned that their actions will not change their current situation, may not value long-term investments (Zimbardo & Boyd, 1999). Investments of this nature could impact relationships, health, and financial stability. An individual's motivation when forming decisions comes from their life history, childhood experiences, and understanding of time (Boyd & Zimbardo, 1997; McDade, 2003). They may be more willing to take risks because of the possibility of a quick payout rather than withholding and waiting for a greater benefit long-term (Boyd & Zimbardo, 1997). In relation to the future, time perspective can impact an individual's interest in taking risks or erring on the cautionary side of things when making decisions. Life history and time perspective can be used to predict a person's inclination to protect their health, exhibited through the behavioral immune system (Figueredo et al., 2006).

When individuals make impulsive decisions, they must choose whether to trade the potential for immediate gratification for more desirable future circumstances that require delayed gratification. People have distinct goals motivating their behavior, impacting how risky or cautious their decisions are. The drive for all behavior is to increase satisfaction or decrease dissatisfaction (Neel et al., 2016). If an individual was reared in conditions where they had little

to no control over their safety, they might trade off their health through risk-taking to ensure they accomplish their social or personal goals later in life. Their understanding or beliefs about how much control they have over the outcome of their decision will influence their behavior to reach their goal (Maranges et al., 2022). Individuals high in disease avoidance motivation generally prefer to avoid taking risks when it comes to encountering pathogens in hopes of protecting their health and safety (Oaten et al., 2009). It is possible that childhood unpredictability may lower people's disease avoidance if they develop a time perspective in which they do not believe their actions have a high correlation to their present situation. They may take more risks in hopes of instant reward because they do not expect long-term benefits (Miller & Maner, 2012; Zimbardo & Boyd, 1999).

We predict that people who believe that they are about to interact with someone who could be sick will place the chairs farther apart than participants in the control condition. Individual differences in personality traits, personal history, and social motives are also expected to interact with the disease salience manipulation to impact behavior. By measuring disease avoidance and collecting data regarding childhood unpredictability and fundamental social motives, the current work aims to address shortcomings in previous disease-avoidant behavior studies. Combining the Mini-K Life History scale, Zimbardo's Time Perspective Inventory, and Fundamental Social Motives, our research aims to provide a better understanding of how individual life experiences have an impact on present disease-avoidant actions. There has been little overlap in previous studies on fundamental social motives and life history theory, and we plan to examine how the relevant variables interact to impact disease-avoidant behavior. Previous research reveals that childhood unpredictability and fundamental social motives influence disease avoidance but neglects to study the correlation between life history and time

perspective in measuring the behavioral immune system's response to disease (Martinez, 2022; Mittal et al., 2015). While past research has primarily relied on self-report measures, our study includes a behavioral dependent variable which is beneficial due to the various limitations of self-report methods.

In accordance with our institution's COVID-19 safety guidelines as of March 2022, when data collection began, wearing a face mask during the study was made optional for participants and experimenters. Recent studies that include polls regarding the level of wariness about COVID-19 in psychology studies found that most participants are not worried and are confident in their decision to either be vaccinated or not at the time of the study (Makhanova et al., 2022). COVID-19 is not expected to be a major factor in this study.

## **Methods**

### **Design**

In this experiment, a between-subjects design was employed, with the disease salience manipulation serving as the manipulated independent variable (disease prime vs. control). Additional factors that were measured and will serve as predictor variables include Childhood Unpredictability (Maranges et al., 2022), Mini-K Life History (Figueredo et al., 2006), Fundamental Social Motives Inventory (FSMI, Neel et al., 2016), and Zimbardo's Time Perspective Inventory (Zimbardo & Boyd, 1999). The behavioral immune response served as the dependent variable, and this response was operationalized as the distance between chairs in the experiment after participants were asked to arrange them for a meeting with a purported additional participant.

### **Participants**

A total of 257 participants completed the procedure,  $n = 257$  undergraduate participants. Of those participants, 26.8% identified as male and 64.2% identified as female. There was one individual who indicated that they were genderqueer, and 22 individuals (8.5%) who chose not to report their gender identity. A power analysis via G\*Power 3.1.9.7 indicated that a sample size of at least  $N = 176$  is necessary to provide sufficient statistical power to detect a medium-sized effect ( $d = 0.5$ ). Our sample consisted of  $N = 257$  participants, which should allow for detection of medium-to-small effects. The participants were all undergraduate students who were enrolled in Introduction to Psychology classes at a public university in the southeastern US. The average age of our participants was  $M = 18.79$  years old ( $SD = 1.985$  years). These students were given the option to satisfy a course research requirement by either participating in one or more research studies or completing an alternative assignment.

### **Materials**

The procedure was created by Dr. Michael Baker and our 162-item questionnaire was created using the FSMI, Childhood Unpredictability Scale, Zimbardo Time Perspective Inventory, and Mini-K scales (Figueredo et al., 2006; Maranges et al., 2022; Neel et al., 2016; Zimbardo & Boyd, 1999). The participants personality traits were measured by the result of a self-report questionnaire answered on an 8-point Likert scale. An example of some of the questions used to measure life history theory are, “I could not predict which of many caretakers (e.g., babysitters, nannies, neighbors, family) would be watching me” and, “I was never certain where it was safe to play”. The participants responses from this survey were used to measure the predictor variable of childhood harshness and unpredictability based on an 8-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree”. To measure the outcome variable of disease avoidance, a self-report method was also used. An example of the behavioral and social

motives questions that were asked are, “I am motivated to keep myself safe from others”, and “I avoid people who might have a contagious illness”. The participants responses from this survey were used to measure the outcome variable of disease avoidance based on an 8-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree”. To measure the predictor variable of disease avoidance, the chair distance after hearing an introductory voice recording was measured. This measurement (in meters) was taken using a Bosch DLR130K Laser Measure.

### **Procedure**

Consent was given by the participants prior to completing any components of the experiment. Participation was considered voluntary as they could decline to answer any questions or withdraw from the experiment at any time without penalty. The participants were invited into a room containing a desk, a computer, and two identical chairs pushed against the wall. They were then told a cover story, indicating that this was an experiment about first impressions. The cover story explained that another participant in the experiment, who would meet with them at a later point, was currently in a room down the hall. They were told they would be randomly assigned to record or type an introduction, but all participants were assigned to type a brief introduction. They were then told they would either listen to or read the introduction the other participant created, and that after the other participant read or listened to their introduction, they would meet in person.

After writing their introduction, deception was involved, as the introduction participants were about to hear was prerecorded and they would not be meeting another person. Each participant was randomly assigned to either an experimental “high disease salience” condition or a control condition. Those who were selected for the control condition heard an audio recording from a healthy sounding individual, introducing themselves as a fellow student. Participants who

were randomly assigned to hear the experimental condition heard the same person, however, the audio recording included repeated coughing, intended to give the impression that the person who the participant will meet is likely to be sick. Immediately after hearing this recording, each participant was asked to arrange two chairs in the lab room for their purported meeting with the individual from the recording. The chairs were positioned similarly for every participant upon arriving at the lab, set up next to one another against one wall.

The distance between those chairs, which would serve as a measure of the participant's preferred social distance and the key behavioral dependent variable in this study, would be measured by the experimenter after the participant left the room at the end of the session. After arranging the chairs, and prior to the deception being revealed, participants were asked to complete some questionnaires designed to measure their time perspective, the unpredictability of their childhood environment, and their fundamental social motives. Finally, participants were debriefed and dehoaxed after completing the final questionnaire, at which point they were informed that they would not actually be meeting another person. The last step was measuring the distance between the two chairs twice, so we could later calculate the average of the measurements.

### **Results**

A multiple linear regression was calculated to predict chair distance based on our manipulation of disease salience and present fatalistic time perspective. The analysis did not reveal a significant interaction between these variables. Present fatalistic time perspective is not predictive of differences in chair distance ( $F(3, 250) = 1.427, p < .235$ ), with an  $R^2$  of .017. Participants predicted chair distance is equal to  $1.241 + -.146$  (Present Fatalism x Disease Salience) +  $.171$  (Present Fatalism) +  $.372$  (disease salience), where disease salience is coded or



measured as 1= low disease salience, 2= high disease salience. Participants chair distance increased .372 meters as a function of the condition in which they were assigned. Neither disease salience nor present fatalism were significant predictors of chair distance.

A second multiple linear regression was calculated to predict chair distance based on our manipulation of disease salience and mate seeking motivation. Again, the analysis did not reveal a significant interaction. Mate seeking motivation is not predictive of differences in chair distance ( $F(3, 250) = .402, p < .752$ ), with an  $R^2$  of .005. Participants predicted chair distance is equal to  $1.547 + -.032 (\text{Mate Seeking} \times \text{Disease Salience}) + .043 (\text{Mate Seeking}) + .096 (\text{disease salience})$ , where disease salience is coded or measured as 1= low disease salience, 2= high disease salience. Participants chair distance increased .096 meters as a function of the condition in which they were assigned. Neither disease salience nor mate seeking motivation were significant predictors of chair distance.

Another multiple linear regression was conducted to attempt to predict chair distance based on our manipulation of disease salience and childhood unpredictability. As with the previous two analyses, this analysis did not reveal a significant interaction. Childhood unpredictability is not predictive of differences in chair distance ( $F(3, 250) = .619, p < .603$ ), with an  $R^2$  of .007. Participants predicted chair distance is equal to  $1.550 + -.046 (\text{Childhood Unpredictability} \times \text{Disease Salience}) + .056 (\text{Childhood Unpredictability}) + .104 (\text{disease salience})$ , where disease salience is coded or measured as 1= low disease salience, 2= high disease salience. Participants chair distance increased .104 meters as a function of the condition in which they were assigned. Neither disease salience nor childhood unpredictability were significant predictors of chair distance.

### **Exploratory Analysis**

An exploratory multiple linear regression analysis was calculated to determine whether the dependent measure of chair distance was impacted our disease salience manipulation and individual levels of any of the fundamental social motives. This analysis revealed that mate retention motivation, which served as a subject variable in the regression equation, appears to interact with the disease salience manipulation. Per the instructions for administering the Fundamental Social Motives Inventory, mate retention motives were only measured among participants who indicated that they were currently involved in a relationship. A total of 102 participants (39.7%) reported being in a relationship. Among these individuals we discovered a positive correlation between mate retention motives and chair distance. A significant regression equation was found ( $F(3, 95) = 3.400, p < .021$ ), with an  $R^2$  of .097. Participants predicted chair distance is equal to  $.179 + -.088 (\text{Mate Retention} \times \text{Disease Salience}) + .238 (\text{Mate Retention}) + .572 (\text{disease salience})$ , where disease salience is coded or measured as 1 = low disease salience, 2 = high disease salience. Participants chair distance increased by .572 meters (1.88 feet) as a function of the condition in which they were assigned. Mate retention motivation was a significant predictor of chair distance.

### **Discussion**

The analyses in our results section first reveal that we have failed to find any relationship between the manipulation of disease salience and having a present fatalistic time perspective. The distance between the chairs that the participants were asked to arrange did not vary as a function of the participants level of present fatalism or exposure to the disease salience prime. The next analysis indicated that the disease salience manipulation and participants self-reported level of mate seeking motivation, as measured by the mate seeking subscale of the FSMI, did not impact the distance between the chairs. Individuals who scored high in mate seeking motives

were hypothesized to have a lesser chair distance in the manipulation condition than individuals who scored low in mate seeking motive. However, results showed no significant correlation between disease salience and mate seeking motivation. Lastly, we predicted a relationship between disease salience and childhood unpredictability, such that individuals that had higher levels of childhood unpredictability would be less impacted by the disease salience manipulation. However, individuals who indicated that their childhood had a relatively high degree of instability did not put a greater amount of distance between the chairs compared to individuals who had more predictable childhood environments.

Although none of the aforementioned hypotheses were supported by the evidence, an exploratory analysis suggested that there may be a relationship between mate retention motivation and interpersonal distance. People who have higher mate retention motives tended to place themselves farther apart from another person. These results do not apply to the whole sample, as there were fewer participants in this analysis because mate retention was only measured in people who were in a relationship at the time of the study. Individuals who scored high in mate retention motives placed their chairs farther apart in the experimental condition than individuals who did not score high in mate retention. People who are high in mate retention motives tend to have low levels of childhood unpredictability and prioritize maintaining their current relationships over finding new potential partners (Neel et al., 2016).

### **Limitations and Future Directions**

This study had several potential limitations that may have prevented us from finding a significant effect. The population we used consisted primarily of 18- to 20-year-olds (89.1%), and all participants were college students. College students tend to be higher in socioeconomic status, more highly educated, and are a commonly more affluent population than a general

sample including non-college students. Researchers have referred to this cluster of attributes as “WEIRD” (western, educated, industrialized, rich and democratic) (Pitessa & Gelfand, 2022).

Future research on this subject should incorporate a more diverse sample, if possible, in order to allow for broader generalizations.

There was a significant gender imbalance in the sample, which could have limited the study as well. There were more than twice as many men than women in the sample. There might not have been enough data from men to be adequately representative of that population if we were to analyze the sex difference. Future studies interested in sex differences could take measures to ensure a more balanced sample to acquire a better understanding of potential distinctions. Due to the nature of our data collection, possible limitations could also have arisen from the self-reported questionnaires. Participants might have selective memory, which could influence perceived levels of childhood unpredictability. Perception of one's childhood environment could also vary in severity and stability because of the subjectivity of memory. One person's experiences might be considered more or less extreme than another. Because they were self-reported, the participant's perception of these experiences may have affected their results.

Another potential limitation was the strength of the manipulation. In the procedure of this study, the manipulated condition involved a person coughing in a voice recording, which participants listened to at a controlled volume. If the coughing was not a strong enough effect, it is possible that participants did not relate coughing to a potential contagion. Therefore, the manipulation would not result in higher levels of disease avoidant behavior, measured by the interpersonal distance between chairs. Additionally, college students may be more likely to prioritize socialization over health due to their environment and peer influence. The study's

timing could impact the effects of the manipulation on participants if they were desensitized to coughing due to being in a college setting.

The lack of a relationship between the manipulated independent variable and the subject variables of interest may be due to several different factors. The nature of the phenomenon in question may have impacted the outcome of this study. It is possible that the disease salience cue had no impact at all on chair distance. Conversely, a type II error could have occurred, in which there was an effect of the experimental condition on chair distance, and we failed to find it. This may be due to the manipulation not being strong enough, making the effect too small for us to find. If participants in the experimental condition heard coughing, and the manipulation did not cause them to think about disease, they would not set up the chairs in a farther distance than if they believed they were meeting a healthy individual. Therefore, the effect would be too small to measure.

Another possibility is that there was an effect, but due to insufficient sample size, we were unable to detect the effect. This procedure was designed and conducted with an assumed medium-size effect. If the predicted effect was small or subtle, the sample size might not have provided sufficient statistical power to detect it. The population of all college aged students may have limited the results, due to the higher levels of affluence in college students as opposed to individuals without any higher education. One more possible limitation to this study is that participants may not have responded to the disease salient experimental condition due to various levels of desensitization to sickness. If an individual participating in the study is less sensitive to pathogen-related cues, such as coughing, they may not exhibit disease avoidant behavior.

Researchers who are interested in factors that impact interpersonal distance and disease avoidance could further investigate the role of mate retention motives in this behavior. They

could measure mate retention motives and look for a significant relationship between individuals high in mate retention motives, and their levels of disease avoidance. Future studies could also look for a correlation between mate retention and childhood unpredictability, to measure if individuals low in childhood unpredictability are more likely to be high in mate retention motives. People who experienced predictable childhood environments might focus on long-term relationships, motivating them to prioritize mate retention and exhibit higher levels of disease avoidance because of this.

Although this study failed to find an effect of disease salience on disease avoidant behavior, the behavioral immune system is still an important part of human psychology. This system continues to play a significant role in self-preservation, by prompting individuals to behave in ways which will keep them safe from potentially harmful pathogens. One's behavioral response to cues of disease can be impacted by their memories, the immediate social environment, and any emotions that are triggered, such as fear and disgust (Miller & Maner, 2012). Disease avoidant behavior can either positively or negatively impact social interactions, offering researchers insight into the lengths a person might go to protect their health.

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