Climate as a moderator of the effect of disease threat on interpersonal behavior

by

Elizabeth Osborne

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Graduate Supervisory Committee:

Adam Cohen, Chair
Sau Kwan
Steven Neuberg

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ABSTRACT

Infectious diseases have been a major threat to survival throughout human history. Humans have developed a behavioral immune system to prevent infection by causing individuals to avoid people, food, and objects that could be contaminated. This current project investigates how ambient temperature affects the activation of this system. Because temperature is positively correlated with the prevalence of many deadly diseases, I predict that temperature moderates the behavioral immune system, such that a disease prime will have a stronger effect in a hot environment compared to a neutral environment and one's avoidant behaviors will be more extreme. Participants were placed in a hot room (*M* = 85F) or a neutral room (*M* = 77F) and shown a disease prime slide show or a neutral slide show. Disgust sensitivity and perceived vulnerability surveys were used to measure an increased perceived risk to disease. A taste test between a disgusting food item (gummy bugs) and a neutral food item (gummy animals) measured food avoidance. There was no significant avoidance of the gummy and no significant difference in ratings of disgust sensitivity or perceived vulnerability as a function of temperature conditions. There were no significant interactions between temperature and disease. The conclusion is that this study did not provide evidence that temperature moderates the effect of disease cues on behavior.

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Chapter 1

INTRODUCTION

Think back the last time you were outside on a hot humid day. The uncomfortable malaise makes even the most menial tasks hard to complete. The feeling we feel in hot weather is similar to the way we feel when we are sick. Could this heat-induced fatigue serve a functional purpose? Heat is a major determinant of environmental pathogen prevalence. Ambient heat is an ideal warning cue for individuals to be especially alert for disease threats. There is extensive evidence that we are especially prone to disease cues. In this paper I will present an overview of the transmission of disease and mechanisms that have evolved to reduce pathogen transmission (disgust and avoidance), discuss the various cues that trigger disease avoidant behavior, and present an experiment to examine whether ambient heat and humidity moderate the behavioral effects of disease-threat.

Although we have a highly complex physical immune system, it is only activated once a pathogen has invaded the body. The amount of energy that is needed to fight off a foreign invader that has already infected the body can be substantial. The dangers of illness were even more costly in our evolutionary past. With the advancements of modern medicine, being sick now may be threatening to our paycheck or social life, but as an early human, illness was a substantial threat to survival. Not only could the disease itself kill but the energy used to fight a major flu or infection was energy taken away from seeking food, shelter, safety and caring for offspring.

Because humans are highly social and depend on groups for survival, disease is especially dangerous because of the spread of disease from contact with infected humans and animals. The large-scale spread of infection throughout a group can hinder the productivity of the group as a whole. This not only has major consequences for those who are ill, but for uninfected members of the group as well. This is evident in the economic and social effects of major epidemics like the bubonic plague epidemic that spread throughout Europe in the 17^{th} century (Lippi & Conti, 2002). Adaptations allowing humans to detect and avoid disease before becoming infected would be especially useful to survival and evolutionary success.

I propose we have adapted to be sensitive to increases in temperature because it is highly related to increases in deadly infectious pathogens. In the paper I will discuss (1) the many ways in which we are susceptible to pathogens, (2) the relationship between temperature and pathogen prevalence and transmission, (3) behavioral responses to disease threat, and (4) possible effects of temperature on behavioral responses to disease.

Disease transmission

Before we can discuss what behaviors we use to avoid disease we need to understand how pathogens are contracted and spread. Pathogens are abundant in any environment and the methods of contracting disease are varied. The transmission of pathogens typically occurs through ingestion, human-to-human contact, or transmission from animals to humans (Wolfe, Dunavan, & Diamond, 2007).

Wolfe et al. (2007) identified the transmission method of 25 diseases that impose the greatest threat to humans. Human-to-human contact is the most common method of disease transmission (Taylor, Latham, & Woolhouse, 2001). Human to human transmission of diseases can occur through direct contact and the exchange of bodily fluids (e.g., feces, blood, saliva, and urine). Some diseases, like hepatitis B, syphilis, and HIV are transmitted via sexual contact or through blood. Other diseases, like typhoid, rotavirus, and cholera, are transmitted through fecal-oral contact. Aerosol transmission (the inhalation of breath droplets, saliva, and nasal secretions) is the primary transmission method for 7 of the 25 diseases (e.g., influenza, measles, pertussis, tuberculosis, diphtheria, mumps, and rubella).

Human-to-human disease transmission can occur through direct contact or indirect contact (Taylor et al., 2001). Direct contact occurs when there is physical contact with an infected individual. Indirect contact occurs when transmission occurs without direct human-to-human contact. This can occur through contact with contaminated surfaces and objects or through vectors such as mosquitoes and rats. Depending on environmental conditions, some pathogens, such as influenza, can survive on surfaces for long lengths of time (Arundel, Sterling, Biggin, & Sterling, 1986). Intermediary species, such as mice, fleas, lice, or mosquitoes act as vectors transferring pathogens from infected individuals to healthy individuals. For example, lice carry plague and typhus, and mosquitoes are responsible for the spread of malaria, yellow fever, and dengue fever (Wolfe et al., 2007). This means that humans would increase their genetic fitness by being cautious of both individuals who appear to be infected and vectors, such as lice, mosquitoes, and mice, which can transfer disease.

Pathogens are also transmitted through ingestion of contaminated food. Because humans are omnivores, we are exposed to a wide variety of foods; this creates a high risk of ingestion of pathogens for which we have no immunity (Curtis, Aunger, & Rabie, 2004). According to the Center for Disease Control, Bacteria (e.g., salmonella, E. coli, staphylococcus), parasites (e.g., flatworms, tapeworms, nematodes, protozoa), viruses (e.g., enterovirus, hepatitis A, rotavirus), and toxic fungi or mold (e.g., fusarium moniliforme, aspergillus parasiticus) can all be transmitted through food ("Foodborne illness frequently asked questions", 2005). Because of the threat of food-borne pathogens, humans should be cautious of foods that appear to be contaminated and avoid particularly novel foods, especially in high-disease environments.

Because pathogens are transmitted through such various means it is important for humans to use a varied range of behaviors when avoiding infection. It is also advantageous to be especially vigilant when changes in the environment signal an increased pathogen threat.

Temperature and Disease Prevalence

I propose that because there is a strong positive relationship between pathogen prevalence and ambient temperature because of this strong relationship ambient temperature should cue higher disease threat in the environment. Pathogens such as viruses, bacteria, fungi, and parasites are dependent on environmental factors just like any other organism. Higher temperatures are related to increased outbreaks and the spread of many infectious viruses, such as Malaria and Dengue Fever, and food born infections, such as Salmonella and Cholera (Checkley et al., 2000; National Research Council, 2001). Ambient temperature has both direct and indirect effects of virus transmission. According to a publication by the National Research Council (2001), "Infectious microorganisms have a replication rate proportional to the ambient temperature (p. 34)." Furthermore, there is a minimum threshold for many microorganisms to reproduce at all. Vector-borne diseases are affected by the prevalence, reproduction, and biting rates of their vectors (e.g., mosquitoes, lice, flies, mice, etc.). Many of these vectors, especially cold-blooded vectors, are dependent on minimum temperatures to reproduce and if the threshold temperature has been reached their reproduction and biting rates increase as temperature increases (Bradley, 1993; Gillet, 1974; Shope, 1991).

Malaria is a prime example of the effects of temperature on disease vectors. Increased susceptibility to malaria due to increased heat occurs at several levels. First, the reproduction of the parasite responsible for spreading malaria increases with heat.

Second, malaria is dependent on mosquitoes to spread from host to host (Talman, Domarle, McKenzie, Ariey, Robert 2004; National Research Council, 2001). Mosquitoes require a minimum temperature to reproduce. Increases in temperature cause mosquitoes to develop more rapidly and increase reproduction rates. Because mosquitoes carry malaria to other hosts, increases in mosquito reproduction are directly related to an increased spread of malaria (Checkley et al., 2000). Finally, increases in temperature also increase the biting rate of female mosquitoes (Bradley, 1993; Gillet, 1974; Shope, 1991). Since the malaria virus is transmitted through mosquito bites, increased biting increases probability of infection.

Because both pathogens and pathogens vectors are dependent on ambient temperature to reproduce and spread, ambient temperature should cue higher disease threat in the environment. Therefore, it would have been advantageous for humans to associate increases in temperature with a higher disease threat and develop behaviors to avoid disease in these especially risky environments.

Behavioral responses to disease threat

Disgust as a disease-avoidance mechanism

Because of the abundant prevalence of pathogens and the serious threat they pose, mechanisms have evolved to detect and avoid disease (Oaten, Stevenson, & Case, 2009; Hart, 1990; Rozin, Haidt, McCauley 2008). The emotion disgust is one such mechanism designed to facilitate disease avoidance. People experiencing discuss produce a distinct facial expression (slightly narrowed brows, wrinkled nose, and protrusion of the tongue) that is universally recognized across cultures (Ekman & Friesen, 1974; Rozin, Lowery, & Ebert, 1994). This facial expression is important because it would prevent toxins from entering the eyes and nose and expel any toxins that may have entered the mouth. Though this facial expression is distinct to disgust, research has shown that disgust is not always accompanied by a noticeable facial expression (Soussignan & Schall, 1996; Rozin, Haidt, & McCauley, 2008).

If the function of disgust is to facilitate disease avoidance, then direct cues of pathogens or infection should elicit disgust. Research has shown that this is in fact the case. Curtis and Biran (2001) showed that substances that spread disease (i.e., feces, blood, urine, semen, ticks, lice and spoiled foods) are associated with a strong disgust response. Haidt, McCauley, and Rozin (1994) found that the odor of decay is an especially potent disgust elicitor. This is not surprising since many communicable diseases (e.g., Staphococcus) are present in rotting flesh (Benenson, 1995). Images depicting direct symptoms of disease, like scabs, wounds, or a pale sweaty complexion, elicited a significantly stronger disgust response compared to neutral images (Curtis, Aunger, & Rabie, 2004).

Disgust as a disease avoidance mechanism is effective in some situations but limited in others. The onset is immediate, but the effects are somewhat short-lived. If there were a constant threat of disease in the environment there would be desensitization of these threats. It would be adaptive to have additional mechanisms that work on a cognitive level to avoid disease.

Behavioral Immune System

Disgust promotes general avoidance and aversion towards disease cues but there are other systematic behaviors needed to successfully limit disease transmission when a disease threat is perceived. Schaller and Duncan (2007) have proposed the evolution of a behavioral immune system. The behavioral immune system enables humans to reduce contagion by automatically reducing interpersonal contact with individuals who show signs of disease. Similar to disgust, there is a bias toward false positives because of the possible dire consequences that would occur if disease cues that were indicative of an actual contagion were ignored (Haselton, Nettle, & Andrews, 2005; Kurzban & Leary, 2001). Research has shown that the behavioral immune system triggers behaviors that facilitate physical and social distancing. Decreased socialization under a disease threat is not always limited to individuals that show possible cues for disease. Because infected individuals can sometimes show no overt signs, when an individual feels a disease-threat, an overall bias in self-perception towards less sociability and less desire to seek out new social connections would be adaptive (Mortensen, Becker, Ackerman, Neuberg, & Kenrick, 2010).

In a series of studies, Mortensen et al. (2010) investigated the effects of a disease prime on personality constructs and approach avoidance tendencies. In the first study, participants were shown a slide show that depicted germs and disease (disease prime condition) or a slide show that depicted different architectural building styles (neutral condition). Personality constructs (extroversion, conscientiousness, openness to experience, agreeableness, and neuroticism) were measured using the 44-item Big Five Inventory. They found that ratings of extroversion were lower in the disease prime. Openness and agreeableness were rated lower in the disease prime but only for individuals who perceived themselves to be highly vulnerable to diseases. In a second study, approach-avoidance responses were measured using a task developed by Chen & Bargh (1999). Participants were asked to perform a shape recognition task in which they had to flex their arm (movement of pulling something towards them) or extend their arm (movement of pushing something away) to select the appropriate key corresponding to the shape shown (circle or square). Neutral faces of males and females were presented with the shapes and counterbalanced for movement. They found that participants were quicker to perform arm extension (avoidance) movements compared to arm flexing (approach) movements in a disease prime condition.

Cross-cultural research shows that there is variability in personality constructs based on the disease prevalence of the region. A series of cross-cultural studies measured personality constructs and disease prevalence in 71 cities in Europe, Asia, North America, South America, and Africa. Big Five personality traits (extroversion, conscientiousness, openness to experience, agreeableness, and neuroticism) were measured using the NEO Personality Inventory (McCrae, 2002). They found that individuals in areas that have high pathogen prevalence rated lower on self-reported extroversion (i.e., general sociability) and openness to experience (i.e., desire to seek new and novel experiences) (Schaller & Murray, 2008). Because many pathogens are spread through human contact, lower overall sociability (extroversion) would limit risk of transmission through human contact. Because out-group members and novel objects are more likely to carry disease for which we have no immunity, individuals should seek out the familiar over the unfamiliar (i.e., openness to experience). Because many diseases are spread through direct physical contact, it is sensible that sexual promiscuity (measured via the self- reported Sociosexual Orientation Inventory, Simpson & Gangestad, 1991) is also negatively correlated with disease prevalence (Schaller & Murray, 2008).

Disease cue detection

Throughout this paper I have discussed reactions to disease cues but what exactly is a ‘disease cue’? First, a disease cue may not be completely synonymous with an infectious object or individual. There is evidence that disease avoidance can be triggered by cues that do not necessarily denote contagion. Because a false rejection (mistaking a contagious individual as healthy) is potentially much more harmful than a false positive (mistaking a healthy individual as contagious), then we can expect a bias in signal detection towards false positives, thus minimizing false rejections (Haselton, Nettle, & Andrews, 2005; Kurzban & Leary, 2001). Furthermore, Schaller and Duncan (2007) proposed that there is a bias in disease detection towards overgeneralization because highly specified cues would result in false negatives of novel cues.

This signal detection bias is important in understanding the wide range of cues that are interpreted as signs of disease. It is important in the current research to understand what cues individuals commonly associate with disease. It's important to first understand what is identified as a disease cue before we can discuss how temperature may affect the response to these cues. In the following three sections I will discuss three main types of disease cues that have been studied extensively: morphological disease cues, out-groups as disease cues, and risky sexual behavior as disease cues.

Morphological disease cues

Changes in morphology and asymmetry are cues that are often associated with disease. Abnormal morphology and asymmetry may be associated with disease because certain contagious diseases can cause physical malformations and deformities. For example, polio can cause muscle spasms and flaccid paralysis of the limbs that is often worse on one side (Atkinson et al. 2009). Lymphatic filariasis is another disease that causes drastic morphological changes. According to the Center for Disease Control, Lymphatic filariasis is "a parasitic disease caused by microscopic thread-like worms can cause Lymphadema, swelling of lymphatic tissues, and elephantiasis, the enlargement of skin and underlying tissue particularly in legs and genitals ("Lymphatic filariasis", 2012)." These dangerous infectious diseases can present the same morphological deformities as non-contagious morphological differences like obesity and physical birth defects. Thus, cues like obesity, physical deformities, and asymmetry are associated with disease and tend to elicit disgust responses.

Park, Schaller, and Crandall (2006) investigated the cognitive link between physical handicaps and disease. They administered an implicit associations test in which words were categorized as "health" or "disease" and images were categorized as "disabled" or "able bodied". They found that individuals were quicker at categorizing when "disabled" was paired with "disease." Duncan (2005) found participants associated a man with a visual deformity (a port-wine stain birthmark) with disease even when they were explicitly told the target was healthy. It has been proposed that the cultural stigma against obesity arises, in part, from a disease avoidance mechanism (Park et al, 2006). In a study by Vartanian (2010), obese individuals were rated as more disgusting than all other social groups. Park et al. (2006) found that there was an implicit association between obese individuals and the concept of disease and that this relationship was strengthened when disease was primed. These studies show that there is an implicit generalization that most morphological abnormalities imply a higher disease risk and individuals especially cautious of disease are more likely to avoid others with morphological abnormalities that could signal a disease threat.

Out-groups as a cue of disease threat

Outsiders, or strangers, pose a particularly high threat because the immune system is highly adapted to our specific social and geographical environment. Individuals or foods that we do not have regular contact with are more likely to carry pathogens to which we have no immunity (Oaten et al., 2009). Furthermore, foreigners are less likely to adhere to local norms of hygiene that prevent disease transmission (Schaller & Duncan, 2007). Therefore, we can expect that there would be a stronger disease avoidance response to out-group members (strangers and foreigners) compared to in-group members. Scheifenhovel (1997) found that individuals often displayed disgust reactions when speaking about ethnic out-groups. Faulkner et al. (2004) exposed participants in Canada to a slide show that made disease salient or a slide show depicting electrocution (a threat unrelated to disease). Participants were then asked to allocate money to a program to recruit immigrants to Canada from various foreign countries. They found that participants exposed to the disease prime allocated more money to recruit from culturally familiar countries (e.g., Poland, Taiwan) compared to culturally foreign countries (e.g., Mongolia, Brazil). There is also evidence that individuals perceive unfamiliar disgust eliciting sources to be more disgusting than familiar sources (Case, Repacholi, & Stevenson, 2006; Oaten et al., 2009). This research has shown that people associate foreign individuals with disease and - when primed with disease threat - will avoid these individuals.

Sex and disease cues

Sexual activity is associated with many different diseases. It is typically associated with sexually transmitted diseases, like syphilis or HIV, but the close contact and exchange of body fluids can transmit almost any type of infectious disease. Although sex is a necessary and desirable activity to most adults, we can expect that certain risky sexual behavior, like having sex with a stranger, would elicit a feeling of disgust and avoidance response, especially in the presence of other disease cues. There is evidence that particularly risky sexual behaviors evoke a disgust response, especially when other disease cues are present (Stevenson, Case, & Oaten, 2011; Tybur, Lieberman, & Griskevicius, 2009), and that individuals are more likely to take measures to avoid disease, like using condoms, when primed with an olfactory disease cue (Tybur, Bryan, Magnan, & Hooper, 2011). This research shows that people associate certain sexual behaviors with an increased threat of disease and will avoid these behaviors especially when there are other disease cues present in the environment.

Hypothesis

Temperature facilitates the reproduction and spread of diseases in the environment, but temperature itself is not a disease threat. Temperature would not necessarily be effective as a direct cue for disease since high ambient heat can be present for long amounts of time. An adaptation that causes one to use ambient heat as a direct disease cue would become activated much of the time. The cue may not be sensitive enough to be effective and could have deleterious effects by overtaxing the system or causing individuals to avoid possible opportunities in the environment. For this reason I propose that temperature is not a disease cue in itself but that a high ambient temperature causes one to be more sensitive to other cues of disease. I hypothesize that ambient heat will increase the effects of a disease prime, causing higher activation of the behavioral immune system and in turn eliciting high overall disgust sensitivity and lower overall sociability and openness to new experiences.

I hypothesize that when high ambient heat is paired with a disease prime:

I. There will be a significant main effect of disease prime on disgust sensitivity such that participants presented with disease cues will show higher ratings on overall disgust sensitivity, pathogen disgust, and sexual disgust. There will also be a significant interaction between the presentation of disease cues and temperature. In a hot room, there will be a greater difference in disgust sensitivity, pathogen disgust, and sexual disgust between participants presented with a disease prime and those given a neutral prime.

II. There will be a significant main effect of disease cues on PVD such that participants presented with disease cues will show higher ratings on general PVD and germ concern. There will also be a significant interaction between presence of disease cues and temperature. In a hot room, there will be a greater difference in overall PVD and germ concern between participants presented with a disease prime and those given a neutral prime.

III. There will be a significant main effect of disease cues on openness, agreeableness, and extroversion. Participants presented with disease cues will show lower ratings of openness. There will also be a significant interaction between disease cues and temperature. In a hot room, there will be a greater difference in extroversion, agreeableness, and openness between participants presented with a disease prime and those given a neutral prime.

IV. There will be a significant main effect of disease prime on taste preference related to higher disgust avoidance. Participants in the disease prime conditions will find the gummy bug less appetizing. There will also be a significant interaction between disease prime and heat condition. Participants in the heated disease prime condition will rate a mildly disgusting food item less appetizing than a neutral food item.

Chapter 2

METHODS

Participants

Four hundred forty participants were recruited from the introductory psychology subject pool at Arizona State University. Due to programming errors, survey data could not be recorded for 52 participants. Twenty-one additional participants were excluded because they guessed the true purpose of the experiment. Additionally, two participants were excluded because they provided unrealistic responses when estimating the temperature of the room (one respondent estimated 200 °F the other estimated 1000 °F) indicating their responses may not be reliable. Data from 365 participants remained (159 males, 206 females). Approximately 57% of the participants were White, 13.2% Hispanic, 5.9% Asian, 4.7% African American, 3% Middle Eastern, and less than 1% Native American or Eastern Indian. The mean age of participants was 18.85 (SD = 2.40).

Materials

The study used a basic 2 X 2 between-subjects design with disease prime and ambient temperature as independent variables. Participants were randomly assigned to one of four conditions: (1) heated room with a disease prime (n = 105), (2) heated room with no disease prime (n = 100), (3) non-heated room with a disease prime (n = 81), (4) non-heated room and no disease prime (n = 79).

Disease prime

Participants watched a slide show before completing the dependent measures of the study. To reduce suspicion of the prime participants were told that this slide show was the for the purpose of a memory test and that they would be answering questions about the slides later in the experiment. Half of the participants were assigned to view a slide show depicting germ transmission and germ prevalence (disease prime condition).

The other participants were assigned to view a slide show depicting innocuous architectural buildings (neutral condition). Both slide shows have been used in past experiments investigating disease (Mortensen et al., 2010; Ackerman et al., 2009; Faulkner et al., 2004).

Ambient Heat

Participants were randomly assigned to perform the study in either a 'non-heated' condition or a 'heated' condition. Participants were not told anything regarding the temperature of the room. The temperature of the room was manipulated using an oil-filled radiating heater. The average temperature for the non-heat conditions was 77.7°F with a range of 75-88°F. The non-heat control condition had an average temperature of 77.67 °F (*SD* = 1.36). The non-heat disease prime condition had an average temperature of 77.61 °F (*SD* = 1.62). The average temperature for the heat conditions were 84.9 °F with a range of 77-90 °F. The heated control condition had an average temperature of 85.01 °F (*SD* = 2.64). The heated disease prime condition had an average temperature of 84.73 °F (*SD* = 2.79). See Table 1 for complete means, standard deviations, and ranges of temperature for each condition.

Subjective temperature **–** A 7-point likert scale measuring the subjective feel of the room from 1 "Uncomfortably cold" to 7 "Uncomfortably hot" was used to determine subjective experience (see Appendix A for complete scale). The mean rating for the no heat control condition was 4.52 (*SD* = 0.695). The mean rating for the no heat disease prime condition was 4.42 (*SD* = 0.295). The mean rating for the heated control condition was 5.85 (*SD* = 0.880). The mean rating for the heated disease condition was 6.04 (*SD* = .759). Lab room temperature was significantly correlated with subjective temperature ratings (r = .656, $p < .001$). This confirms that the participants in the heated conditions rated felt they were in a hotter environment compared to participants in the non-heated conditions. Prime condition (disease or neutral) was not correlated with subjective temperature (r = .033, p = .53).

Food avoidance

Past research has shown that individuals tend to avoid disgust-eliciting foods (Rozin et al., 2008). In the United States, individuals rated insects to be particularly disgusting (Martins & Pliner, 2006). Because the aversion towards eating actual bugs would probably create a floor effect (most participants would not be willing to eat bugs regardless of condition) bug shaped gummy candy (Figure 1) were used to mildly activate this food aversion. To ensure that participants are not just less hungry in the heat or disease conditions the gummy bug was paired with a gummy animal candy as a control (Figure 2). The frog from the assortment of gummy animals (as seen in Figure 2) was not used in the study because it might elicit disgust.

Participants were presented with a taste test scenario. They were each given one gummy bug and one gummy animal candy. After eating both candies they were asked to rate which one they preferred. Because there is limited variability in a forced choice behavioral measure a taste preferences survey was designed to determine subtle differences in perceptions of the gummy bug and gummy animal. This survey included questions about the overall appearance of the candy. For example, participants were asked to "rate how appetizing product A appears" on a 7-point likert scale. The survey also included questions about taste and texture that relate directly to attributes associated with a disgust response. For example, participants were asked to rate how "slimy" each gummy tasted on a 7-point likert scale. See Appendix B for the full taste preferences survey.

Because overall hunger levels may decrease at higher temperatures, participants rated their current hunger level before the taste test on a 7-point likert scale, in which 1 is “not at all hungry” and 7 is “extremely hungry”. The ratings of hunger ranged from 1 to 7 (M = 3.84; SD = 1.67). There was no significant correlation of hunger rating with lab room temperature (r = - .06, p = .26) or disease prime (r = - .002, p = .96).

Disgust Scale

A three-domain disgust sensitivity self-report scale was used to measure disgust (Tybur et al., 2009). The Disgust Scale includes an overall rating of general disgust sensitivity (α = .85) as well as three subscales: pathogen disgust (α = .75), sexual disgust (α = .84), and moral disgust (α = .84). This survey uses a 7-point likert scale to rate how disgusting participants find different types of acts and experiences. The pathogen subscale includes 7 items pertaining to contact with contaminated items that may spread pathogens. A sample item from this scale is “stepping on dog poop”. The sexual subscale includes various sexual acts that may elicit disgust. A sample item from this scale is, “performing oral sex”. The moral subscale includes moral transgressions that could be interpreted as disgusting. A sample item from this scale is, “a student cheating to get good grades”. See Appendix C for complete disgust scale.

Perceived Vulnerability to Disease

Park et al’s (2004) Perceived Vulnerability to Disease (PVD) scale was used to determine differences in perception of disease threat between conditions. The PVD scale is a 15-item 7-point likert scale that measures perceived overall vulnerability to disease (α = .83). It is comprised of two subscales: germ concern (α = .76) and vulnerability (α = .90). The germ concern subscale includes 8 items that measure “discomfort with specific situations or behaviors through which disease causing germs might be transmitted” (Park et al., 2004, p. 73). Some sample items from this scale include, “I’m comfortable sharing a water bottle with a friend” or “I don’t like to write with a pencil someone else has obviously chewed on”. The 7-item vulnerability subscale measures “general beliefs about the personal susceptibility to disease" (Park et al., 2004, p. 73). This includes items like "I think I am very susceptible to colds, flu, and other infectious diseases". See Appendix D for complete PVD scale.

Big Five Personality Inventory (BFI)

The 44-item Big Five Inventory (John & Srivastava, 1999) was used to measure self-reported personality based on five dimensions: Extroversion, Openness to experience, Agreeableness, Neuroticism, and Conscientiousness. As describe by John and Srivastava (1999), extroversion ($\alpha = .83$) is a measure of "sociability, activity, assertiveness, and positive emotionality"(John & Srivastava, 1999, p. 30). Sample items measuring extroversion are "I see myself as someone who is talkative" and "I see myself as someone who tends to be reserved". Openness ($\alpha = .74$) is a measure of "the breadth, depth, originality, and complexity of an individual's mental and experiential life" (John & Srivastava, 1999, p. 30). Sample items measuring openness are "I see myself as someone who is original" and "I see myself as someone who prefers work that is routine". Agreeableness ($\alpha = .72$) is a measure of "altruism, tender-mindedness, trust, and modesty"(John & Srivastava, 1999, p. 30). Sample items measuring agreeableness are "I see myself as someone who is helpful and unselfish with others" and "I see myself as someone who tends to find fault with others." Conscientiousness ($\alpha = .72$) is a measure of "socially prescribed impulse control" (John & Srivastava, 1999, p. 30). A sample item measuring conscientiousness is "I see myself as someone who is a reliable worker." Finally, Neuroticism ($\alpha = .78$) is the measure of "emotional stability and even-temperedness with negative emotionality" (John & Srivastava, 1999, p. 30). A sample item measuring neuroticism is "I see myself as someone who can be tense". All questions are answered using a 5-point likert scale ranging from "strongly disagree" to "strongly agree". See Appendix E for complete Big Five Inventory.

Covariates

In past research, temperature has been strongly linked with aggression and an overall sense of negative affect (Baron & Bell, 1986). To rule out these alternative explanations, the current study included measures of Anger-proneness ($\alpha = .85$) (Sell, Tooby, & Cosmides, 2009) to rule out the heat-aggression hypothesis, Belief in a Dangerous World ($\alpha = .81$) (Altemeyer, 1988), and the PANAS, which measures positive and negative affect (positive: $\alpha = .89$; negative $\alpha = .84$) (Watson, Clark, & Tellegan, 1988).

Anger-proneness - anger proneness was measured using a 7-point likert scale from "strongly disagree" to "strongly agree". A sample item of the scale was "People who get in my face bug the hell out of me." The aggression prone scores ranged from 1.52 to 6.71 ($M = 4.082$; $SD = 0.83$). Anger proneness was not significantly correlated with lab room temperature ($r = -.05, p = .34$) or disease prime ($r = .06, p = .28$).

Belief in a dangerous world (*BDW*) – This scale uses a 8-point likert scale from "strongly disagree" to "strongly agree" to rate items such as "There are many dangerous people in our society that will attack someone out of pure meanness for no reason at all". BDW scores range from 1.25 to 8 ($M = 3.85$; $SD = 0.90$). BDW was not significantly correlated with lab room temperature ($r = -.010, p = .86$) or disease prime ($r = -.31, p = .56$).

PANAS - The PANAS uses a 5-point likert scale from "not at all" to "extremely" to rate the emotions the participant is currently feeling. The PANAS is comprised of two subscales: positive affect scale and negative affect scale. The positive affect scores ranged from 1 to 5 ($M = 3.09$; $SD = 0.91$). The negative affect scores ranged from 1 to 4.40 ($M = 1.52$; $SD = 0.59$). Lab room temperature was not significantly correlated with positive affect ($r = .045, p = .39$) or negative affect ($r = .038, p = .47$). Disease prime was not significantly correlated with positive affect (r = - .015, p = .77) or negative affect (r = .04, p = .45).

Because many factors can affect the subjective feel of the room, demographic questions were taken at the conclusion of the experiment to control for extenuating factors.

Humidity – Humidity attenuates the physical effects of heat by inhibiting evaporative cooling and blocking pores. Humidity of the lab room during each session was recorded using a portable digital hygrometer. The humidity of the lab room ranged from 16% to 59% (M = 31.42%; SD = 11.28%). Lab room humidity was negatively correlated with lab room temperature (r = - .505, p < .001) but there was no significant correlation between lab room humidity and disease prime (r = - .033, p = .50).

Waiting room temperature – Participants spent several minutes in a waiting room prior to entering the study. The temperature for the waiting room was recorded at the beginning of each session because the temperature of this room could affect their perceptions of the lab room temperature. The temperature of the waiting remained relatively stable. The waiting room ranged from 74°F to 80°F (M = 76.62; SD = 1.39). Waiting room temperature was not significantly correlated with lab room temperature (r = .085, p = .083) or disease prime (r = - .011, p = .81).

Outside climate **–** Current temperature and humidity were measured for each session using www.weather.com. The temperature and humidity of the experimental waiting area were recorded using a portable thermometer. Because temperature and humidity fluctuate throughout the day temperature and humidity measurements were recorded at the beginning of each session. The study was conducted between August and November in Tempe, AZ. Because the study was conducted from August through November there was a large range in outside temperature and humidity.

The outside temperature ranged from 51°F to 106°F (*M* = 87.92°F; *SD* = 12.2). Outside temperature was positively correlated with lab room temperature ($r = .25$, $p < .001$) and was not correlated with disease prime condition ($r = -.001$, $p = .98$).

The outside humidity ranged from 8% to 74% (*M* = 22.97%; *SD* = 13%). Outside humidity was negatively correlated with lab room temperature ($r = -.408$, $p < .001$) and was not correlated with disease prime condition($r = -.002$, $p = .97$)

Sensitivity to heat - Individuals differ in their sensitivity to heat and cold.). We used 7-point likert scales to measure self-reported sensitivity to heat or cold where "1" is "not at all sensitive" and "7" is "very sensitive." The temperature sensitivity ratings ranged from 1 to 7 (*M* = 4.09; *SD* = 1.81).

Dress **–** Participants self-reported the items of clothing they were currently wearing (e.g., t-shirt and jeans) from a list of clothing items. Each of these items was coded from 1-3. Lightest items (e.g., tank tops, t-shirts, shorts, skirts, and dresses) were coded "1", moderate items (e.g., long-sleeve shirts and khakis/pants) were coded "2", and heavy items (e.g., sweaters, sweatshirts, and jeans) were coded "3". The clothing score was a sum of all the items worn. For example, someone in a t-shirt (1), jeans (3), and a sweatshirt (3) received a dress score of "7". The clothing ratings ranged from 2 to 12 (*M* = 3.32; *SD* = 1.75). Clothing code was significantly correlated with lab room temperature ($r = -.162$, $p = .002$) but was not significantly correlated with disease prime ($r = .022$, $p = .68$). For complete list of correlations of all of the covariates with lab room temperature and disease prime see (Table 3).

Procedure

Participants viewed a brief slide show depicting disease threats (disease prime) or depicting architectural structures (control). Directly following the slide show, they were presented with a taste test in which they rated the taste and appearance of two gummy candies (a gummy bug and gummy animal). They were asked to choose which candy they preferred. Following the taste test, participants filled out the disgust sensitivity survey, perceived vulnerability to disease survey, big five inventory, aggressions proneness survey, belief in a dangerous world survey, and finally the PANAS. All surveys were presented in the order described above with the exception of the disgust sensitivity survey and perceived vulnerability to disease survey. To ensure that the questions of the disgust sensitivity scale and PVD were not influencing each other, the order of the scales was counterbalanced between subjects.

Chapter 3

RESULTS

Survey order effects

To ensure that the questions of the disgust sensitivity scale and PVD were not influencing each other, the order of the scales was alternated between subjects. A 3-way ANOVA was used to test for order effects on PVD and disgust sensitivity. We tested for interactions of survey order with temperature, survey order with disease prime, and survey order with temperature and disease prime. There were no main effects of survey order and no significant interactions of survey order with either temperature or disease prime for PVD or disgust sensitivity (for complete results see Table 4).

Perceived vulnerability to disease

Perceived vulnerability to disease (PVD) and the subscales of germ concern and vulnerability were analyzed using 2-way ANOVA with disease prime and temperature as categorical independent variables. Based on past research of PVD it was hypothesized that there would be a significant main effect of disease prime; based on the theory proposed in this study there should also be a significant interaction between disease prime and temperature for overall PVD and germ concern and no anticipated changes for vulnerability. For PVD descriptive statistics and ANOVA table please refer to Table 2 and Table 5.

There were no significant effects of temperature on overall PVD, $F(3, 361) = 0.19, p = .67, \eta_p^2 = .001$, no significant effects of disease on overall PVD, $F(3, 361) = 2.28, p = .13, \eta_p^2 = .006$, and no significant interactions of temperature and disease on overall PVD, $F(3, 361) = 0.11, p = .74, \eta_p^2 < .001$.

There was a significant effect of disease prime on germ concern, $F(3, 361) = 3.77, p = .05, \eta_p^2 = .010$ (see Figure 3). Participants in the disease prime conditions had higher scores of germ concern (non heat disease condition: $M = 4.03$; heated disease condition: $M = 5.01$) compared to the neutral prime conditions (non-heat control condition: $M = 3.87$; heated control condition: $M = 3.84$). There were no significant effects of temperature, $F(3, 361) = 0.09, p = .77, \eta_p^2 < .001$, or a significant interaction, $F(3, 361) = 0.33, p = .56, \eta_p^2 = .001$. For vulnerability, there were no significant effects of temperature, $F(3, 361) = 0.16, p = .69, \eta_p^2 < .001$, disease prime ($F(3, 361) = 0.23, p = .63, \eta_p^2 < .001$, or a significant interaction, $F(3, 361) = 1.282, p = .26, \eta_p^2 = .004$.

The significant main effect of disease prime on germ concern is predicted based on past research. This indicates that the disease prime successfully evoked the anticipated response. The proposed theory that temperature is a moderator of sensitivity to disease threats was not supported based on this analysis.

Because other climate related variables could be suppressing possible temperature effects, PVD, germ concern, and vulnerability were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code (i.e., the amount of clothing the participant was wearing coded for heaviness) were included as covariates since they were all significantly correlated with lab room temperature (see Table 3)[1].

As seen in Table 5, even when incorporating the climate covariates, for overall PVD there were still no significant effects of temperature, $F(8, 344) = 0.01.$, $p = .92, \eta_p^2 < .001$, disease prime, $F(3, 361) = 2.42, p = .12, \eta_p^2 = .007$, or a significant interaction, $F(8, 344) = 0.06, p = .81, \eta_p^2 < .001$. For germ concern disease prime became only marginally significant, $F(8, 344) = 0.3.54, p = .06, \eta_p^2 = .010$, and temperature $F(8, 344) = 0.20, p = .65, \eta_p^2 = .001$, and the interaction between temperature and disease prime, $F(8, 344) = 0.61, p = .43, \eta_p^2 = .002$, remained non-significant. For vulnerability,

[1] It should be noted that waiting room temperature was only marginally correlated with lab room temperature ($r = .10, p = .06$)

temperature, $F(8, 344) = 0.09$, $p = .77$, $\eta_p^2 < .001$, disease prime, $F(8, 344) = 0.39$, $p = .53$, $\eta_p^2 = .001$, and the interaction between temperature and disease, $F(8, 344) = 1.43$, $p = .23$, $\eta_p^2 = .004$, all remained non-significant.

Even when controlling for other climate variables there were no significant effects of temperature and no significant interactions of temperature and disease for PVD or the subscales of germ concern and vulnerability. The theory of temperature as a moderator of perceived disease threat is not supported by the current study. Participants did not perceive an increased prevalence or an increased threat of disease in a heated room. Perhaps PVD is too stable of a personality trait to be manipulated in based on short-term immediate temperature differences (such as the ones used in this study). The significant main effect of disease prime on germ concern indicates that the disease prime was successful in making disease more salient in these conditions.

Disgust Sensitivity

Disgust sensitivity and the subscales of pathogen disgust, sexual disgust, and moral disgust were analyzed using 2-way ANOVA with disease prime and temperature as categorical independent variables. Based on past research on disgust sensitivity it was hypothesized that there would be a significant main effect of disease prime; based on the theory proposed in this study there should also be a significant interaction between disease prime and temperature for disgust sensitivity, pathogen disgust, and sexual disgust and no anticipated changes for moral disgust. For complete descriptive statistics and ANOVA table please refer to Tables 2 & 5.

As seen in Table 5, there were no significant effects on overall disgust, pathogen disgust, sexual disgust, and moral disgust. For overall disgust sensitivity, there were no main effects of temperature, $F(3, 361) = 0.89$, $p = .35$, $\eta_p^2 = .002$, or disease prime, $F(3, 361) = 0.89$, $p = .35$, $\eta_p^2 = .002$, and no significant interaction between temperature and disease prime, $F(3, 361) = 0.40$, $p = .40$, $\eta_p^2 = .002$. For pathogen disgust, there were no significant main effects of temperature, $F(3, 361) = 1.31$, $p = .26$, $\eta_p^2 = .004$. Disease prime was marginally significant for overall disgust sensitivity, $F(3, 361) = 3.21$, $p = .07$, $\eta_p^2 = .009$. There was no significant interaction between temperature and disease prime, $F(3, 361) = 0.38$, p = .54, $\eta_p^2 = .001$. For sexual disgust, there was no significant main effects of temperature, $F(3, 361) = 2.20$, $p = .14$, $\eta_p^2 = .006$, or disease prime, $F(3, 361) = 0.45$, $p = .50$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(3, 361) = 2.15$, $p = .14$, $\eta_p^2 = .006$. There were also no effects on moral disgust. For moral disgust there were no significant effects of temperature, $F(3, 361) = 1.41$, $p = .24$, $\eta_p^2 = .004$, disease prime, $F(3, 361) = 0.04$, $p = .84$, $\eta_p^2 < .001$, or a significant interaction between temperature and disease prime, $F(3, 361) = 0.33$, $p = .57$, $\eta_p^2 = .001$.

The main effect of disease prime for pathogen disgust was marginally significant indicating that there was a marginal influence of disease prime on disgust specific to pathogens. This is expected considering the disease prime stimuli focused primarily on infectious pathogens. These results fail to support the hypothesis that a disease prime will increase overall disgust sensitivity or sexual disgust. Similar to PVD, the current analysis provides no evidence that temperature moderates the relationship between disease cues and disgust sensitivity.

Since other climate related variables could be suppressing possible temperature effects, overall disgust sensitivity, pathogen disgust, sexual disgust, and moral disgust were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code as covariates since they were all significantly correlated with lab room temperature (see Table 3).

As seen in Table 5, there were no significant changes from the initial analyses. For overall disgust, there were still no main effects of temperature, $F(8, 344) = 1.13$, $p = .29$, $\eta_p^2 = .003$, or disease prime, $F(8, 344) = 1.15$, $p = .29$, $\eta_p^2 = .003$, and no significant interaction between temperature and disease prime, $F(8, 344) = 0.92$, $p = .34$, $\eta_p^2 = .003$. For pathogen disgust, there was still no main effect of temperature, $F(8, 344) = 1.15$, $p = .22$, $\eta_p^2 = .004$, or a significant interaction between temperature and disease prime, $F(8, 344) = 2.30$, $p = .13$, $\eta_p^2 = .007$. The main effect of disease prime on pathogen disgust remained marginally significant, $F(8, 344) = 3.44$, $p = .07$, $\eta_p^2 = .010$. For sexual disgust there was still no main effects for temperature, $F(8, 344) = 1.95$, $p = .16$, $\eta_p^2 = .006$, or disgust prime ($F(8, 344) = 0.60$, $p = .44$, $\eta_p^2 = .002$) and no significant interaction between temperature and disease prime, $F(8, 344) = 2.30$, $p = .13$, $\eta_p^2 = .007$. For moral disgust, there was a marginally significant main effect of temperature, $F(8, 344) = 2.70$, $p = .10$, $\eta_p^2 = .008$. No significant effect of disease prime on moral disgust, $F(8, 344) = 0.01$, $p = .94$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime on moral disgust, $F(8, 344) = 0.47$, $p = .49$, $\eta_p^2 = .001$.

This study failed to support the proposed hypotheses that disgust sensitivity will increase in the presence of a disease prime and a heated room with a disease prime even when accounting for other possibly suppressing variables. There was no significant main effect of disease prime on disgust sensitivity, although pathogen disgust was approaching significance. There was also no evidence of a main effect or a moderating effect of temperature on disgust sensitivity.

Big Five Personality Inventory (BFI)

Extroversion, Openness, and Agreeableness

Extroversion, openness to experience and agreeableness were analyzed using 2-way ANOVA with disease prime and temperature as categorical independent variables.

Based on past research of big five personality variables it was hypothesized that there would be a significant main effect of disease prime; based on the theory proposed in this study there should also be a significant interaction between temperature and disease prime of disease prime and temperature for extroversion, openness, and agreeableness. For complete descriptive statistics and ANOVA table refer to Tables 2 & 5.

As seen in Table 5, for openness, there was no significant main effect of temperature, $F(3, 361) = 0.32$, $p = .57$, $\eta_p^2 = .001$, or disease prime, $F(3, 361) = 0.50$, $p = .48$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(3, 361) = 2.45$, $p = 0.12$, $\eta_p^2 = .001$. For extroversion, there were no main effects of temperature, $F(3, 361) = 1.17$, $p = .28$, $\eta_p^2 = .003$. There was a marginal main effect of disease prime on extroversion, $F(3, 361) = 2.778$, $p = .10$, $\eta_p^2 = .008$. There was no significant interaction between temperature and disease prime, $F(3, 361) = 0.03$, $p = .88$, $\eta_p^2 < .001$. For agreeableness there was a significant main effect of temperature, $F(3, 361) = 8.56$, $p = .004$, $\eta_p^2 = .023$ (see Figure 4). There was no main effect of disease prime, $F(3, 361) = 0.004$, $p = .95$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(3, 361) = 0.90$, $p = .34$, $\eta_p^2 = .002$.

The proposed hypotheses were not supported for openness, extroversion, or agreeableness. There were no main effects of disease prime and no significant interactions of temperature and disease prime. There was an interesting unpredicted main effect of temperature. The frustration-aggression hypothesis (Berkowitz, 1989) would suggest that individuals are less agreeable in hot temperatures due to the increased discomfort leading to negative affect. Contrary to the frustration-aggression hypothesis and the proposed disease avoidance hypothesis in the paper, the results from this experiment found that individuals in the heated conditions reported higher agreeableness (heated neutral prime: M = 3.82; heated disease prime: M = 3.87; non-heated neutral prime: M = 3.71; non-heated disease prime: M = 3.67).

Since other climate related variables could be suppressing possible temperature effects, openness, extroversion, agreeableness were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code as covariates since they were all significantly correlated with lab room temperature (see Table 3).

As seen in Table 5, there was little change in the results for all three personality variables. For openness, there were still no main effects of temperature, $F(3, 361) = 0.04$, $p = .84$, $\eta_p^2 < .003$, or disease prime, $F(3, 361) = 0.03$, $p = .85$, $\eta_p^2 = .003$, and no significant interaction between temperature and disease prime, $F(3, 361) = 2.45$, $p = .12$, $\eta_p^2 = .007$. For extroversion, there were no main effects of temperature, $F(3, 361) = 0.13$, $p = .72$, $\eta_p^2 < .001$, or disease prime, $F(3, 361) = 3.38$, $p = .07$, $\eta_p^2 = .010$, and no significant interaction between temperature and disease prime, $F(3, 361) = 0.24$, $p = .62$, $\eta_p^2 = .001$. The main effect of temperature on agreeableness remained significant, $F(3, 361) = 0.4.51$, $p = .03$, $\eta_p^2 = .013$. Effect of disease prime on agreeableness, $F(3, 361) = 0.16$, $p = .69$, $\eta_p^2 < .001$, and the interaction between temperature and disease prime remained non-significant $F(3, 361) = 0.22$, $p = .64$, $\eta_p^2 = .001$.

There were no significant main effects of disease prime and no significant interactions of temperature and disease prime. The hypothesis that disease prime affects personality factors related to social interactions, like openness, extroversion, and agreeableness, was not supported. There was a marginally significant effect of disease prime on extroversion. This may indicate that disease cues may decrease overall extroversion but that the disease prime used in this experiment may not have been strong enough to produce a strong change in extroversion. There was a main effect of temperature on agreeableness but the failure to detect an interaction between temperature and disease prime on any of the three variables fails to support the hypothesis that temperature moderated the effects of disease cues on socially related personality traits.

Avoidance of disease vectors (gummy bug)

Preference for a neutral food item (gummy animal candy) over a disgust eliciting food item (realistic gummy bug candy) was analyzed using logistic regression with disease prime condition (disease slideshow = 1, neutral slideshow = 0) and temperature condition (heated = 1, non-heated = 0) as categorical variables. As seen in Table 6, participants overall preferred the gummy bug over the gummy animal in all conditions, though there was variability in this preference across conditions. 64% of participants preferred the gummy bug in the no heat control condition, 54% preferred the gummy bug in the no heat disease condition, 57% preferred the gummy bug in the heated control condition and 56% preferred the gummy bug in the heated disease prime condition.

The logistic regression was not significant for temperature, $b = 0.28$, $p = .36$, disease prime, $b = 0.40$, $p = .21$, or the interaction between temperature and disease prime, $b = -0.37$, $p = .40$. When climate covariates (lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code) were included as covariates in the logistic regression the results remained non-significant for temperature, $b = 0.34$, $p = .34$, disease prime, $b = 0.42$, $p = .20$, or the interaction between temperature and disease prime, $b = -0.40$, $p = .36$. Refer to Table 7 for full table of results.

In addition, before eating each gummy candy the participants were asked to rate how appetizing each candy appeared on a 7-point likert scale. A repeated measures analysis was used to test the difference between the candies in ratings of appetizing appearance. There were no significant main effects of temperature, $F(1, 354) = 0.84$, $p =$

.36, η_p^2 = .002, or disease prime, $F(1, 354) = 2.30$, $p = .08$, η_p^2 = .008, and no significant interaction between temperature and disease prime, $F(3, 361) = 0.93$, $p = .46$, η_p^2 = .002.

There is no evidence of an avoidance of the disgust eliciting food item (gummy bug, versus gummy animal) based on the data from this study. One limitation is the observation that in all conditions the majority of participants (>50%) preferred the gummy bug over the gummy animal indicates the disgusting food item may not have had a strong enough disgust eliciting effect to be detected in this study or alternatively the neutral gummy animal, although chosen to be as neutral as possible in appearance and taste, may have had unappealing characteristics, texture, that were unaccounted for in this study that led participants to prefer the gummy bug.

Additional Variables

In addition to the variables related directly to the hypotheses discussed, additional variables were also measured.

Conscientiousness and Neuroticism

The big five inventory (See Appendix D) includes 5 personality variables: extroversion, openness, agreeableness, conscientiousness, and neuroticism. Though no discrete hypotheses were made about how heat or disease would affect these two personality factors they were analyzed for exploratory purposes using the same two-way ANOVA with disease prime and temperature as categorical independent variables.

As shown in Table 5, for neuroticism, there are no significant main effects of temperature, $F(3, 361) = 2.61$, $p = .11$, η_p^2 = .007, or disease prime, $F(3, 361) = 1.98$, $p = .16$, η_p^2 = .005, and no significant interaction between temperature and disease prime, $F(3, 361) = 1.76$, $p = .19$, η_p^2 = .001. These remained non-significant when accounting for other climate variables correlated with lab room temperature (lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code).

There were still no main effects for temperature, $F(1, 344) = 0.24$, $p = .62$, $\eta_p^2 = .001$, disease prime, $F(1, 344) = 2.22$, $p = .14$, $\eta_p^2 = .006$, and no significant interaction between temperature and disease prime, $F(1, 344) = 2.11$, $p = .16$, $\eta_p^2 = .006$.

There were also no significant effects of heat or disease on conscientiousness. There were no significant main effects of temperature, $F(1, 361) = 0.49$, $p = .49$, $\eta_p^2 = .001$, or disease prime, $F(1, 361) = 0.27$, $p = .61$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(1, 361) = 0.17$, $p = .69$, $\eta_p^2 = .001$. These remained significant when accounting for the climate variables that were correlated with lab room temperature. There were still no significant main effects of temperature, $F(1, 344) = 0.97$, $p = .33$, $\eta_p^2 = .003$, and disease prime, $F(1, 344) = 0.37$, $p = .55$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(1, 344) = 0.001$, $p = .98$, $\eta_p^2 < .007$.

Taste characteristics

In addition to asking the participants to report which gummy candy they preferred, participants were asked to rate both candies on several taste, texture, and appearance characteristics (See appendix C; see Table 8 for means and STANDAR DEVIATIONS; see Table 12 for full results).

Appearance

Participants were asked to rate certain aspects of appearance before tasting the candy including the items "how pleasing is the appearance of the candy?" and "how much do you look forward to eating the candy?" (see Table 8 for means and standard deviations). There was no significant difference in the rating of pleasing appearance based on temperature, $F(1, 354) = 0.04$, $p = .84$, $\eta_p^2 < .001$, or disease prime, $F(1, 354) = 0.65$, $p = .42$, $\eta_p^2 = .002$, and no significant differences based on an interaction between temperature and disease prime, $F(1, 354) = 0.52$, $p = .47$, $\eta_p^2 = .001$. These remained non-significant when accounting for climate variables correlated with lab room temperature. There were still no significant differences based on temperature conditions, $F(1, 338) = 0.58$, $p = .45$, $\eta_p^2 = .002$, or disease prime conditions, $F(1, 338) = 0.48$, $p = .49$, $\eta_p^2 = .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 338) = 0.28$, $p = .60$, $\eta_p^2 = .001$, when accounting for climate variables.

There was a significant difference in the ratings of how much the participants looked forward to eating each candy based on disease prime condition, $F(1, 354) = 5.32$, $p = .02$, $\eta_p^2 = .015$. Participants in the disease prime condition rated that they were looking forward to eating the gummy animal ($M = 4.00$) much more than the gummy bug ($M = 3.11$) compared to participants in the control prime condition (bug: $M = 3.35$, animal: $M = 3.83$) There was no significant differences based on temperature condition, $F(1, 354) = 0.01$, $p = .93$, $\eta_p^2 < .001$, and no significant differences based on an interaction between temperature and disease prime, $F(1, 354) = 0.55$, $p = .46$, $\eta_p^2 = .002$. These results remained similar when accounting for climate variables correlated with lab room temperature. There was still a significant differences based on disease prime condition, $F(1, 338) = 0.5.19$, $p = .02$, $\eta_p^2 = .015$, and still no significant difference based on temperature condition, $F(1, 338) = 0.89$, $p = .35$, $\eta_p^2 = .003$, and no significant difference based on an interaction between temperature and disease, $F(1, 338) = 0.45$, $p = .50$, $\eta_p^2 = .001$. The decreased positive feelings toward eating the gummy bug in the disease prime condition may provide indirect support to the effectiveness of the prime as an elicitor of disgust. “Bugs” were featured in at least one slide in the disease prime slide show, relating bugs to other infectious things may have mildly increased avoidance behavior.

Taste and texture characteristics

Participants were asked to rate how (1) sweet (2) bitter (3) slimy (4) chewy (5) dry and (6) sour each candy tasted (see Table 8 for means and standard deviations). Each item was analyzed using a repeated measures ANOVA with temperature and disease and independent variables (for full results see Table 12).

For sweetness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 354) = 0.05$, $p = .82$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 354) = 0.12$, $p = .73$, $\eta_p^2 < .001$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 354) = 2.11$, $p = .15$, $\eta_p^2 = .006$,. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 338) = 0.10$, $p = .75$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 338) = 0.19$, $p = .66$, $\eta_p^2 = .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 338) = 1.57$, $p = .21$, $\eta_p^2 = .005$.

For bitterness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 354) = 0.27$, $p = .60$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 354) = 0.35$, $p = .56$, $\eta_p^2 = .001$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 354) = 1.16$, $p = .28$, $\eta_p^2 = .003$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 338) = 0.004$, $p = .95$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 338) = 0.59$, $p = .44$, $\eta_p^2 = .002$, and no significant difference based on an interaction between temperature and disease, $F(1, 338) = 1.27$, $p = .26$, $\eta_p^2 = .004$.

For sliminess, there was a significant difference in ratings of each candy based on temperature condition, $F(1, 354) = 6.37$, $p = .01$, $\eta_p^2 = .018$, and a significant difference based on disease prime condition, $F(1, 354) = 4.34$, $p = .04$, $\eta_p^2 = .012$. The gummy bug was rated slimier than the gummy animal in the heated conditions (heated conditions combined: bug $M = 3.47$, animal $M = 2.73$; non-heated conditions: bug $M = 3.11$, animal $M = 3.06$). The gummy bug was rated much slimier than the gummy animal in the neutral condition than in the disease prime condition (neutral conditions combined: bug $M = 3.27$, animal $M = 2.57$; disease prime conditions: bug $M = 3, 32$, animal $M = 3.00$). There was no significant differences based on an interaction between temperature condition and disease prime, $F(1, 354) = 0.17$, $p = .68$, $\eta_p^2 < .001$. When controlling for climate variables correlated with temperature there remained significant differences in ratings of sweetness of the gummy bug and gummy animal based on temperature condition, $F(1, 338) = 3.89$, $p = .05$, $\eta_p^2 = .011$, and disease prime condition, $F(1, 338) = 4.00$, $p = .05$, $\eta_p^2 = .012$. There was no significant difference based on an interaction between temperature and disease, $F(1, 338) = 0.04$, $p = .84$, $\eta_p^2 < .001$. The significant increased difference in sliminess in the heated conditions may be related to the actual softening of the candies. While the candies were chosen to be identical there could be physical characteristics in the gummy bug that caused it to soften and thus become "gummier" or "slimier" than the animal candy. The increased ratings of sliminess in the neutral prime conditions may be due to a contrast effect in the disease prime condition. Many of the disease prime slides depicted mucus, spit, and bacteria. The "sliminess" associated with bugs may have been reduced in comparison with these extremely slimy substances.

For chewiness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 354) = 0.54$, $p = .46$, $\eta_p^2 = .002$, or disease prime condition, $F(1, 354) = 1.30$, $p = .26$, $\eta_p^2 = .004$. There were significant differences based on an interaction between temperature condition and disease prime, $F(1, 354) = 5.58$, $p = .02$, $\eta_p^2 = .016$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 338) = 0.2.23$, $p = .14$, $\eta_p^2 = .007$, or disease prime condition, $F(1, 338) = 1.63$, $p = .20$, $\eta_p^2 = .005$, and there was still a significant difference based on an interaction between temperature and disease, $F(1, 338) = 5.39$, $p = .02$, $\eta_p^2 = .016$.

For dryness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 354) = 0.002$, $p = .97$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 354) = 0.34$, $p = .56$, $\eta_p^2 = .001$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 354) = 0.02$, $p = .88$, $\eta_p^2 < .001$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 338) = 0.06$, $p = .80$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 338) = 0.54$, $p = .46$, $\eta_p^2 = .002$, and no significant difference based on an interaction between temperature and disease, $F(1, 338) = 0.04$, $p = .84$, $\eta_p^2 < .001$.

For sourness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 354) = 0.20$, $p = .66$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 354) = 2.61$, $p = .11$, $\eta_p^2 = .007$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 354) = 2.82$, $p = .09$, $\eta_p^2 = .008$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition,

$F(1, 338) = 0.19, p = .66, \eta_p^2 = .001$, or disease prime condition, $F(1, 338) = 3.15, p = .07, \eta_p^2 = .009$, and no significant difference based on an interaction between temperature and disease, $F(1, 338) = 1.86, p = .17, \eta_p^2 = .005$.

Overall assessment

Participants were asked two items to give an overall assessment of each candy. They were asked to rate their overall enjoyment of the candy and "how likely would you be to purchase the candy?" (see Table 12 for complete results).

There were no significant differences in enjoyment of each candy based on temperature, $F(1, 354) = 0.19, p = .66, \eta_p^2 = .001$ or disease prime, $F(1, 354) = 0.14, p = .71, \eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease prime, $F(1, 354) = 0.002, p = .97, \eta_p^2 < .001$. Even when controlling for climate variables correlated with temperature there were no still significant differences in ratings of enjoyment of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 338) = 0.17, p = .68, \eta_p^2 = .001$, or disease prime condition, $F(1, 338) = 0.10, p = .757, \eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 338) = 0.13, p = .72, \eta_p^2 < .001$.

There were no significant differences in likelihood to purchase of each candy based on temperature, $F(1, 354) = 0.63, p = .43, \eta_p^2 = .002$, or disease prime, $F(1, 354) = 0.10, p = .75, \eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease prime, $F(1, 354) = 0.01, p = .91, \eta_p^2 < .001$. Even when controlling for climate variables correlated with temperature there were no still significant differences in ratings of enjoyment of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 338) = 0.05, p = .83, \eta_p^2 < .001$, or disease prime condition, $F(1, 338) = 0.26, p = .61, \eta_p^2 = .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 338) = 0.01, p = .93, \eta_p^2 < .001$.

Additional analyses

Equipment issues led to larger than anticipated overlap of temperatures between conditions. To address this issue, several additional analyses were conducted

(1) An 80 degree cut-off was used to filter out any participants in the heat condition who took the experiment when the lab room temperature was under 81°F and filter out any participants in the non heat condition that took that experiment in the room when it was above 79°F (for complete results see appendix F).

(2) A subjective temperature cut-off was used to filter out participants based on their ratings of the subjective feel of the room. Participants in the heated condition who rated the room as "neutral"(4) or below were filtered out and participants in the non-heated condition who rated the room "moderately warm" (5) or hotter were filtered out (for complete results see appendix G).

(3) Each dependent variable was analyzed using a regression analysis with lab room temperature as a continuous variable and disease prime as a categorical variable (for complete results see appendix H).

Only significant changes in main hypothesized dependent variables will be discussed in this section, for complete tables and summaries of results refer to Appendices F-H.

80°F filter

When including an 80°F filter 7 participants were excluded from the analyses (non-heated control condition $n = 78$; non-heated disease condition $n = 80$; heated control condition $n = 96$; heated disease condition $n = 98$). The cut-off of 80°F was chosen for two reasons. First, 80°F is the temperature in which heat receptors in the skin activate and other physiological reactions to heat are activated (Patapoutian et al, 2003). Second, with the 80 degree cut-off there is a discrete cut-off with no overlap and all participants are within +/- 4 degrees of the goal temperature for each condition (non-heated: 75 °F, heated: 85 °F).

There were no substantial differences in the results of these analyses compared to the analyses including all 365 participants (for means and standard deviations see Tables 10 & 13). As seen in Table 11, there are no significant effects of temperature or disease for overall PVD, and vulnerability. There was still a significant main effect of disease prime on germ concern, $F(1, 348) = 4.27$, $p = .04$, $\eta_p^2 = .012$ (See Figure 5).

There was no main effect of temperature or a significant interaction of temperature and disease prime on germ concern. There were no main effects of temperature or disease for overall disgust sensitivity, pathogen disgust, sexual disgust, or moral disgust.

There was still a significant main effect of temperature on agreeableness, $F(1, 348) = 4.91$, $p = .02$, $\eta_p^2 = .014$ (See Figure 6). There was no main effect of disease prime and no significant interaction of temperature and disease prime for agreeableness. For extroversion and openness there were no effects of temperature or disease prime.

Finally, the logistic regression of preference for the gummy animal compared to the gummy bug remained non-significant (see Table 12). Interestingly, there was a significant difference in the ratings of the appetizing appearance of the gummy bug and the gummy animal based on disease prime condition, $F(1, 341) = 4.43$, $p = .04$, $\eta_p^2 = .013$. Participants rated the gummy animal much more appetizing than the gummy bug in the disease prime conditions compared to the neutral prime conditions. This indicates that while there was not a behavioral avoidance observed using the taste preference item, there may be a slight tendency to avoid the eating the gummy bug.

Subjective feel filter

When including the subjective feel filter, 84 of the 365 participants were excluded from the analyses (non-heated control condition $n = 37$; non-heated disease condition $n = 43$; heated control condition $n = 97$; heated disease condition $n = 104$). The subjective feel cut-off was chosen because this would be a good indicator that the temperature was having an effect in the heated conditions and was not having an effect in the non-heated conditions.

There were very few differences in these results compared to the initial ANOVAs (for means and standard deviations see Tables 15 & 18; for complete ANOVA results see Tables 15, 17, & 18).

There were no effects of temperature or disease prime on overall PVD or vulnerability. Germ concern still had a significant main effect of disease, $F(1, 277) = 3.97$, $p = .05$, $\eta_p^2 = .014$ (See Figure 7). There was still no significant main effect of temperature or a significant interaction for germ concern.

Like the previous analyses there were no significant effects of temperature or disease on disgust sensitivity, pathogen disgust, sexual disgust, or moral disgust.

For agreeableness, there was no longer a significant main effect of temperature, $F(1, 262) = 1.95$, $p = .164$, $\eta_p^2 = .002$. There were still no significant main effects of disease prime on agreeableness and no significant interaction between temperature and disease prime on agreeableness. There were still no effects of temperature or disease prime for extroversion or openness.

There was no significant difference in preference for gummy animal or gummy bug, and no significant difference in rating of how appetizing each candy appeared.

Regression (lab room temperature)

There was little difference between the initial analysis and the regression with lab temperature as a categorical variable. A regression was used because it addresses the issue of the large range of temperatures in both temperature conditions.

As seen in Tables 20 & 21, there were no significant effects of lab temperature or disease prime on overall PVD or vulnerability. There was a marginally significant main effect of disease prime on germ concern, this is consistent with previous analyses, b = 0.10, p = .06 (See Figure 8). There was also a marginally significant effect of temperature on germ concern (See Tables 20 & 21) indicating that perhaps with more power a main effect of temperature and an interaction would be observed. This is not consistent with the previous analyses.

There was no main effect of temperature and no significant interaction for germ concern. There were no effects of disease or temperature on disgust sensitivity, pathogen disgust, sexual disgust, or moral disgust. There were also no effects of temperature or disease on openness agreeableness. There was a marginally significant effect of disease prime on extroversion when controlling for climate variables, $b = 0.10$, p = .06. Because of the large amount of analyses ran and the lack of an effect of disease on extroversion, there is a possibility that this is a spurious result. There were no effects of temperature or an interaction for extroversion.

There was no significant difference in preference for the gummy animal over the gummy bug based on temperature prime, disease prime, or an interaction between temperature and disease (see Table 22).

All three additional analyses resulted in very similar results to the initial ANOVA. There was no evidence in any of the four analyses that suggests an interaction between temperature and disease prime (for comparisons of results see Tables 25 – 30).

Chapter 4

DISCUSSION

In this study I hypothesized that temperature would moderate the disease avoidant effects of disease cues. I predicted that disease cues would have a stronger effect on attitudes (PVD, disgust sensitivity) and behavior (avoidance of a disgust eliciting food item). Under this hypothesis we expected to find significant interactions of disease prime and temperature in a 2X2 design in which temperature and disease prime were systematically varied across conditions. Overall there was no evidence of any such interactions in the data from this study.

PVD

The PVD scale was used to measure an explicit awareness of increase in disease prevalence and vulnerability to disease elicited by a disease prime and/or an increase in temperature.

For PVD, there were no significant main effects of temperature or disease and no significant interactions for overall PVD and the subscale of vulnerability. Germ concern was significantly affected by the disease prime. In the disease prime conditions, germ concern scores were higher than neutral prime conditions. This is expected considering the strong relationship between the material in the disease priming slide show and the items on the germ concern subscale (See appendix B). For example, the first germ concern item is “It really bothers me when people sneeze without covering their mouths”. There is a slide in the disease prime slide show that depicts an individual’s sneezing with their mouth open against a dark background to highlight the amount of saliva that is released into the air during the spit. The significant change in germ concern indicates that the slide show was priming disease. There is no main effect of temperature and no interaction between temperature and disease. Even though the main effect of germ concern indicates that the disease prime successfully elicited disease salience, there is no evidence that germ concern was affected by an increase in ambient temperature.

Disgust

Disgust sensitivity was used to measure any changes in disgust of pathogens, sexual activity, and moral transgressions elicited by a disease prime and/or increase in temperature. We hypothesized that a disease prime would increase sexual and pathogen disgust and the difference between a disease prime and a neutral prime would be greater in a heated environment.

There were no changes in overall disgust and no changes for any of the three subscales: pathogen disgust, sexual disgust, and moral disgust. There was a marginal main effect of disease prime on pathogen disgust. When disease threat is made salient, individuals are more likely to feel disgust, specifically toward behaviors that relate to disease, such as touching a bloody cut.

Extroversion, agreeableness, and openness to experience

Extroversion, agreeableness, and openness to experience were used to measure overall sociability. These are all interpersonal personality traits that measure our tendency to interact with our social environment.

There were no main effects of temperature or disease prime and no significant interaction for extroversion or openness to experience. There was a significant main effect of temperature on agreeableness. Individuals were more agreeable in a heated room. This is contradictory to both the hypotheses of this study and past research on frustration, aggression, and temperature (Baron & Bell, 1976; Berkowitz, 1989). We should expect lower ratings of agreeableness in hotter temperatures. I have two possible explanations for this finding. The first is that the items on the agreeableness scale are worded in a way that only measures agreeableness towards in-group members (e.g.

friends and family). Agreeableness is a social personality trait and as such most of the items relate to interactions of others (e.g., "[I am] always considerate and kind to almost everyone") but do not specify a target. Considering most daily interactions are usually with ingroup members (e.g., friends, family members, fellow students, etc.) it would make sense that these would be the targets that came to mind when asked how the participant interacts with 'others'. If the items had specified strangers as the targets, there may have been very different results. There is evidence in cross-cultural research that areas of high disease prevalence have higher ethnocentrism and are more collectivistic (Fincher, Thornhill, Murray, & Schaller, 2008). This would be consistent with higher levels of agreeableness towards in-group members found in this study.

The second explanation for increased agreeableness in a warm environment is unrelated to disease threat. It has been proposed by several embodied cognition researchers that we associate interpersonal warmth with physical warmth (Williams & Bargh, 2008, Ijzermann & Semin, 2009). If physical warmth activates the cognitive concept of interpersonal warmth it would explain why individuals felt more agreeable towards others.

Avoidance of a disease vector (taste preference measure)

The gummy bug and gummy animal "taste test" scenario was used to measure avoidance of disgust eliciting item related to disease. Because insects are commonly disease vectors responsible for spreading a wide range of diseases, it was hypothesized that individuals would want to avoid ingesting insects, or an item resembling an insect, in a high disease environment.

Participants rated the gummy bug as appearing less appetizing in the disease conditions but there were no differences in preference for the gummy animal over the gummy bug based on temperature, disease, or an interaction of temperature and disease.

These results may be due to the fact that the participants were not given the option to actually avoid ingesting either food item, so their preference was recorded after ingesting each candy. If participants were given a choice they may have been more likely to choose to eat the gummy animal more than the gummy bug, but this was not tested in the current experiment. Instead, we asked the participants' preference after eating both bugs. Some of the disgust and aversion could have decreased once the gummy bug was tasted and other factors, like the sweet taste, indicated that it was not toxic.

I nterestingly, across all conditions there was actually a slight preference for the gummy bug over the gummy animal. This may indicate that the gummy bug was not a strong enough disease cue to elicit avoidance. There was no evidence from the taste preference measure of any relationship between temperature and disease. Another issue was the design of the behavioral taste preference measure. The participants were asked to eat both candies and essentially were not given the choice to avoid actually eating one or both candies. The participants may have been more likely to avoid eating the gummy bug all together if they were given the option.

Overall, there was evidence that the disease prime increased disease concern and marginally increased disease avoidance behavior. The presence of a disease prime increased germ concern (PVD), decreased pathogen disgust, decreased extroversion, and increased avoidance of ingesting a disease vector. This is consistent with past research on disease avoidance (Mortenson et al., 2010). This study suggests that the behavioral immune system is specialized to the current threats in the environment. This is evident because there was not an overall increase in PVD, disgust and the specified avoidance of ingesting a disease vector but no decrease in general hunger. This specified avoidance of disease is adaptive because it allows individuals to optimize avoidance of threats in the environment while still pursuing opportunities that are not directly related to those threats.

Temperature had little to no effect on self-reported ratings of perceived vulnerability to disease, disgust sensitivity, disgust food avoidance, or personality characteristics related to interpersonal contact, with the exception of agreeableness. There was no evidence of any interactions between temperature and disease in relation to variables shown in past research to be affected by disease avoidance motives. There is no supporting evidence that temperature acts as a direct disease cue or evidence that temperature moderates the relationship between disease cues and disease avoidant behaviors.

Limitations

There were several limitations that may have influenced the results of this study. First, while a disease prime that has been established in many past studies on disease cues and avoidant behaviors was used, we detected only marginal effects of the expected behavioral responses to disease cues based on past research. The significant main effect of disease prime on germ concern indicates that disease was salient in the disease prime conditions. Past studies using these disease primes focused on behavioral outcomes, while most of the variables in the current study relied on self-reported responses to surveys. Some of the surveys, such as the BFI, were chosen because they showed correlational differences at the national level. Similarly, PVD and disgust sensitivity have been commonly used as individual difference measures. It may be that the self-reported scales used are relatively stable across contexts and represent trait level personality characteristics. While there was a behavioral measure in the study, the forced choice design of the taste preference item may have limited the variability of the item.

The disease prime slide show describes disease transmission and visually represents the large amount of pathogens in any environment. This has been shown to increase disease salience and vulnerability to disease but it is not a disease prime in itself. This study made the assumption that temperature was acting on perceptions of danger of this disease salience but it is possible that temperature affects perception of specific disease cues, like subtle morphological differences, and not directly on perceived prevalence of pathogens in the environment. The disease prime is meant to be a powerful reminder of disease, the cues presented in the slide show were meant to be unambiguous disease cues. Its possible that temperature would have an effect on more subtle cues that would be interpreted as a disease cue is some contexts but not others. For example, perhaps a slide show of insects (a disease vector) would act as a disease cue in a hot environment but would not act as a disease cue in a neutral or cool environment.

Third, the range of manipulated temperatures was problematic. There was difficulty achieving the goal temperature in both heated (goal: 85°F) and non-heated (goal: 75°F) conditions. Even when controlling for these equipment issues, however, there were still no noticeable interactions of temperature and disease. Another issue related to temperature is the constrained range of temperature studied. In Arizona, temperatures throughout the year range from 40-50°F up to 120°F. Even though 10°F is a noticeable temperature change it may not have been large enough to produce differences expected. Ideally, there should have been at least 3 temperature conditions (cool, neutral, and hot) with at least a 10° difference between each condition. Unfortunately, the equipment available for this experiment was not able to produce a large range in temperatures and was not able to control the temperature at a fine-tuned level.

Finally, the participants were in the heated room for of 10 minutes before starting the dependent measures of the study. This small amount of time may not have been be long enough to motivate disease avoidant behavior. Disease avoidant reactions to temperature may only be motivated by long-term exposure to increased temperatures and not a variable that is easily manipulated in a lab setting. From an evolutionary perspective this would seem sensible since an increase in temperature would not lead to an immediate increase in disease prevalence, there would need to be a prolonged increase (days-weeks) before disease prevalence would be affected. Preliminary analyses indicate that outdoor temperature predicts higher ratings of PVD and disgust sensitivity and lower ratings of extroversion and agreeableness. This provides evidence that while there may be effects of temperature, a larger change in temperature or a longer exposure to a heated environment is needed to elicit disease avoidant behaviors. Future studies that examine the effects of outdoor temperature (while controlling for other confounding variables) should be preformed before any concrete conclusions can be made.

Future Directions

Considering the difficulty in this study in finding the anticipated main effect of disease prime, future studies should focus on replicating past disease prime experiment results while incorporating a temperature element into the design. Using an experiment design that has already been shown to be affected by a disease prime would make it easier to determine any additional or additive effects of temperature and determine if there is an interaction between temperature and disease.

Some other factors to consider when designing future studies would include incorporating a multi-level temperature manipulation with at least 3 temperature conditions. Three temperature conditions would be able to determine whether the shape of the relationship between disease avoidance and climate is linear or curvilinear.

Because cold temperatures are colloquially associated with getting sick (e.g., 'catching a cold') it is possible that individuals are more likely to be avoidant of others in colder temperatures as well as hotter temperatures.

In future studies, Participants should spend a longer amount of time in the temperature condition before measure for disease avoidance effects. Using direct disgust elicitor, such as an olfactory cue, may elicit stronger pathogen avoidance behaviors compared to a disease prime cue.

Future studies should attempt to incorporate more behavioral measures of disease avoidance, like approach/avoid tendencies, physical distancing and social distancing measures. Behavioral measures may provide more variability across contexts than the personality measures used in this study. Behavioral measure also allow to measure disease avoidant responses that do not rely on an implicit awareness of increased disease in the environment. It may be that individuals change their behavior in response to disease even if they are not consciously aware of the disease threat.

Correlational studies measuring the relationship between changes in temperature and local disease prevalence should be used to examine changes in interpersonal behavior based on environmental climate fluctuations. It may be that short-term changes in indoor temperature do not activate the behavioral immune system but that individuals are sensitive to changes in outdoor climate over time. Longitudinal design could be used to determine if changes in outdoor climate mediate the relationship between disease prevalence and changes in interpersonal behavior within regions.

Cross-cultural data could be used to examine the relationship between disease avoidant behavior and temperature. Cross-cultural data provides much more variability for personality traits. Additionally, past research has established disease prevalence is related to differences in interpersonal personality constructs, like extroversion, openness, and collectivism (Murray & Schaller, 2008; Fincher et al., 2008). Future studies should determine if temperature moderates the relationship between disease prevalence and interpersonal avoidance tendencies.

Conclusions

There is evidence that the behavioral immune system responds to the specific disease threats salient in the environment. While more research is needed to make an absolute conclusion on the relationship between temperature, disease prevalence, and disease avoidance behaviors, there is little evidence from this study that supports the proposed theory that temperature is a moderator of sensitivity to disease cues and disease avoidance behaviors.

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Table 1.

Temperature means, standard deviations, and range by condition

	NN	ND	HN	HD
temperature (all cases)				
M	77.67	77.61	85.01	84.73
SD	1.36	1.62	2.64	2.79
range	75-84	75-88	77-90	77-90
n	79	81	100	105
temperature (80 degree filter)				
M	77.59	77.49	85.26	85.15
SD	1.17	1.14	2.38	2.36
range	75-79	75-79	81-90	81-90
n	78	80	96	98
temperature (subjective temperature filter)				
M	77.45	77.79	85.1	84.81
SD	1.19	1.94	2.55	2.69
range	75-79	75-88	79-90	77-90
n	37	43	97	104
subjective temperature ratings				
M	4.52	4.42	5.85	6.04
SD	0.695	0.722	0.88	0.759
range	3.0-6.0	2.0-6.0	4.0-7.0	4.0-7.0
n	79	81	100	105

Note. NN = non-heated neutral prime condition, ND = non-heated disease prime condition, HN = heated neutral prime condition, HD = heated disease prime condition, subj. temp. = subjective temperature.

Table 2.

Means and standard deviations for PVD, disgust sensitivity, and BFI

Variable	NN (*n*=79) *M (SD)*	ND (*n*=81) *M (SD)*	HN (*n*=100) *M (SD)*	HD (*n*=105) *M (SD)*
PVD	3.55 (.86)	3.74 (.93)	3.63 (.98)	3.75 (.94)
Germ concern	3.87 (1.06)	4.03 (1.08)	3.84 (1.13)	4.13 (1.11)
Vulnerability	3.19 (1.19)	3.40 (1.24)	3.39 (1.34)	4.13 (1.12)
Disgust Sensitivity	4.84 (.81)	4.85 (.82)	4.85 (.92)	5.01 (.85)
Moral disgust	4.91 (.90)	4.82 (1.18)	4.98 (1.27)	5.02 (1.09)
Pathogen disgust	5.37 (.98)	5.61 (.81)	5.32 (.98)	5.43 (.93)
Sexual disgust	4.25 (1.45)	4.13 (1.42)	4.25 (1.52)	4.58 (1.38)
Openness	3.51 (.46)	3.62 (.45)	3.61 (.60)	3.58 (.57)
Extroversion	3.51 (.70)	3.40 (.69)	3.60 (.68)	3.47 (.67)
Agreeableness	3.71 (.52)	3.67 (.51)	3.82 (.56)	3.87 (.45)
Neuroticism	2.89 (.69)	2.90 (.65)	2.69 (.62)	2.88 (.74)
Conscientious	3.62 (.52)	3.57 (.46)	3.63 (.52)	3.62 (.58)

Note. NN = non-heated neutral prime condition, ND = non-heated disease prime condition, HN = heated neutral prime condition, HD = heated disease prime condition

Table 3.

Correlations of temperature and disease prime with climate variables, aggressions proneness, PANAS, and BDW

	Temperature		Disease prime	
Covariates	*r*	*p*	*r*	*p*
lab room humidity	- .47***	<.001	- .05	.373
waiting room temperature	.10 +	.056	- .02	.762
outside temperature	.37 ***	<.001	.001	.979
outside humidity	- .44 ***	<.001	- .01	.853
clothing	- .17 **	.002	.02	.656
PANAS positive affect	.05	.388	- .02	.776
PANAS negative affect	.04	.472	.04	.452
Belief in a dangerous world	.01	.856	- .03	.56
aggression proneness	- .05	.345	.06	.278

Note. *** p<.001, **p<.01, *p<.05, + p<.10

Table 4.

PVD and Disgust sensitivity survey order effects.

	Survey order			Temperature X survey order			Disease prime X survey order			Temp X disease X order		
Variables	*F*	*p*	η_p^2	*F*	*p*	η_p^2	*F*	*p*	η_p^2	*F*	*p*	η_p^2
Overall PVD	0.133	.71	< .001	0.385	.53	.001	0.664	.42	0.002	1.299	.26	.005
Germ concern	0.002	.96	< .001	0.233	.63	.001	1.865	.17	0.007	3.393	.08	.012
Vulnerability	0.426	.51	.002	0.273	.60	.001	0.006	.94	< .001	0.001	.97	< .001
Disgust sensitivity	0.112	.74	< .001	0.133	.72	< .001	< .001	.99	< .001	0.403	.53	.001
Moral disgust	0.090	.77	< .001	0.104	.75	< .001	0.220	.64	0.001	0.033	.86	< .001
Pathogen disgust	1.546	.22	.006	1.034	.31	.004	0.070	.79	< .001	0.244	.62	.001
Sexual disgust	0.002	.96	< .001	0.067	.80	< .001	0.309	.58	0.001	0.916	.34	.003

Table 5.

PVD, Disgust sensitivity, and BFI ANOVA table

	Temperature			Disease prime			Temp X Disease		
	F	*p*	η_p^2	*F*	*p*	η_p^2	*F*	*p*	η_p^2
Dependant variables									
Overall PVD	0.185	.67	.001	2.278	.13	.006	.110	.74	< .001
Germ concern	0.086	.77	< .001	3.768	.05	.01	.328	.57	.001
Vulnerability	0.164	.69	< .001	0.232	.63	.001	1.282	.26	.004
Disgust Sensitivity	0.887	.35	.002	0.886	.35	.002	.728	.40	.002
Moral disgust	1.405	.24	.004	0.039	.84	< .001	.325	.57	.001
Pathogen disgust	1.313	.25	.004	3.209	.07	.009	.378	.54	.001
Sexual disgust	2.202	.14	.006	0.454	.50	.001	2.146	.14	.006
Openness	0.318	.57	.001	0.499	.48	.001	1.507	.22	.004
Extroversion	1.169	.28	.003	2.778	.09	.008	.025	.88	< .001
Agreeableness	8.557	.004	.023	0.004	.95	< .001	.903	.34	.002
Neuroticism	2.610	.11	.007	1.977	.16	.005	1.763	.19	.005
Conscientious	0.485	.49	.001	0.265	.61	.001	.165	.69	< .001
Dependant variables covarying climate variables									
Overall PVD	0.009	.92	< .001	2.415	.12	.007	.057	.81	< .001
Germ concern	0.201	.65	.001	3.542	.06	.01	.614	.43	.002
Vulnerability	0.089	.77	< .001	0.389	.53	.001	1.426	.23	.004
Disgust Sensitivity	1.13	.29	.003	1.148	.29	.003	.918	.34	.003
Moral disgust	2.703	.10	.008	0.006	.94	< .001	.469	.49	.001
Pathogen disgust	1.148	.22	.004	3.437	.07	.01	.3	.58	.001
Sexual disgust	1.951	.16	.006	0.597	.44	.002	2.303	.13	.007
Openness	0.04	.84	< .001	0.034	.85	< .001	2.447	.12	.007
Extroversion	0.126	.72	< .001	3.381	.07	.01	.24	.63	.001
Agreeableness	4.51	.03	.013	0.162	.69	< .001	.217	.64	.001
Neuroticism	0.242	.62	.001	2.224	.14	.006	2.112	.15	.006
Conscientious	0.966	.33	.003	0.365	.55	.001	.001	.98	< .001

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 6.

Proportions of reported preference for gummy animal and gummy bug

Condition	Bug chosen	Animal chosen	% choosing bug
NN	50	28	64.1%
ND	44	37	54.3%
HN	55	41	57.3%
HD	58	45	56.3%

Note. NN = non-heated neutral prime condition, ND = non-heated disease prime condition, HN = heated neutral prime condition, HD = heated disease prime condition

Table 7.

Taste preference logistic regression

Predictor Variables	B	*SE*	*p*
Temperature	0.286	0.314	.36
Disease prime	0.407	0.325	.21
Temp X disease	- 0.367	0.433	.40
Predictor variables covarying climate variables			
Temperature	0.337	0.341	.32
Disease prime	0.418	0.329	.20
Temp X disease	- 0.403	0.44	.36

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 8.

Taste characteristics means and standard deviations

	NN (*n*=79) *M* (*SD*)			ND (*n*=81) *M* (*SD*)			HN (*n*=96) *M* (*SD*)			HC (*n*=103) *M* (*SD*)		
	Bug	Animal	Diff.	Bug	Animal	Diff.	Bug	Animal	Diff.	Bug	Animal	Diff.
Sweet	5.1 (1.34)	4.73 (1.59)	0.37	5.2 (1.39)	4.62 (1.45)	0.58	5.25 (1.29)	4.65 (1.53)	0.6	5.22 (1.11)	4.96 (1.51)	0.26
Bitter	2.12 (1.29)	2.54 (1.62)	- 0.42	2.41 (1.52)	2.53 (1.75)	- 0.12	1.89 (1.10)	2.02 (1.32)	- 0.13	1.97 (1.25)	2.19 (1.40)	- 0.22
Slimy	2.97 (1.62)	2.55 (1.61)	0.42	3.26 (1.61)	3.15 (1.70)	0.11	3.56 (1.62)	2.59 (1.57)	0.97	3.37 (1.70)	2.86 (1.65)	0.51
Chewy	5.73 (1.41)	5.63 (1.43)	0.1	6.07 (1.00)	5.38 (1.42)	0.69	5.98 (1.10)	5.35 (1.33)	0.63	5.88 (1.19)	5.47 (1.49)	0.41
Dry	2.92 (1.82)	3.44 (1.83)	- 0.52	2.93 (1.56)	3.28 (1.74)	- 0.35	2.77 (1.50)	3.26 (1.73)	- 0.49	3.06 (1.44)	3.46 (1.73)	- 0.4
Sour	2.18 (1.43)	2.53 (1.65)	- 0.35	2.60 (1.60)	2.38 (1.46)	0.22	2.04 (1.17)	2.02 (1.21)	0.02	2.21 (1.18)	2.20 (1.42)	0.01
Pleasing appearance	2.94 (1.43)	4.17 (1.44)	-1.23	2.79 (1.38)	4.32 (1.68)	-1.53	2.97 (1.34)	4.30 (1.50)	-1.33	3.03 (1.52)	4.38 (1.50)	-1.35
Appetizing	2.73 (1.42)	3.91 (1.53)	-1.18	2.81 (1.39)	4.14 (1.59)	-1.33	3.11 (1.49)	3.95 (1.45)	- 0.84	2.73 (1.42)	4.06 (1.47)	-1.33
Look forward to eating	3.26 (1.48)	3.68 (1.51)	- 0.42	3.14 (1.75)	4.11 (1.82)	- 0.97	3.44 (1.64)	3.98 (1.64)	- 0.54	3.07 (1.56)	3.89 (1.714)	- 0.82
Enjoyment	4.76 (1.56)	4.33 (1.46)	0.43	4.86 (1.33)	4.52 (1.30)	0.34	5.14 (1.07)	4.80 (1.34)	0.34	4.91 (1.34)	4.64 (1.53)	0.27
Purchase likelihood	3.37 (2.03)	3.08 (1.93)	0.29	3.43 (2.05)	3.04 (1.93)	0.39	3.50 (1.81)	3.36 (1.85)	0.14	3.50 (1.90)	3.32 (2.00)	0.18

Note. NN = non-heated neutral prime condition, ND = non-heated disease prime condition, HN = heated neutral prime condition, HD = heated disease prime condition. Diff = $M_{\text{bug}} - M_{\text{animal}}$.

Table 9.

Taste characteristic repeated measures ANOVA table.

	Temperature			Disease prime			Temp X disease		
Dependant variables	*F*	*p*	η_p^2	*F*	*p*	η_p^2	*F*	*p*	η_p^2
Sweet	0.051	.82	< .001	0.124	.72	< .001	2.106	.15	.006
Bitter	0.273	.60	.001	0.347	.56	.001	1.163	.28	.003
Slimy	6.365	.01	.018	4.342	.04	.012	0.166	.68	< .001
Chewy	0.544	.46	.002	1.279	.26	.004	5.58	.02	.016
Dry	0.002	.97	< .001	0.34	.56	.001	0.022	.88	< .001
Sour	0.200	.66	.001	2.608	.11	.007	2.821	.09	.008
Pleasing appearance	0.040	.84	< .001	0.646	.42	.002	0.52	.47	.001
Appetizing	0.835	.36	.002	2.995	.08	.008	0.928	.34	.003
Look forward to eating	0.008	.93	< .001	5.323	.02	.015	0.55	.46	.002
Enjoyment	0.193	.66	.001	0.139	.71	< .001	0.002	.97	< .001
Purchase likelihood	0.629	.43	.002	0.102	.75	< .001	0.012	.91	< .001
Dependant variables covarying climate variables									
Sweet	0.103	.75	< .001	0.192	.66	.001	1.574	.21	.005
Bitter	0.004	.95	< .001	0.594	.44	.002	1.273	.26	.004
Slimy	3.888	.05	.011	3.998	.05	.012	0.043	.84	< .001
Chewy	2.231	.14	.007	1.629	.20	.005	5.389	.02	.016
Dry	0.063	.80	< .001	0.539	.46	.002	0.04	.84	< .001
Sour	0.191	.66	.001	3.145	.07	.009	1.859	.17	.005
Pleasing appearance	0.575	.45	.002	0.48	.49	.001	0.28	.60	.001
Appetizing	1.344	.25	.004	3.417	.07	.01	1.269	.26	.004
Look forward	0.892	.35	.003	5.193	.02	.015	0.454	.50	.001
Enjoyment	0.170	.68	.001	0.096	.76	< .001	0.132	.72	< .001
Purchase likelihood	0.045	.83	< .001	0.255	.61	.001	0.007	.93	< .001

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 10.

Means and standard deviations for PVD, disgust sensitivity, and BFI (80 degree filter)

	NN (*n*=78) *M* (*SD*)	ND (*n*=80) *M* (*SD*)	HN (*n*=96) *M* (*SD*)	HD (*n*=98) *M* (*SD*)
PVD	3.56 (.87)	3.73 (.93)	3.62 (.99)	3.74 (.94)
Germ concern	3.88 (1.06)	4.03 (1.09)	3.82 (1.11)	4.16 (1.12)
Vulnerability	3.19 (1.19)	3.39 (1.25)	3.4 (1.34)	3.26 (1.09)
Disgust Sensitivity	4.841 (.82)	4.842 (.82)	4.843 (.94)	5.02 (.85)
Moral disgust	4.9 (.89)	4.79 (1.16)	4.97 (1.3)	5.03 (1.10
Pathogen disgust	5.36 (.98)	5.6 (.81)	5.31 (.98)	5.46 (.93)
Sexual disgust	4.26 (1.46)	4.13 (1.43)	4.25 (1.55)	4.57 (1.36)
Openness	3.52 (.46)	3.61 (.44)	3.63 (.59)	3.6 (.55)
Extroversion	3.51 (.70)	3.4 (.69)	3.62 (68)	3.48 (62)
Agreeableness	3.71 (.52)	3.66 (.51)	3.81 (.57)	3.86 (.43)
Neuroticism	2.91 (.69)	2.91 (.65)	2.68 (.63)	2.89 (.73)
Conscientious	3.61 (.51)	3.57 (.46)	3.63 (.52)	3.62 (.58)

Note. NN = non-heated neutral prime condition, ND = non-heated disease prime condition, HN = heated neutral prime condition, HD = heated disease prime condition.

Table 11.

PVD, Disgust sensitivity, and BFI ANOVA table (80 degree filter)

	Temperature			Disease prime			Temp X disease		
Dependant variables	*F*	*p*	η_p^2	*F*	*p*	η_p^2	*F*	*p*	η_p^2
Overall PVD	.147	.70	< .001	2.083	.15	.006	0.078	.78	< .001
Germ concern	0.088	.77	< .001	4.272	.04	.012	0.697	.40	.002
Vulnerability	0.106	.75	< .001	0.064	.80	< .001	1.732	.19	.005
Disgust Sensitivity	0.974	.32	.003	0.951	.33	.003	0.93	.34	.003
Moral disgust	1.674	.20	.005	0.038	.85	< .001	0.464	.50	.001
Pathogen disgust	1.003	.32	.003	3.716	.06	.011	0.185	.67	.001
Sexual disgust	1.935	.17	.006	0.424	.52	.001	2.135	.15	.006
Openness	0.727	.39	.002	0.307	.58	.001	1.199	.27	.003
Extroversion	1.643	.20	.005	2.933	.09	.008	0.021	.89	< .001
Agreeableness	7.632	.006	.021	0.001	.98	< .001	1.085	.30	.003
Neuroticism	3.163	.08	.009	1.98	.16	.006	1.832	.18	.005
Conscientious	0.284	.60	.001	0.157	.69	< .001	0.062	.80	< .001
Dependant variables covarying climate variables									
Overall PVD	0.048	.83	< .001	1.798	.18	.005	0.134	.72	< .001
Germ concern	0.122	.73	< .001	3.351	.07	.01	0.698	.40	.002
Vulnerability	< .001	.99	< .001	0.107	.74	< .001	2.16	.14	.006
Disgust Sensitivity	1.084	.30	.003	1.025	.31	.003	0.863	.35	.003
Moral disgust	3.141	.08	.009	0.009	.93	< .001	0.557	.46	.002
Pathogen disgust	1.104	.29	.003	3.216	.07	.01	0.33	.57	.001
Sexual disgust	1.323	.25	.004	0.515	.47	.002	2.086	.15	.006
Openness	0.399	.53	.001	0.066	.80	< .001	1.498	.22	.004
Extroversion	0.64	.42	.002	2.804	.10	.008	0.073	.79	< .001
Agreeableness	4.905	.03	.014	0.027	.87	< .001	0.502	.48	.002
Neuroticism	0.742	.39	.002	1.764	.19	.005	1.708	.19	.005
Conscientious	0.989	.32	.003	0.153	.70	< .001	0.002	.97	< .001

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 12.

Taste preference logistic regression table (80 degree filter)

Dependant variables	b	*SE*	*p*
Temperature	0.341	0.316	.28
Disease prime	0.409	0.326	.21
Temp X disease	- 0.4	0.439	.36
Dependant variables covarying climate variables			
Temperature	0.393	0.347	.26
Disease prime	0.424	0.33	.20
Temp X disease	- 0.462	0.446	.30

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code

Table 13.

Taste characteristics means and standard deviations (80 degree filter)

	NN (*n*=77) *M* (*SD*)			ND (*n*=80) *M* (*SD*)			HN (*n*=92) *M* (*SD*)			HD (*n*=96) *M* (*SD*)		
	Bug	Animal	Diff.	Bug	Animal	Diff.	Bug	Animal	Diff.	Bug	Animal	Diff.
Sweet	5.10 (1.35)	4.74 (1.59)	0.36	5.25 (1.32)	4.64 (1.45)	0.61	5.26 (1.31)	4.65 (1.53)	0.61	5.22 (1.11)	5.04 (1.46)	0.18
Bitter	2.12 (1.30)	2.53 (1.64)	- 0.41	2.39 (1.52)	2.50 (1.74)	- 0.11	1.89 (1.09)	2.01 (1.31)	- 0.12	1.98 (1.25)	2.16 (1.36)	- 0.18
Slimy	3.00 (1.61)	2.57 (1.61)	0.43	3.29 (1.60)	3.17 (1.70)	0.12	3.58 (1.64)	2.58 (1.57)	1.00	3.29 (1.67)	2.80 (1.63)	0.49
Chewy	5.74 (1.42)	5.61 (1.43)	0.13	6.09 (1.00)	5.40 (1.42)	0.69	6.02 (.94)	5.43 (1.26	0.59	5.86 (1.21)	5.49 (1.49)	0.37
Dry	2.87 (1.77)	3.42 (1.83)	- 0.55	2.91 (1.57)	3.28 (1.75)	- 0.37	2.74 (1.49)	3.26 (1.73)	- 0.52	3.09 (1.45)	3.45 (1.75)	- 0.36
Sour	2.16 (1.42)	2.52 (1.66)	- 0.36	2.59 (1.61)	2.32 (1.38)	0.27	2.04 (1.18)	2.03 (1.23)	0.01	2.25 (1.33)	2.20 (1.40)	0.05
Pleasing appearance	2.92 (1.44)	4.14 (1.44)	-1.22	2.79 (1.38)	4.34 (1.68)	-1.55	2.96 (1.37)	4.27 (1.52)	-1.31	2.92 (1.46)	4.35 (1.50)	-1.43
Appetizing	2.74 (1.43)	3.90 (1.53)	-1.16	2.81 (1.40)	4.15 (1.59)	-1.34	3.12 (1.49)	3.91 (1.43)	- 0.79	2.62 (1.33)	4.03 (1.44)	-1.41
Look forward to eating	3.26 (1.49)	3.66 (1.51)	- 0.40	3.13 (1.76)	4.11 (1.83)	- 0.98	3.45 (1.65)	3.95 (1.65)	- 0.50	3.00 (1.53)	3.86 (1.73)	- 0.86
Enjoyment	4.77 (1.57)	4.35 (1.46)	0.42	4.87 (1.34)	4.53 (1.30)	0.34	5.12 (1.09)	4.84 (1.31)	0.28	4.90 (1.35)	4.66 (1.49)	0.24
Purchase likelihood	3.40 (2.02)	3.10 (1.93)	0.30	3.46 (2.04)	3.06 (1.93)	0.4	3.46 (1.81)	3.39 (1.88)	0.07	3.53 (1.94)	3.35 (2.00)	0.18

Note. NN = non-heated neutral prime condition, ND = non-heated disease prime condition, HN = heated neutral prime condition, HD = heated disease prime condition. Diff = $M_{bug} - M_{animal}$.

Table 14.

Taste characteristics ANOVA table (80 degree filter)

	Temperature			Disease prime			Temp X disease		
Dependant variables	*F*	*p*	η_p^2	*F*	*p*	η_p^2	*F*	*p*	η_p^2
Sweet	0.243	.62	.001	0.224	.64	.001	3.106	.08	.009
Bitter	0.398	.53	.001	0.448	.50	.001	0.965	.33	.003
Slimy	6.183	.01	.018	4.694	.03	.014	0.26	.61	.001
Chewy	0.185	.67	.001	1.056	.31	.003	5.236	.02	.015
Dry	0.006	.94	< .001	0.671	.41	.002	0.001	.97	< .001
Sour	0.218	.64	.001	3.612	.06	.010	2.774	.10	.008
Pleasing appearance	0.002	.96	< .001	1.253	.26	.004	0.263	.61	.001
Appetizing	0.605	.44	.002	4.432	.04	.013	1.305	.25	.004
Look forward	0.005	.95	< .001	6.483	.01	.019	0.349	.56	.001
Enjoyment	0.416	.52	.001	0.083	.77	< .001	0.004	.95	< .001
Purchase likelihood	0.918	.34	.003	0.2	.66	.001	< .001	.98	< .001
Dependant variables covarying climate variables									
Sweet	0.357	.55	.001	0.298	.59	.001	2.435	.12	.007
Bitter	< .001	.98	< .001	0.56	.46	.002	1.211	.27	.004
Slimy	3.918	.05	.012	4.594	.03	.014	0.135	.71	< .001
Chewy	1.582	.21	.005	1.169	.28	.004	5.65	.02	.017
Dry	0.037	.85	< .001	0.816	.37	.002	0.023	.88	< .001
Sour	0.052	.82	< .001	3.725	.05	.011	2.186	.14	.007
Pleasing appearance	0.325	.57	.001	0.863	.35	.003	0.193	.66	.001
Appetizing	1.04	.31	.003	4.391	.04	.013	1.309	.25	.004
Look forward	0.933	.34	.003	6.06	.01	.018	0.396	.53	.001
Enjoyment	0.443	.51	.001	0.126	.72	< .001	0.062	.80	< .001
Purchase likelihood	0.125	.72	< .001	0.291	.59	.001	0.019	.89	< .001

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 15.

Means and standard deviations for PVD, disgust sensitivity, and BFI (subjective temperature filter)

Dependent variables	NN (n=37) M (SD)	ND (n=43) M (SD)	HN (n=97) M (SD)	HD (n=104) M (SD)
PVD	3.56 (.87)	3.73 (.93)	3.62 (.99)	3.74 (.94)
Germ concern	3.88 (1.06)	4.03 (1.09)	3.82 (1.11)	4.16 (1.12)
Vulnerability	3.19 (1.19)	3.39 (1.25)	3.4 (1.34)	3.26 (1.09)
Disgust Sensitivity	4.841 (.82)	4.842 (.82)	4.843 (.94)	5.02 (.85)
Moral disgust	4.9 (.89)	4.79 (1.16)	4.97 (1.3)	5.03 (1.10
Pathogen disgust	5.36 (.98)	5.6 (.81)	5.31 (.98)	5.46 (.93)
Sexual disgust	4.26 (1.46)	4.13 (1.43)	4.25 (1.55)	4.57 (1.36)
Openness	3.52 (.46)	3.61 (.44)	3.63 (.59)	3.6 (.55)
Extroversion	3.51 (.70)	3.4 (.69)	3.62 (68)	3.48 (62)
Agreeableness	3.71 (.52)	3.66 (.51)	3.81 (.57)	3.86 (.43)
Neuroticism	2.91 (.69)	2.91 (.65)	2.68 (.63)	2.89 (.73)
Conscientious	3.61 (.51)	3.57 (.46)	3.63 (.52)	3.62 (.58)

Note. NN = non-heated neutral prime condition, ND = non-heated disease prime condition, HN = heated neutral prime condition, HD = heated disease prime condition

Table 16.

PVD, Disgust sensitivity, and BFI ANOVA table (subjective temperature filter)

	Temperature			Disease prime			Temp X Disease		
Dependant variables	*F*	*p*	η_p^2	*F*	*p*	η_p^2	*F*	*p*	η_p^2
Overall PVD	0.097	.76	< .001	2.235	.14	.008	0.100	.75	< .001
Germ concern	0.081	.78	< .001	3.970	.05	.014	0.019	.89	< .001
Vulnerability	0.666	.42	.002	0.150	.70	.001	0.447	.50	.002
Disgust Sensitivity	0.002	.96	< .001	0.620	.43	.002	0.526	.47	.002
Moral disgust	0.334	.56	.001	0.144	.70	.001	0.585	.45	.002
Pathogen disgust	3.150	.08	.011	2.227	.14	.008	0.388	.53	.001
Sexual disgust	0.325	.57	.001	0.565	.45	.002	1.123	.29	.004
Openness	0.405	.53	.001	0.152	.70	.001	0.369	.54	.001
Extroversion	1.199	.27	.004	1.317	.25	.005	0.056	.81	< .001
Agreeableness	1.947	.16	.007	0.004	.95	< .001	0.477	.49	.002
Neuroticism	0.060	.81	< .001	1.743	.19	.006	0.811	.37	.003
Conscientious	0.139	.71	.001	0.534	.47	.002	0.312	.58	.001
Dependant variables covarying climate variables									
Overall PVD	0.157	.69	.001	2.857	.09	.011	0.257	.61	.001
Germ concern	0.054	.82	< .001	4.659	.03	.017	0.012	.91	< .001
Vulnerability	0.794	.37	.003	0.451	.58	.001	0.893	.35	.003
Disgust Sensitivity	0.335	.56	.001	0.442	.51	.002	1.109	.29	.004
Moral disgust	1.298	.26	.005	0.299	.59	.001	1.342	.25	.005
Pathogen disgust	2.075	.15	.008	2.550	.11	.01	0.413	.52	.002
Sexual disgust	1.020	.31	.004	0.375	.54	.001	1.767	.19	.007
Openness	0.241	.62	.001	0.024	.88	< .001	0.58	.45	.002
Extroversion	0.700	.40	.003	0.710	.40	.003	0.149	.70	.001
Agreeableness	0.649	.42	.002	1.285	.26	.005	0.406	.53	.002
Neuroticism	1.802	.30	.004	0.001	.98	< .001	0.005	.95	< .001
Conscientious	0.621	.43	.002	1.543	.22	.006	1.437	.23	.005

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 17.

Taste preference logistic regression (subjective temp filter)

Predictor variables	b	*SE*	*p*
Temperature	0.392	0.406	.33
Disease prime	0.242	0.465	.60
Interaction	- 0.25	0.55	.65
Predictor variables covarying climate variables			
Temperature	0.364	0.426	.39
Disease prime	0.29	0.474	.54
Interaction	- 0.301	0.559	.59

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 18.

Taste characteristic Means and standard deviations (subjective temp filter)

	NN (n=34) M (SD)			ND (n=43) M (SD)			HN (n=97) M (SD)			HD (n=104) M (SD)		
	Bug	Animal	Diff.	Bug	Animal	Diff.	Bug	Animal	Diff.	Bug	Animal	Diff.
Sweet	5.22 (1.21)	4.92 (1.32)	0.3	5.21(1.34)	4.74 (1.53)	0.47	5.29 (1.28)	4.66 (1.53)	0.63	5.23 (1.12)	4.97 (1.52)	0.26
Bitter	2.08 (1.28)	2.11 (1.41)	- 0.03	2.40 (1.47)	2.51 (1.86)	- 0.11	1.87 (1.10)	1.99 (1.32)	- 0.12	1.96 (1.25)	2.20 (1.41)	- 0.24
Slimy	2.49 (1.39)	2.27 (1.43)	0.22	3.40 (1.75)	3.16 (1.71)	0.24	3.61 (1.62)	2.58 (1.56)	1.03	3.37 (1.71)	2.87 (1.65)	0.5
Chewy	5.92 (1.32)	5.86 (1.34)	0.06	6.02 (1.00)	5.49 (1.40)	2.53	6.03 (.914)	5.34 (1.34)	0.69	5.87 (1.19)	5.48 (1.49)	0.39
Dry	2.81 (1.78)	3.05 (1.83)	- 0.24	2.65 (1.45)	3.12 (1.70)	- 0.47	2.71 (1.49)	3.27 (1.75)	- 0.56	3.05 (1.45)	3.45 (1.77)	- 0.4
Sour	1.95 (1.10)	2.49 (1.59)	- 0.54	2.58 (1.61)	2.28 (1.52)	0.3	2.01 (1.18)	1.98 (1.19)	0.03	2.21 (1.33)	2.21 (1.43)	0
Pleasing appearance	2.86 (1.67)	4.03 (1.61)	-3.744	2.67 (1.19)	4.05 (1.62)	-1.38	2.96 (1.36)	4.30 (1.52)	-1.34	3.00 (1.50)	4.36 (1.50)	-1.36
Appetizing	2.73 (1.60)	3.86 (1.69)	-1.13	2.58 (1.18)	4.02 (1.62)	-1.44	3.12 (1.49)	3.97 (1.46)	- 0.85	2.70 (1.84)	4.04 (1.46)	-1.34
Look forward to eating	3.05 (1.62)	3.57 (1.76)	- 0.52	3.26 (1.58)	4.21 (1.79)	- 0.95	3.43 (1.65)	3.99 (1.66)	- 0.56	3.05 (1.55)	3.88 (1.72)	- 0.83
Enjoyment	4.43 (1.63)	4.24 (1.42)	0.19	4.86 (1.83)	4.35 (1.31)	0.51	5.13 (1.08)	4.82 (1.34)	0.31	4.90 (1.35)	4.65 (1.53)	0.25
Purchase likelihood	2.97 (1.03)	2.81 (1.85)	0.16	3.51 (2.04)	2.84 (1.89)	0.67	3.44 (1.81)	3.37 (1.89)	0.07	3.50 (1.92)	3.34 (1.99)	0.16

Note. NN = non-heated neutral prime condition, ND = non-heated disease prime condition, HN = heated neutral prime condition, HD = heated disease prime condition. Diff = $M_{bug} - M_{animal}$.

Table 19.

Taste characteristic repeated measures ANOVA table (subjective temp filter)

	Temperature			Disease prime			Interaction		
Dependant variables	*F*	*p*	η_p^2	*F*	*p*	η_p^2	*F*	*p*	η_p^2
Sweet	0.083	.77	< .001	0.231	.63	.001	1.542	.22	.006
Bitter	0.243	.62	.001	0.234	.63	.001	0.001	.95	< .001
Slimy	6.68	.01	.024	1.514	.22	.006	1.712	.19	.006
Chewy	1.437	.23	.005	0.203	.65	.001	3.591	.06	.013
Dry	0.259	.61	.001	0.017	.90	< .001	0.582	.45	.002
Sour	0.543	.50	.002	4.073	.05	.015	4.747	.03	.017
Pleasing appearance	0.126	.72	< .001	0.22	.64	.001	0.154	.70	.001
Appetizing	0.718	.40	.003	3.11	.08	.011	0.17	.68	.001
Look forward	0.026	.87	< .001	2.385	.12	.009	0.128	.72	< .001
Enjoyment	0.089	.77	< .001	0.349	.56	.001	0.713	.40	.003
Purchase likelihood	1.107	.29	.004	1.069	.30	.004	0.562	.45	.002
Dependant variables covarying climate variables									
Sweet	0.109	.74	< .001	0.57	.45	.002	0.706	.40	.003
Bitter	0.371	.54	.001	< .001	.99	< .001	0.187	.67	.001
Slimy	4.28	.04	.016	1.159	.28	.004	1.242	.27	.005
Chewy	3.701	.06	.014	0.237	.63	.001	3.032	.08	.012
Dry	0.272	.60	.001	0.002	.96	< .001	0.54	.46	.002
Sour	0.038	.85	< .001	4.204	.04	.016	3.178	.08	.012
Pleasing appearance	0.347	.56	.001	0.04	.84	< .001	0.004	.95	< .001
Appetizing	0.986	.32	.004	3.163	.08	.012	0.45	.50	.002
Look forward	0.938	.33	.004	2.406	.12	.009	0.083	.77	< .001
Enjoyment	0.508	.48	.002	0.135	.71	.001	0.124	.73	< .001
Purchase likelihood	0.305	.58	.001	0.748	.39	.003	0.077	.78	< .001

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code

Table 20.

PVD, Disgust sensitivity, and BFI Regression table

	Temperature				Disease prime				Temp X disease			
	b	*b**	*p*	*partial r*	*b*	*b**	*p*	*partial r*	*b*	*b**	*p*	*partial r*
Overall PVD	0.007	0.033	.66	.023	0.144	0.077	.15	.077	0.008	0.026	.73	.018
Germ concern	- 0.009	- 0.033	.66	-.023	0.221	0.100	.06	.100	0.035	0.097	.08	.068
Vulnerability	0.025	0.088	.24	.061	0.056	0.023	.67	.023	- 0.023	- 0.058	.44	- .040
Disgust Sensitivity	- 0.002	- 0.008	.91	- .006	0.084	0.049	.35	.049	0.032	0.114	.13	.080
Moral disgust	0.001	0.003	.96	.002	- 0.024	- 0.011	.84	-.011	0.029	0.078	.30	.054
Pathogen disgust	- 0.101	- 0.044	.55	- .031	0.163	0.087	.10	.087	0.011	0.035	.64	.024
Sexual disgust	0.004	0.011	.88	.008	0.113	0.039	.46	.039	0.057	0.12	.11	.084
Openness	0.009	0.073	.33	.051	0.037	0.035	.51	.034	- 0.012	- 0.068	.37	- .048
Extroversion	0.004	0.026	.73	.018	- 0.123	- 0.091	.09	- .09	0.009	0.041	.58	.029
Agreeableness	0.008	0.069	.35	.049	< .001	< .001	.99	< .001	0.014	0.085	.25	.06
Neuroticism	- 0.024	- 0.149	.05	- .105	0.1	0.073	.16	.073	0.025	0.112	.13	.079
Conscientious	0.003	- 0.021	.78	- .015	- 0.027	- 0.026	.63	- .025	0.003	0.015	.85	.010

Note. Temperature was analyzed as a continuous variable.

Table 21.

PVD, Disgust sensitivity, and BFI Regression table covarying climate variables

	Temperature				Disease prime				Interaction			
Variable	*b*	*b**	*p*	*partial r*	*b*	*b**	*p*	*partial r*	*b*	*b**	*p*	*partial r*
Overall PVD	0.001	0.003	.98	.082	0.153	0.082	.13	.008	0.003	0.011	.89	.028
Germ concern	- 0.023	- 0.089	.29	- .057	0.217	0.098	.07	.099	0.033	0.091	.23	.064
Vulnerability	0.028	0.096	.25	.061	0.08	0.033	.54	.033	- 0.030	- 0.075	.33	- .052
Disgust Sensitivity	- 0.002	- 0.008	.93	- .005	0.098	0.057	.29	.057	0.030	0.106	.16	.074
Moral disgust	0.007	0.025	.77	.016	- 0.01	- 0.005	.93	- .005	0.032	0.086	.26	.060
Pathogen disgust	- 0.014	- 0.064	.45	- .040	0.176	0.095	.08	.095	0.005	0.016	.84	.011
Sexual disgust	0.002	0.007	.93	.004	0.128	0.044	.41	.044	0.053	0.111	.15	.078
Openness	0.007	0.06	.48	.038	0.006	0.006	.92	.006	- 0.012	- 0.069	.37	- .049
Extroversion	0.003	0.018	.83	.012	- 0.14	- 0.103	.06	- .103	0.01	0.045	.55	.032
Agreeableness	0.009	0.073	.37	.048	- 0.021	- 0.021	.69	- .022	0.011	0.067	.36	.049
Neuroticism	- 0.018	- 0.109	.19	- .070	0.108	0.079	.13	.081	0.025	0.11	.14	.079
Conscientious	0.004	0.032	.70	.021	- 0.038	- 0.032	.55	- .033	0.001	0.001	.99	< .001

Note. . Temperature was analyzed as a continuous variable. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code

Table 22

Logistic regression of taste preference

	Taste preference		
Predictor variables	b	*SE*	*p*
Temperature	0.063	0.045	0.16
Disease prime	0.086	0.269	0.75
Temp X disease	- 0.011	0.062	0.86
Predictor variables covarying climate variables			
Temperature	0.069	0.049	0.16
Disease prime	0.096	0.273	0.73
Temp X disease	- 0.014	0.063	0.83

Note. . Temperature was analyzed as a continuous variable. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 23.

Taste characteristics regression table

	Temperature				Disease prime				Temp X disease			
	b	*b**	*p*	*partial r*	*b*	*b**	*p*	*partial r*	*b*	*b**	*p*	*partial r*
Sweet	0.029	0.067	.38	.047	- 0.07	- 0.02	.71	- .02	- 0.095	- 0.16	.04	- .112
Bitter	0.039	0.097	.20	.067	0.095	0.028	.60	.028	- 0.026	- 0.047	.54	- .033
Slimy	0.05	0.118	.12	.083	- 0.384	- 0.109	.04	- .108	- 0.016	- 0.028	.71	- .019
Chewy	0.035	0.094	.22	.065	0.173	0.054	.30	.055	- 0.084	- 0.16	.04	- .111
Dry	0.016	0.033	.66	.023	0.123	0.031	.56	.031	- 0.008	- 0.012	.87	- .009
Sour	0.024	0.063	.41	.044	0.257	0.079	.14	.079	- 0.031	- 0.058	.45	- .04
Pleasing appearance	- 0.029	0.066	.39	.046	- 0.146	- 0.04	.46	- .04	< .001	0.012	.87	< .001
Appetizing	0.027	0.065	.39	.045	- 0.318	- 0.092	.08	.091	- 0.062	- 0.109	.15	- .075
Look forward	- 0.03	- 0.074	.33	- .052	- 0.408	- 0.119	.02	- .119	0.01	0.017	.82	.012
Enjoyment	- 0.02	- 0.047	.54	- .033	- 0.068	- 0.019	.72	- .019	- 0.011	- 0.02	.80	- .014
Purchase likelihood	- 0.056	- 0.109	.15	- .076	0.065	0.015	.78	.015	0.002	0.002	.98	.002

Note. Temperature was analyzed as a continuous variable.

Table 24.

Taste characteristics regression table covarying for climate variables

	Temperature				Disease prime				Temp X disease			
Variables	*b*	*b**	*p*	*partial r*	*b*	*b**	*p*	*partial r*	*b*	*b**	*p*	*partial r*
Sweet	0.018	0.044	.61	.028	- 0.086	- 0.024	.65	- .024	- 0.082	- 0.141	.07	- .099
Bitter	0.033	0.082	.34	.052	0.135	0.04	.46	.04	- 0.034	- 0.061	.43	- .043
Slimy	0.044	0.103	.23	.066	- 0.379	- 0.106	.05	- .107	- 0.014	- 0.023	.76	- .017
Chewy	0.048	0.128	.14	.081	0.203	0.064	.23	.065	- 0.088	- 0.169	.03	- .119
Dry	0.012	0.025	.77	.016	0.162	0.041	.46	.041	- 0.016	- 0.024	.75	- .017
Sour	0.013	0.035	.68	.022	0.294	0.091	.09	.091	- 0.028	- 0.052	.50	- .037
Pleasing appearance	- 0.018	- 0.042	.62	- .027	- 0.137	- 0.038	.49	- .038	0.016	0.026	.74	.018
Appetizing	0.036	0.088	.79	.056	- 0.346	- 0.101	.03	- .102	- 0.051	- 0.09	.78	- .064
Look forward	- 0.009	- 0.023	.47	- .014	- 0.411	- 0.121	.77	- .122	0.012	0.022	.76	.016
Enjoyment	- 0.025	- 0.061	.29	- .039	- 0.054	- 0.016	.63	- .016	- 0.014	- 0.024	.90	- .017
Purchase likelihood	- 0.046	- 0.091	.31	- .057	0.111	0.026	.06	.026	- 0.007	- 0.01	.24	- .007

Note. Temperature was analyzed as a continuous variable. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code.

Table 25.

Summary comparison of temperature main effects from 4 analyses. (PVD, disgust, BFI)

	Temperature							
	ANOVA		ANOVA (80 °F filter)		ANOVA (ST filter)		Regression	
Dependant Variables	*F*	*p*	*F*	*p*	*F*	*p*	b	*p*
Overall PVD	0.185	.67	1.47	.70	0.097	.76	0.033	.66
Germ concern	0.086	.77	0.088	.77	0.081	.78	- 0.033	.66
Vulnerability	0.164	.69	0.106	.75	0.666	.42	0.088	.24
Disgust Sensitivity	0.887	.35	0.974	.32	0.002	.96	- 0.008	.91
Moral disgust	1.405	.24	1.674	.20	0.334	.56	0.003	.96
Pathogen disgust	1.313	.25	1.003	.32	3.15	.08	- 0.044	.55
Sexual disgust	2.202	.14	1.935	.17	0.325	.57	0.011	.88
Openness	0.318	.57	0.727	.39	0.405	.53	0.073	.33
Extroversion	1.169	.28	1.643	.20	1.199	.27	0.026	.73
Agreeableness	8.557	.004	7.632	.01	1.947	.16	0.069	.35
Neuroticism	2.61	.11	3.163	.08	0.06	.81	- 0.149	.05
Conscientious	0.485	.49	0.284	.60	0.139	.71	- 0.021	.78
Dependant variables covarying climate variables								
Overall PVD	0.009	.92	0.048	.83	0.157	.69	0.003	.98
Germ concern	0.201	.65	0.122	.73	0.054	.82	- 0.089	.29
Vulnerability	0.089	.77	< .001	1.00	0.794	.37	0.096	.26
Disgust Sensitivity	1.13	.29	1.084	.30	0.335	.56	- 0.008	.93
Moral disgust	2.703	.10	3.141	.08	1.298	.26	0.025	.77
Pathogen disgust	1.148	.22	1.104	.29	2.075	.15	- 0.064	.45
Sexual disgust	1.951	.16	1.323	.25	1.02	.31	0.007	.93
Openness	0.04	.84	0.399	.53	0.241	.62	0.06	.48
Extroversion	0.126	.72	0.64	.42	0.7	.40	0.018	.83
Agreeableness	4.51	.03	4.905	.03	0.649	.42	0.073	.37
Neuroticism	0.242	.62	0.742	.39	1.802	.30	- 0.109	.19
Conscientious	0.966	.33	0.989	.32	0.621	.43	0.032	.70

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code. ST filter = subjective temperature filter.

Table 26.

Summary comparison of temperature main effects from 4 analyses. (taste characteristics)

	Temperature							
	ANOVA		ANOVA (80°F filter)		ANOVA (STfilter)		Regression	
Dependant Variables	*F*	*p*	*F*	*p*	*F*	*p*	*b*	*p*
Sweet	0.051	.82	0.243	.62	0.083	.77	0.067	.38
Bitter	0.273	.60	0.398	.53	0.243	.62	0.097	.20
Slimy	6.365	.01	6.183	.01	6.68	.01	0.118	.12
Chewy	0.544	.46	0.185	.67	1.437	.23	0.094	.22
Dry	0.002	.97	0.006	.94	0.259	.61	0.033	.66
Sour	0.2	.66	0.218	.64	0.543	.50	0.063	.41
Pleasing appearance	0.04	.84	0.002	.96	0.126	.72	0.066	.39
Appetizing	0.835	.36	0.605	.44	0.718	.40	0.065	.39
Look forward	0.008	.93	0.005	.95	0.026	.87	- 0.074	.33
Enjoyment	0.193	.66	0.416	.52	0.089	.77	- 0.047	.54
Purchase likelihood	0.629	.43	0.918	.34	1.107	.29	- 0.109	.15
Dependant variables covarying climate variables								
Sweet	0.103	.75	0.357	.55	0.109	.74	0.044	.61
Bitter	0.004	.95	< .001	.98	0.371	.54	0.082	.34
Slimy	3.888	.05	3.918	.05	4.28	.04	0.103	.23
Chewy	2.231	.14	1.582	.21	3.701	.06	0.128	.14
Dry	0.063	.80	0.037	.85	0.272	.60	0.025	.77
Sour	0.191	.66	0.052	.82	0.038	.84	0.035	.68
Pleasing appearance	0.575	.45	0.325	.57	0.347	.56	- 0.042	.62
Appetizing	1.344	.25	1.04	.31	0.986	.32	0.088	.31
Look forward	0.892	.35	0.933	.34	0.938	.33	- 0.023	.79
Enjoyment	0.17	.68	0.443	.51	0.508	.48	- 0.061	.47
Purchase likelihood	0.045	.83	0.125	.72	0.305	.58	- 0.091	.29

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code. ST filter = subjective temperature filter.

Table 27.

Summary comparison of disease main effects from 4 analyses. (PVD, disgust, BFI)

	Disease prime							
	ANOVA		ANOVA (80°F filter)		ANOVA (ST filter)		Regression	
Dependant Variables	*F*	*p*	*F*	*p*	*F*	*p*	b	*p*
Overall PVD	2.278	.13	2.083	.15	2.235	.14	0.077	.15
Germ concern	3.768	.05	4.272	.04	3.97	.05	0.100	.06
Vulnerability	0.232	.63	0.064	.80	0.15	.70	0.023	.67
Disgust Sensitivity	0.886	.35	0.951	.33	0.62	.43	0.049	.35
Moral disgust	0.039	.84	0.038	.85	0.144	.70	- 0.011	.84
Pathogen disgust	3.209	.07	3.716	.06	2.227	.14	0.087	.10
Sexual disgust	0.454	.50	0.424	.52	0.565	.45	0.039	.46
Openness	0.499	.48	0.307	.58	0.152	.70	0.035	.51
Extroversion	2.778	.10	2.933	.09	1.317	.25	- 0.091	.09
Agreeableness	0.004	.95	0.001	.98	0.004	.95	< .001	.99
Neuroticism	1.977	.16	1.98	.16	1.743	.19	0.073	.16
Conscientious	0.265	.61	0.157	.69	0.534	.47	- 0.026	.63
Dependant variables covarying for climate variables								
Overall PVD	2.415	.12	1.798	.18	2.857	.09	0.082	.13
Germ concern	3.542	.06	3.351	.07	4.659	.03	0.098	.07
Vulnerability	0.389	.53	0.107	.74	0.451	.58	0.033	.54
Disgust Sensitivity	1.148	.29	1.025	.31	0.442	.51	0.057	.29
Moral disgust	0.006	.94	0.009	.93	0.299	.59	- 0.005	.93
Pathogen disgust	3.437	.07	3.216	.07	2.55	.11	0.095	.08
Sexual disgust	0.597	.44	0.515	.47	0.375	.54	0.044	.41
Openness	0.034	.85	0.066	.80	0.024	.88	0.006	.92
Extroversion	3.381	.07	2.804	.10	0.71	.40	- 0.103	.06
Agreeableness	0.162	.69	0.027	.87	1.285	.26	- 0.021	.69
Neuroticism	2.224	.14	1.764	.19	0.001	.98	0.079	.13
Conscientious	0.365	.55	0.153	.70	1.543	.22	- 0.032	.55

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code. ST filter = subjective temperature filter.

Table 28.

Summary comparison of disease main effects from 4 analyses. (taste characteristics)

	Disease prime							
	ANOVA		ANOVA (80°F filter)		ANOVA (ST filter)		Regression	
Dependant Variables	*F*	*p*	*F*	*p*	*F*	*p*	*b*	*p*
Sweet	0.124	.72	0.224	.64	0.231	.63	- 0.02	.71
Bitter	0.347	.55	0.448	.50	0.234	.63	0.028	.60
Slimy	4.342	.04	4.694	.03	1.514	.22	- 0.109	.04
Chewy	1.279	.26	1.056	.31	0.203	.65	0.054	.30
Dry	0.34	.56	0.671	.41	0.017	.90	0.031	.56
Sour	2.608	.11	3.612	.06	4.073	.05	0.079	.14
Pleasing appearance	0.646	.42	1.253	.26	0.22	.64	- 0.04	.46
Appetizing	2.995	.08	4.432	.04	3.11	.08	- 0.092	.08
Look forward	5.323	.02	6.483	.01	2.385	.12	- 0.119	.02
Enjoyment	0.139	.71	0.083	.77	0.349	.56	- 0.019	.72
Purchase likelihood	0.102	.75	0.2	.66	1.069	.30	0.015	.78
Dependant variables covarying climate variables								
Sweet	0.192	.66	0.298	.59	0.57	.45	- 0.024	.65
Bitter	0.594	.44	0.56	.46	< .001	.99	0.04	.46
Slimy	3.998	.05	4.594	.03	1.159	.28	- 0.106	.05
Chewy	1.629	.20	1.169	.28	0.237	.63	0.064	.23
Dry	0.539	.46	0.816	.37	0.002	.96	0.041	.46
Sour	3.145	.08	3.725	.05	4.204	.04	0.091	.09
Pleasing appearance	0.48	.49	0.863	.35	0.04	.84	- 0.038	.49
Appetizing	3.417	.07	4.391	.04	3.163	.08	- 0.101	.06
Look forward	5.193	.02	6.06	.01	2.406	.12	- 0.121	.03
Enjoyment	0.096	.76	0.126	.72	0.135	.71	- 0.016	.77
Purchase likelihood	0.255	.61	0.291	.59	0.748	.39	0.026	.63

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code. ST filter = subjective temperature filter.

Table 29.

Summary comparison of interaction between temperature and disease from 4 analyses. (PVD, disgust, BFI)

	Temp X Disease interaction							
	ANOVA		ANOVA (80°F filter)		ANOVA (ST filter)		Regression	
Dependant Variables	*F*	*p*	*F*	*p*	*F*	*p*	*b*	*p*
Overall PVD	0.11	.74	0.078	.78	0.1	.75	0.026	.73
Germ concern	0.328	.57	0.697	.40	0.019	.89	0.097	.08
Vulnerability	1.282	.26	1.732	.19	0.447	.50	- 0.058	.44
Disgust Sensitivity	0.728	.40	0.93	.34	0.526	.47	0.114	.13
Moral disgust	0.325	.57	0.464	.50	0.585	.45	0.078	.30
Pathogen disgust	0.378	.54	0.185	.67	0.388	.53	0.035	.64
Sexual disgust	2.146	.14	2.135	.15	1.123	.29	0.12	.11
Openness	1.507	.22	1.199	.27	0.369	.54	- 0.068	.37
Extroversion	0.025	.88	0.021	.89	0.056	.81	0.041	.58
Agreeableness	0.903	.34	1.085	.30	0.477	.49	0.085	.25
Neuroticism	1.763	.19	1.832	.18	0.811	.40	0.112	.13
Conscientious	0.165	.69	0.062	.80	0.312	.58	0.015	.85
Dependant variables covarying climate variables								
Overall PVD	0.057	.81	0.134	.72	0.257	.61	0.011	.89
Germ concern	0.614	.43	0.698	.40	0.012	.91	0.091	.23
Vulnerability	1.426	.23	2.16	.14	0.893	.35	- 0.075	.33
Disgust Sensitivity	0.918	.34	0.863	.35	1.109	.29	0.106	.16
Moral disgust	0.469	.49	0.557	.46	1.342	.25	0.086	.26
Pathogen disgust	0.3	.58	0.33	.57	0.413	.52	0.016	.84
Sexual disgust	2.303	.13	2.086	.15	1.767	.19	0.111	.15
Openness	2.447	.12	1.498	.22	0.58	.45	- 0.069	.37
Extroversion	0.24	.63	0.073	.79	0.149	.70	0.045	.55
Agreeableness	0.217	.64	0.502	.48	0.406	.53	0.067	.36
Neuroticism	2.112	.15	1.708	.19	0.005	.95	0.11	.14
Conscientious	0.001	.98	0.002	.97	1.437	.23	0.001	.99

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code. ST filter = subjective temperature filter.

Table 30.

Summary comparison of disease main effects from 4 analyses. (taste characteristics)

	Temp X Disease interaction							
	ANOVA		ANOVA (80°F filter)		ANOVA (ST filter)		Regression	
Dependant Variables	*F*	*p*	*F*	*p*	*F*	*p*	*b*	*p*
Sweet	2.106	.15	3.106	.08	1.542	.22	- 0.16	.04
Bitter	1.163	.28	0.965	.33	0.001	.95	- 0.047	.54
Slimy	0.166	.68	0.26	.61	1.712	.19	- 0.028	.71
Chewy	5.58	.02	5.236	.02	3.591	.06	- 0.16	.04
Dry	0.022	.88	0.001	.97	0.582	.45	- 0.012	.87
Sour	2.821	.09	2.774	.10	4.747	.03	- 0.058	.45
Pleasing appearance	0.52	.47	0.263	.61	0.154	.70	0.012	.87
Appetizing	0.928	.34	1.305	.25	0.17	.68	- 0.109	.15
Look forward	0.55	.46	0.349	.56	0.128	.72	0.017	.82
Enjoyment	0.002	.97	0.004	.95	0.713	.40	- 0.02	.80
Purchase	0.012	.91	< .001	.98	0.562	.45	0.002	.98
Dependant variables covarying climate variables								
Sweet	1.574	.21	2.435	.12	0.706	.40	- 0.141	.07
Bitter	1.273	.26	1.211	.27	0.187	.67	- 0.061	.43
Slimy	0.043	.84	0.135	.71	1.242	.27	- 0.023	.76
Chewy	5.389	.02	5.65	.02	3.032	.08	- 0.169	.03
Dry	0.04	.84	0.023	.88	0.54	.46	- 0.024	.75
Sour	1.859	.17	2.186	.14	3.178	.08	- 0.052	.50
Pleasing appearance	0.28	.60	0.193	.66	0.004	.95	0.026	.74
Appetizing	1.269	.26	1.309	.25	0.45	.50	- 0.09	.24
Look forward	0.454	.50	0.396	.53	0.083	.77	0.022	.78
Enjoyment	0.132	.72	0.062	.80	0.124	.73	- 0.024	.76
Purchase	0.007	.93	0.019	.89	0.077	.78	- 0.01	.90

Note. Climate variables = waiting room temperature, lab room humidity, outside temperature, outside humidity, and clothing code. ST filter = subjective temperature filter.

Figure 1. Gummy bugs

Figure 2. Traditional gummy candy. The frog candy was not used in the study because it might be interpreted as a disgust cue.

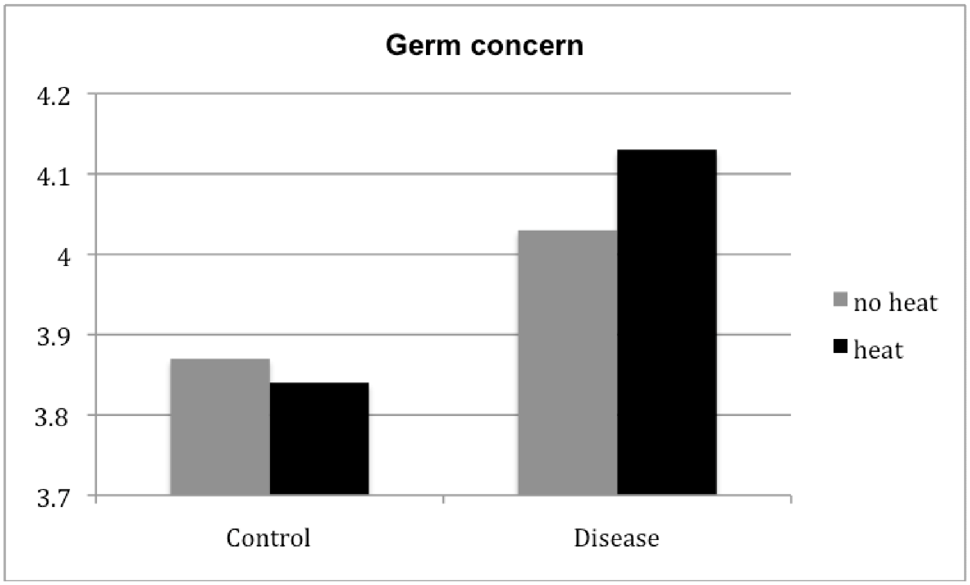

Figure 3. Self-reported germ concern ratings by condition.

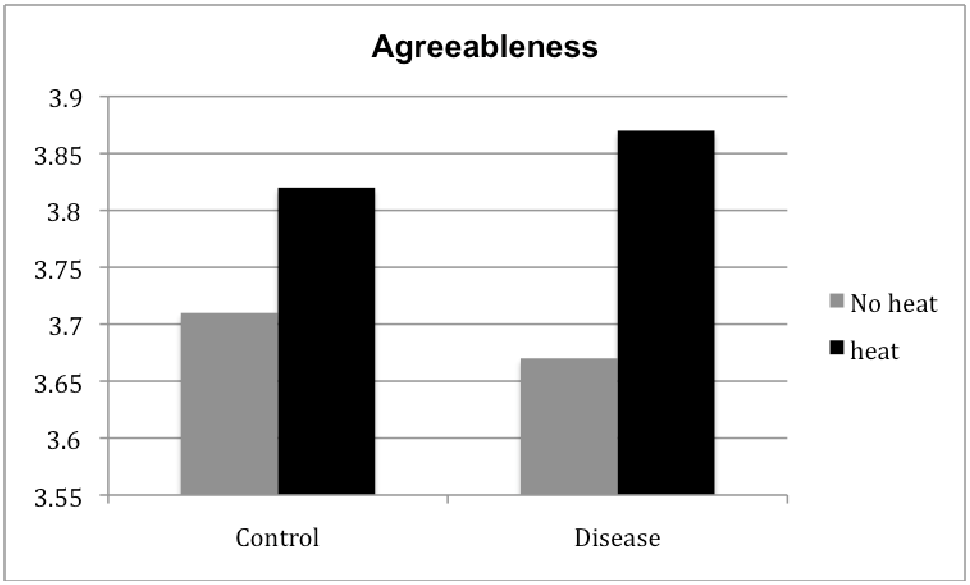

Figure 4. Self-reported agreeableness ratings by condition.

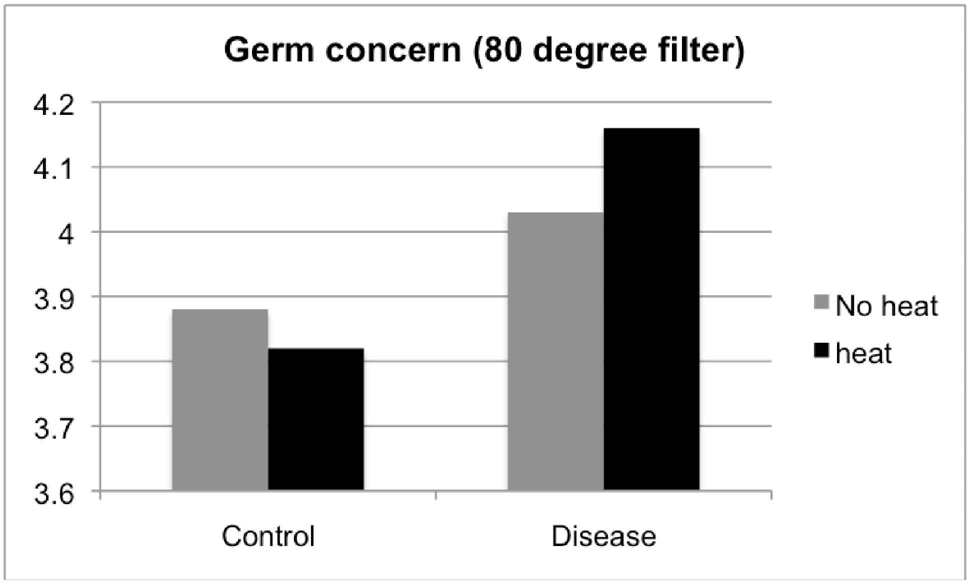

Figure 5. Self-reported germ concern ratings by condition (Participants who participated in the heat conditions when the room was below 80°F or participated in the non-heated conditions when the room was above 80°F were removed)

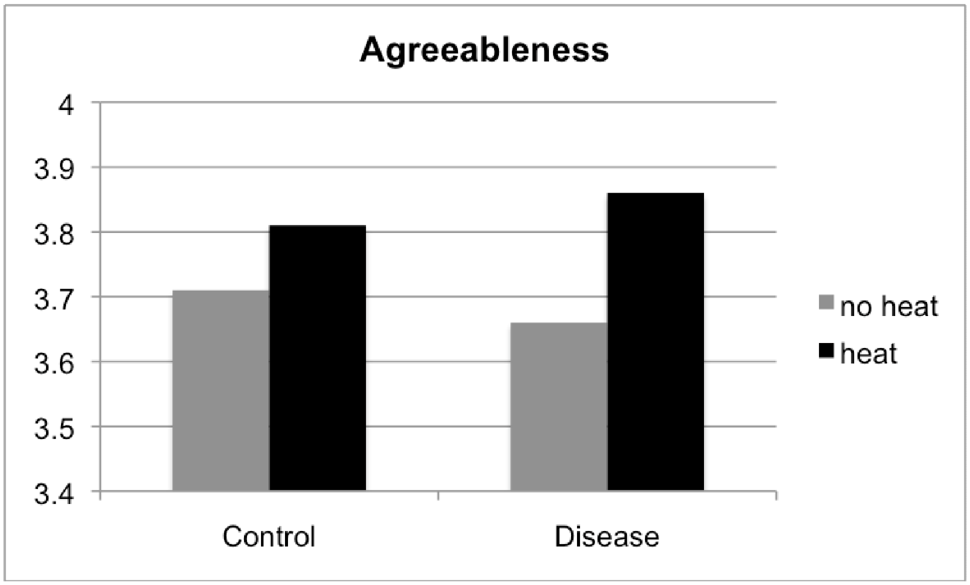

Figure 6. Self-reported agreeableness ratings by condition (Participants who participated in the heat conditions when the room was below 80°F or participated in the non-heated conditions when the room was above 80°F were removed).

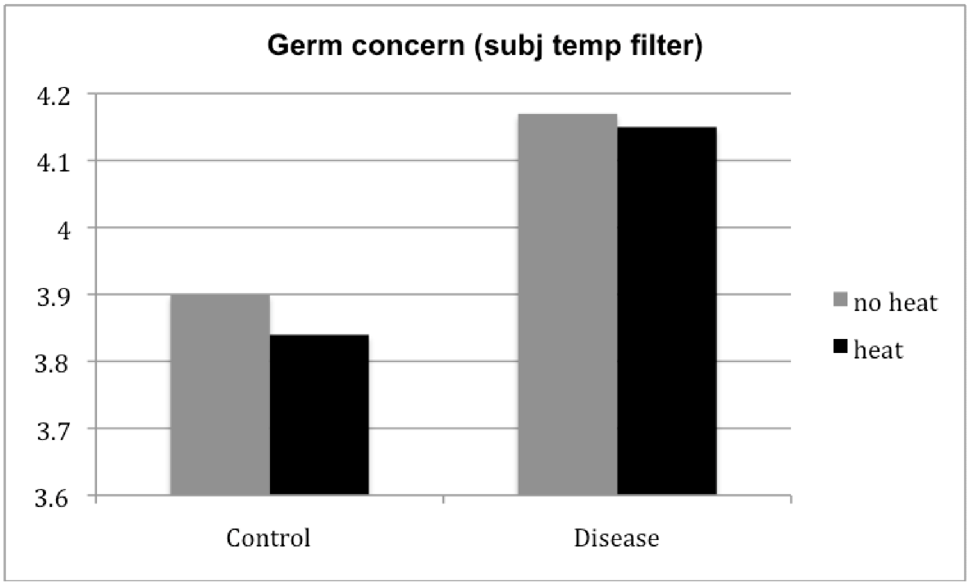

Figure 7. Self-reported germ concern ratings by condition (Participants in the heated conditions who reported the room was “neutral” or “cool” and participants in the non-heated conditions that reported the room was “warm” or “hot” were removed)

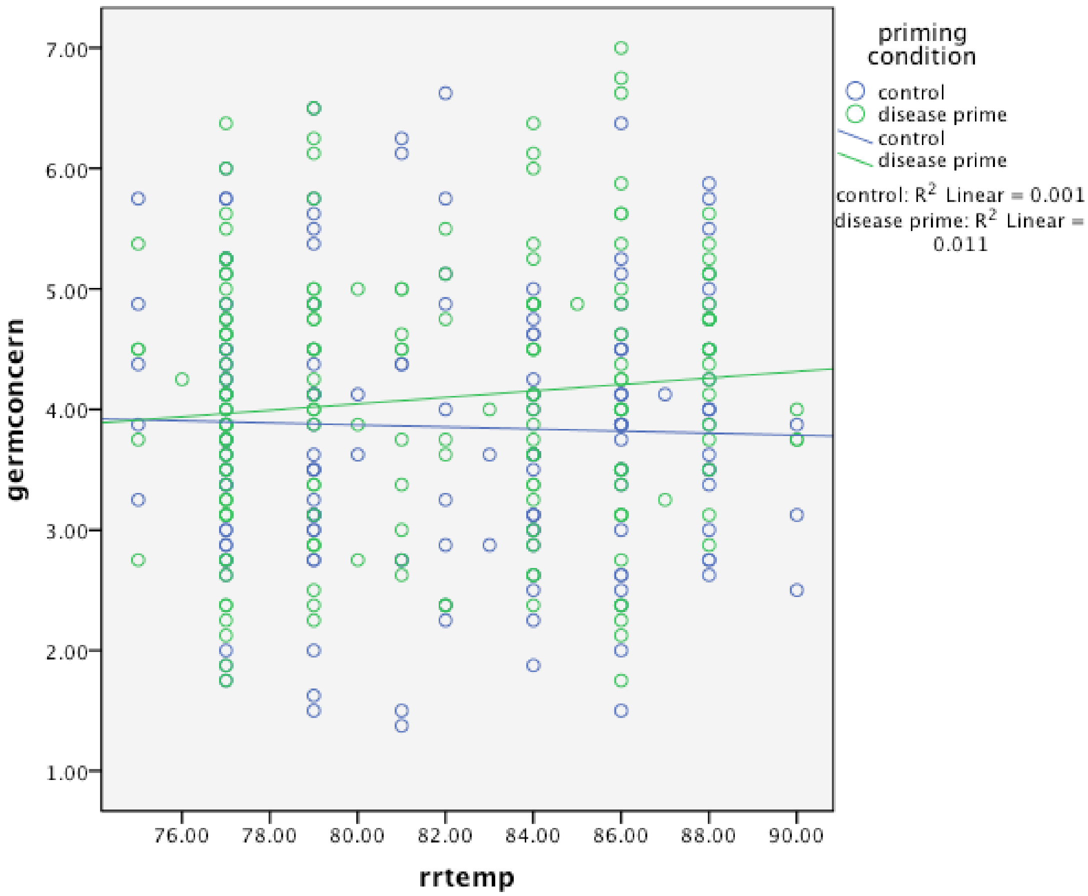

Figure 8. Scatterplot of self-reported germ concern ratings by lab room temperature.

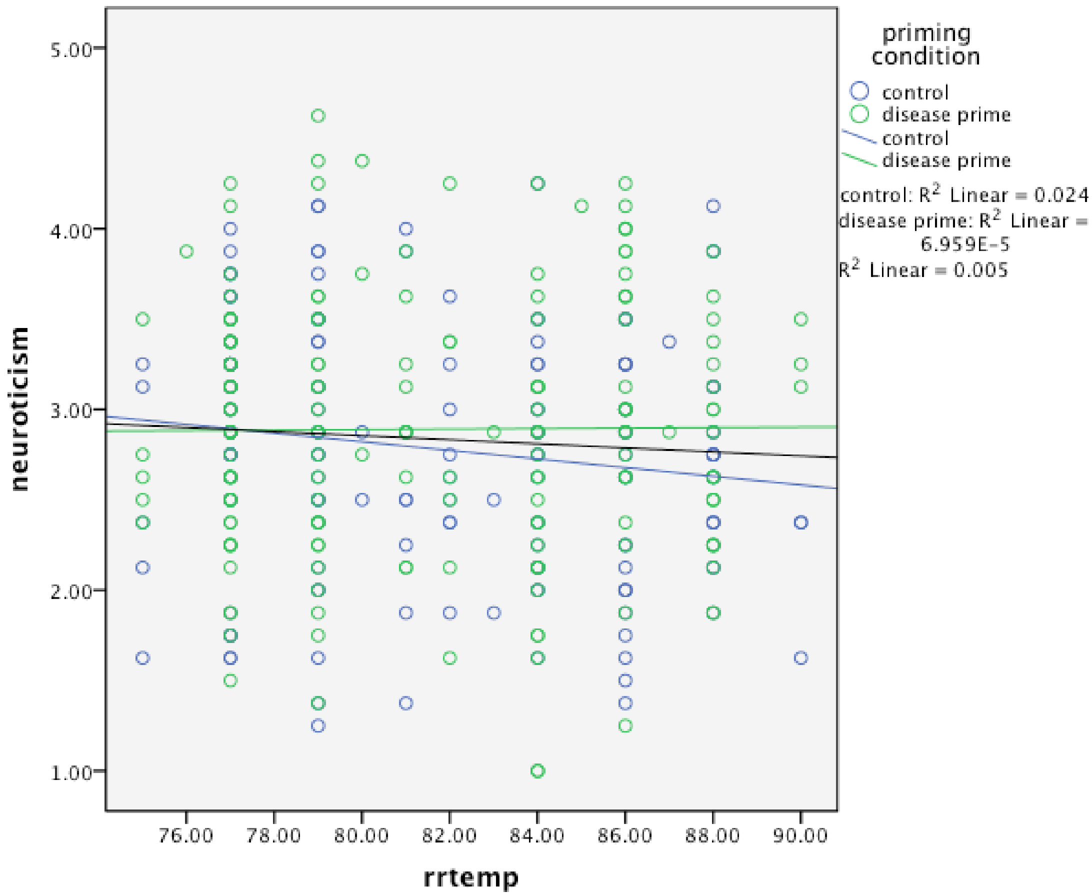

Figure 9. Scatterplot of self-reported neuroticism scores by lab room temperature.

APPENDIX A

SELF-REPORTED TEMPERATURE ITEMS

1.) On a scale from 1(not at all) to 5 (very comfortable) how comfortable is the temperature of the room?
2.) - How is the current temperature in the room which you are taking this survey?

1 = Very cold
2 = Moderately cold
3 = Cool
4 = Neutral
5 = Warm
6 = Moderately hot
7 = Very hot

3.) How is the current outside temperature?

1 = Very cold
2 = Moderately cold
3 = Cool
4 = Neutral
5 = Warm
6 = Moderately hot
7 = Very hot

4.) In Fahrenheit, estimate the current temperature of the room.
5.) In Fahrenheit, estimate the current temperature outside.
6.) On a scale from 1 to 5 how sensitive are you to hot weather?
7.) On a scale from 1 to 5 how sensitive are you to cold weather?
8.) How long have you live in the greater Phoenix area?

- Less than a year
- 1-2 years
- 3-4 years
- 5-6 years
- more than 6 years

9.) If you are not from the Phoenix area, what city and state did you live in prior? If you have never lived anywhere else just write "N/A"

10.) Please check all of the items that you are currently wearing

- tank top
- short sleeve shirt
- long sleeve shirt
- sweatshirt
- sweater
- shorts
- skirt
- khakis/pants
- jeans
- dress

APPENDIX B

TASTE PREFERENCES SCALE

Please answer the following questions about the appearance and taste of the following food items on a scale from 1 (not at all) to 6 (extremely)

Product A = gummy bug
Product B = gummy animal

TP1 – How hungry are you right now?
TP2 - Overall, how pleasing is the appearance of product A?
TP3 – Overall, how pleasing is the appearance of product B?
TP4 – How appetizing does product A look?
TP5 – How appetizing does product B look?
TP6 – How much do you look forward to eating product A?
TP7 – How much do you look forward to eating product B?

TP8 – How SWEET is product A?
TP9 – How BITTER is product A?
TP10 – How SLIMY is product A?
TP11 – How CHEWY is product A?
TP12 – How DRY is product A?
TP13 – How SOUR is product A?

TP14 – How SWEET is product B?
TP15 – How BITTER is product B?
TP16 – How SLIMY is product B?
TP17 – How CHEWY is product B?
TP18 – How DRY is product B?
TP19 – How SOUR is product B?

TP20 – Overall, how much did you enjoy product A?
TP21 – Overall, how much did you enjoy product B?
TP22 – Would you be likely to purchase product A?
TP23 – Would you be likely to purchase product B?
TP24 – Which product did you prefer?
  1 = product A
  2 = product B

TP25 - comments about product A
TP26 – comments about product B

APPENDIX C

THREE-DOMAIN DISGUST SCALE

The following items describe a variety of concepts. Please rate how disgusting you find the concepts described in the items, where 1 means that you do not find the concept disgusting and 7 means that you find the concept extremely disgusting.

DS01 - Shoplifting a candy bar from a convenience store
DS02 - Hearing two strangers having sex
DS03 - Stepping on dog poop
DS04 - Stealing from a neighbor
DS05 - Performing oral sex
DS06 -Sitting next to someone who has red sores on their arm
DS07 - A student cheating to get good grades
DS08 - Watching a pornographic video
DS09 - Shaking hands with a stranger who has sweaty palms
DS10 - Deceiving a friend
DS11 - Finding out that someone you don't like has sexual fantasies about you
DS12 - Seeing some mold on old leftovers in your refrigerator
DS13 - Forging someone's signature on a legal document
DS14 - Bringing someone you just met back to your room to have sex
DS15 - Standing close to a person who has body odor
DS16 - Cutting to the front of a line to purchase the last few tickets to a show
DS17 - A stranger of the opposite sex intentionally rubbing your thigh in an elevator
DS18 - Seeing a cockroach run across the floor
DS19 - Intentionally lying during a business transaction
DS20 - Having anal sex with someone of the opposite sex
DS21 - Accidentally touching a person's bloody cut

Response format: 1 (not at all disgusting) …. 7 (extremely disgusting)

Moral = ds01, ds04, ds07, ds10, ds13, ds16, ds19
Pathogen = ds03, ds06, ds09, ds12, ds15, ds18, ds21
Sexual = ds02, ds05, ds08, ds11, ds14, ds17, ds20

APPENDIX D

PERCEIVED VULNERABILITY TO DISEASE SCALE

Please answer the following questions as carefully and truthfully as possible. Please rate from 1 (strongly disagree) to 7 (strongly agree).

Pvd01 – It really bothers me when people sneeze without covering their mouths
Pvd02 – If an illness is going around I will get it
Pvd03 – I am comfortable sharing a water bottle with a friend (R)
Pvd04 – I don't like to write with a pencil someone else has obviously chewed on
Pvd05 – My past experiences make me believe I am not likely to get sick even when my friends are sick (R)
Pvd06 – I have a history of susceptibility to infectious diseases
Pvd07 – I prefer to wash my hands pretty soon after shaking someone's hand
Pvd08 – In general, I am very susceptible to infectious diseases
Pvd09 – I dislike wearing used cloths because you don't know what the person who wore it was like
Pvd10 – I am more likely than the people around me to catch an infectious disease
Pvd11 – My hands do not feel dirty after touching money (R)
Pvd12 – I am unlikely to catch a cold, flu, or other illness, even if it is going around (R)
Pvd13 – It does not make me anxious to be around sick people (R)
Pvd14 – My immune system protects me from most illnesses that other people get (R)
Pvd15 – I avoid using public telephones because of the risk that I may catch something.

Response format: 1 = Strongly Disagree ... 7 = Strongly Agree

(R) = Reverse scored

Germ Concern Subscale: Items 1, 3, 4, 7, 9, 11, 13, 15

Vulnerability Subscale: Items 2, 5, 6, 8, 10, 12, 14

APPENDIX E

BIG-FIVE PERSONALITY INVENTORY

Rate from 1 (strongly disagree) to 5 (strongly agree)
How well do the following statements describe your personality
I see myself as someone who is

Ext1	talkative
Ag1	tends to find fault with others
Con1	does a thorough job
Neu1	depressed, blue
Op1	original, comes up with new ideas
Ext2	reserved
Ag2	helpful and unselfish with others
Con2	can be somewhat careless
Neu2	relaxed, handles stress well
Op2	curious about many different things
Ext3	full of energy
Ag3	starts quarrels with others
Con3	a reliable worker
Neu3	can be tense
Op3	an ingenious, deep thinker
Ext4	generates a lot of enthusiasm
Ag4	has a forgiving nature
Con4	tends to be disorganized
Neu4	worries a lot
Op4	has an active imagination
Ext5	tends to be quiet
Ag5	generally trusting
Con5	tends to be lazy
Neu5	emotionally stable, not easily upset
Op5	is inventive
Ext6	has an assertive personality
Ag6	can be cold and aloof
Con6	perseveres until the task is finished
Neu6	can be moody
Op6	values artistic, aesthetic experiences
Ext7	sometimes shy, inhibited
Ag7	is considerate and kind to almost everyone
Con7	does things efficiently
Neu7	remains calm in tense situations
Op7	prefers work that is routine
Ext8	outgoing, sociable
Ag8	sometimes rude to others
Con8	makes plans and follows through with them
Neu8	gets easily nervous
Op8	likes to reflect, play with ideas
Op9	has few artistic interests
Ag9	likes to cooperate with others
Con9	is easily distracted
Op10	is sophisticated in art, music, or literature

Ext = extroversion; Ag = agreeableness; Op = openness; Neu = neuroticism;

Con = conscientiousness

APPENDIX F

DATA RESULTS WITH 80°F FILTER

When including an 80°F filter 7 participants were excluded from the analyses (non-heated control condition n = 78; non-heated disease condition n = 80; heated control condition n = 96; heated disease condition n = 98). The cut-off of 80°F was chosen for two reasons. First, 80°F is the temperature in which heat receptors in the skin activate and other physiological reactions to heat are activated (Patapoutian et al, 2003). Second, with the 80 degree cut-off there is a discrete cut-off with no overlap and all participants are within +/- 4 degrees of the ideal temperature for each condition (non-heated: 75 degrees, heated: 85 degrees). For means and standard deviations see Tables 10 & 13.

Perceived vulnerability to disease

For overall PVD, there were no significant effects of temperature, $F(1, 348) = 0.15, p = .70, \eta_p^2 < .001$, no significant effects of disease, $F(1, 348) = 2.08, p = .15, \eta_p^2 = .006$, and no significant interactions $F(1, 348) = 0.08, p = .78, \eta_p^2 < .001$.

For germ concern, there was a significant effect of disease prime, $F(1, 348) = 4.27, p = .04, \eta_p^2 = .012$ (See Table 11). Participants in the disease prime conditions had higher scores of germ concern (non-heat disease condition: M = 4.03; heated disease condition: M = 4.16) compared to the neutral prime conditions (non-heat control condition: M = 3.88; heated control condition: M = 3.82). There were no significant effects of temperature, $F(1, 348) = 0.09, p = .77, \eta_p^2 < .001$, or a significant interaction between temperature and disease prime, $F(1, 348) = 0.70, p = .40, \eta_p^2 = .002$.

For vulnerability, there were no significant effects of temperature, $F(1, 348) = 0.11, p = .75, \eta_p^2 < .001$, disease prime, $F(1, 348) = 0.06, p = .80, \eta_p^2 < .001$, or a significant interaction between temperature and disease prime, $F(1, 348) = 1.37, p = .19, \eta_p^2 = .005$.

The significant main effect of disease prime on germ concern and lack of effects for the other PVD variables is similar to the results seen when analyzing the data using all 365 participants.

Since other climate related variables could be suppressing possible temperature effects, PVD, germ concern, and vulnerability were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code (i.e. the amount of clothing the participant was wearing coded for heaviness) were included as covariates since they were all significantly correlated with lab room temperature.

When incorporating the climate covariates, for overall PVD there were still no significant effects of temperature, $F(1, 334) = 0.05$, $p = .83$, $\eta_p^2 < .001$, disease prime, $F(1, 334) = 1.80$, $p = .18$, $\eta_p^2 = .005$, or a significant interaction between temperature and disease prime, $F(1, 334) = 0.13$, $p = .72$, $\eta_p^2 < .001$.

For germ concern disease prime became only marginally significant, $F(1, 334) = 3.35$, $p = .07$, $\eta_p^2 = .010$. The main effect of temperature, $F(1, 334) = 0.12$, $p = .73$, $\eta_p^2 < .001$, and the interaction between temperature and disease prime, $F(1, 334) = 0.70$, $p = .40$, $\eta_p^2 = .002$, remained non-significant.

For vulnerability, temperature, $F(1, 334) < .001$, $p = .99$, $\eta_p^2 < .001$, disease prime, $F(1, 334) = 0.011$, $p = .74$, $\eta_p^2 < .001$, and the interaction between temperature and disease prime, $F(1, 334) = 2.16$, $p = .14$, $\eta_p^2 = .006$, all remained non-significant.

When controlling for other climate variables there were no significant effects of temperature and no significant interactions of temperature and disease for PVD or the subscales of germ concern and vulnerability.

Disgust Sensitivity

For overall disgust sensitivity, there were no main effects of temperature, $F(1, 348) = 0.97$, $p = .32$, $\eta_p^2 = .003$, or disease prime, $F(1, 348) = 0.95$, $p = .33$, $\eta_p^2 = .003$, and no significant interaction between temperature and disease prime, $F(1, 348) = 0.93$, $p = .34$, $\eta_p^2 = .003$.

For pathogen disgust, there were no significant main effects of temperature, $F(1, 348) = 1.00$, $p = .32$, $\eta_p^2 = .003$, and no significant interaction between temperature and disease prime, $F(1, 348) = 0.19$, $p = .67$, $\eta_p^2 = .001$. There was a marginally significant main effect of disease prime on pathogen disgust, $F(1, 348) = 3.72$, $p = .06$, $\eta_p^2 = .011$ (See Table 11).

For sexual disgust, there was no significant main effects of temperature, $F(1, 348) = 1.94$, $p = .17$, $\eta_p^2 = .006$, or disease prime, $F(1, 348) = 0.42$, $p = .52$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(1, 348) = 2.14$, $p = .15$, $\eta_p^2 = .006$.

There were also no effects on moral disgust. For moral disgust, there were no significant effects of temperature, $F(1, 348) = 1.67$, $p = .20$, $\eta_p^2 = .005$, disease prime, $F(1, 348) = 0.04$, $p = .84$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(1, 348) = 0.46$, $p = .50$, $\eta_p^2 = .001$.

Since other climate related variables could be suppressing possible temperature effects, overall disgust sensitivity, pathogen disgust, sexual disgust, and moral disgust were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code as covariates since they were all significantly correlated with lab room temperature.

There were no significant changes from the initial analyses. For overall disgust, there were still no main effects of temperature, $F(1, 334) = 1.08$, $p = .30$, $\eta_p^2 = .003$, or disease prime, $F(1, 334) = 1.03$, $p = .31$, $\eta_p^2 = .003$, and no significant interaction between temperature and disease prime, $F(1, 334) = 0.86$, $p = .35$, $\eta_p^2 = .003$.

For pathogen disgust, there was still no main effect of temperature, $F(1, 334) = 1.10$, $p = .29$, $\eta_p^2 = .003$, or a significant interaction between temperature and disease prime, $F(1, 334) = 0.33$, $p = .57$, $\eta_p^2 = .001$. The main effect of disease prime on pathogen disgust remained marginally significant, $F(1, 334) = 3.22$, $p = .07$, $\eta_p^2 = .010$ (see Table 11).

For sexual disgust there was still no main effects for temperature, $F(1, 334) = 1.32$, $p = .25$, $\eta_p^2 = .004$, or disgust prime, $F(1, 334) = 0.52$, $p = .47$, $\eta_p^2 = .002$, and no significant interaction between temperature and disease prime, $F(1, 334) = 2.09$, $p = .15$, $\eta_p^2 = .006$.

For moral disgust there was a marginally significant main effects of temperature, $F(1, 334) = 3.14$, $p = .08$, $\eta_p^2 = .009$. There was not a main effect of disease, $F(1, 334) = 0.01$, $p = .93$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(1, 334) = 0.56$, $p = .46$, $\eta_p^2 = .002$.

Even when controlling temperature overlaps between conditions there are still no significant main effects of temperature and no interactions of temperature and disease for disgust sensitivity, pathogen disgust, sexual disgust, or moral disgust.

Big Five Personality Inventory (BFI)

Extroversion, Openness, and Agreeableness

For openness, there was no significant main effect of temperature, $F(1, 348) = 0.73$, $p = .39$, $\eta_p^2 = .002$, or disease prime, $F(1, 348) = 0.31$, $p = .58$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(1, 348) = 1.20$, $p = .27$, $\eta_p^2 = .003$. For extroversion, there were no main effects of temperature, $F(1, 348) = 1.64$, $p = .20$, $\eta_p^2 = .005$, or disease prime, $F(1, 348) = 2.93$, $p = .09$, $\eta_p^2 = .008$, and no significant interaction between temperature and disease prime, $F(1, 348) = 0.02$, $p = .89$, $\eta_p^2 < .001$.

For agreeableness there was a significant main effect of temperature, $F(1, 348) = 7.63$, $p = .006$, $\eta_p^2 = .021$ (See Table 11) but no main effect of disease prime, $F(1, 348) = 0.001$, $p = .98$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(1, 348) = 1.09$, $p = .30$, $\eta_p^2 = .003$.

Since other climate related variables could be suppressing possible temperature effects, openness, extroversion, agreeableness were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code as covariates since they were all significantly correlated with lab room temperature (see Table 3).

There was little change in the results for all three personality variables. For openness, there were still no main effects of temperature, $F(1, 334) = 0.40$, $p = .53$, $\eta_p^2 = .001$, or disease prime, $F(1, 334) = 0.07$, $p = .80$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(1, 334) = 1.50$, $p = .22$, $\eta_p^2 = .004$. For extroversion, there were no main effects of temperature, $F(1, 334) = 0.64$, $p = .42$, $\eta_p^2 = .002$, or disease prime, $F(1, 334) = 2.80$, $p = .10$, $\eta_p^2 = .008$, and no significant interaction between temperature and disease prime, $F(1, 334) = 0.07$, $p = .79$, $\eta_p^2 < .001$.

The main effect of temperature on agreeableness remained significant, $F(1, 334) = 4.91$, $p = .03$, $\eta_p^2 = .014$ (see Table 11). Effect of disease prime on agreeableness, $F(1, 334) = 0.03$, $p = .87$, $\eta_p^2 < .001$, and the interaction between temperature and disease prime remained non-significant, $F(1, 334) = 0.50$, $p = .48$, $\eta_p^2 = .002$.

Similar to the initial analyses there was a significant main effect of temperature but no main effects of disease and no interactions between disease prime conditions and temperature conditions.

Avoidance of disease vectors (gummy bug)s

Preference for a neutral food item (gummy animal candy) over a disgust eliciting food item (realistic gummy bug candy) was analyzed using logistic regression with disease prime condition (disease slideshow = 1, neutral slideshow = 0) and temperature condition (heated = 1, non-heated = 0) as categorical variables. Participants overall preferred the gummy bug over the gummy animal in all conditions except the no heat control condition. In the no heat control condition 48% of participants preferred the gummy bug, 54% preferred the gummy bug in the no heat disease condition, 55% preferred the gummy bug in the heated control condition, 55% preferred the gummy bug in the heated disease prime condition.

As seen in Table 12, the logistic regression was not significant for temperature, $b = 0.34$, $p = .28$, disease prime, $b = 0.41$, $p = .21$, or the interaction between temperature and disease prime, $b = -.40$, $p = .36$. When climate covariates (lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code) were included as covariates in the logistic regression the results remained non-significant for temperature, $b = 0.39$, $p = .26$, disease prime, $b = 0.42$, $p = .20$, or the interaction between temperature and disease prime, $b = -.46$, $p = .30$. Refer to Table 12 for full table of results.

In addition, before eating each gummy candy the participants were asked to rate how appetizing each candy appeared on a 7-point likert scale. A repeated measures analysis was used to test the difference between the candies in ratings of appetizing appearance. There was a significant main effect of disease prime, $F(1, 341) = 4.43$, $p = .04$, $\eta_p^2 = .013$ (see Table 14). There was no significant main effects of temperature, $F(1, 341) = 0.61$, $p = .44$, $\eta_p^2 = .002$, and no significant interaction between temperature and disease prime, $F(1, 341) = 1.31$, $p = .25$, $\eta_p^2 = .004$.

There is no evidence of an avoidance of the disgust eliciting food item based on the data from this study. One limitation is the observation that in all conditions the majority of participants (>50%) preferred the gummy bug over the gummy animal indicates the disgusting food item may not have had a strong enough disgust eliciting effect to be detected in this study or alternatively the neutral gummy animal, although chosen to be as neutral as possible in appearance, taste and texture, may have had unappealing characteristics that were unaccounted for in this study that led participants to prefer the gummy bug.

Additional Variables

In addition to the variables related directly to the hypotheses discussed, additional variables were also measured.

Conscientiousness and Neuroticism

The big five inventory (See Appendix D) includes 5 personality variables: extroversion, openness, agreeableness, conscientiousness, and neuroticism. Though there were not discrete hypotheses were made about how heat or disease would affect these two personality factors, conscientiousness and neuroticism were analyzed for exploratory purposes using the same two-way ANOVA with disease prime and temperature as categorical independent variables.

As shown in Table 11, for neuroticism, there are no significant main effects of temperature, $F(1, 348) = 3.16, p = .08, \eta_p^2 = .009$, or disease prime, $F(1, 348) = 1.98, p = .16, \eta_p^2 = .006$, and no significant interaction between temperature and disease prime, $F(1, 348) = 1.83, p = .18, \eta_p^2 = .005$. These remained non-significant when accounting for other climate variables correlated with lab room temperature (lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code). There were still no main effects for temperature, $F(1, 334) = 0.74, p = .39, \eta_p^2 = .002$, disease prime, $F(1, 334) = 1.76$, $p = .19$, $\eta_p^2 = .005$, and no significant interaction between temperature and disease prime, $F(1, 334) = 1.71$, $p = .19$, $\eta_p^2 = .005$.

There were also no significant effects of heat or disease on conscientiousness. There were no significant main effects of temperature, $F(1, 348) = 0.28$, $p = 0.60$, $\eta_p^2 = .001$, or disease prime, $F(1, 348) = 0.16$, $p = .69$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(1, 348) = 0.06$, $p = .80$, $\eta_p^2 < .001$. These remained significant when accounting for the climate variables that were correlated with lab room temperature. There were still no significant main effects of temperature, $F(1, 334) = 0.99$, $p = .32$, $\eta_p^2 = .003$, and disease prime, $F(1, 334) = 0.15$, $p = .70$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(1, 334) = 0.002$, $p = .97$, $\eta_p^2 < .001$.

Taste characteristics

In addition to asking the participants to report which gummy candy they preferred, participants were asked to rate both candies on several taste, texture, and appearance characteristics, (See appendix C). For means and STANDAR DEVIATIONS see Table 13; for full results see Table 14.

Appearance

There was no significant difference in the rating of pleasing appearance based on temperature, $F(1, 341) = 0.002$, $p = .96$, $\eta_p^2 < .001$, or disease prime, $F(1, 341) = 1.25$, $p = .26$, $\eta_p^2 = .004$, and no significant differences based on an interaction between temperature and disease prime, $F(1, 341) = 0.26$, $p = .61$, $\eta_p^2 = .001$. These remained non-significant when accounting for climate variables correlated with lab room temperature. There were no significant differences based on temperature conditions, $F(1, 328) = 0.33$, $p = .57$, $\eta_p^2 = .001$, or disease prime conditions, $F(1, 328) = 0.86$, $p = .35$,

η_p^2 = .003, and no significant difference based on an interaction between temperature and disease, $F(1, 328) = 0.19$, $p = .66$, η_p^2 = .001.

There was a significant difference in the ratings of how much the participants looked forward to eating each candy based on disease prime condition, $F(1, 354) = 6.48$, $p = .01$, η_p^2 = .019. There was no significant difference based on temperature condition, $F(1, 341) = 0.005$, $p = .95$, $\eta_p^2 < .001$, and no significant differences based on an interaction between temperature and disease prime, $F(1, 341) = 0.35$, $p = .56$, η_p^2 = .001. These results remained similar when accounting for climate variables correlated with lab room temperature. There was still a significant differences based on disease prime condition, $F(1, 354) = 6.06$, $p = .01$, η_p^2 = .018, and still no significant difference based on temperature condition, $F(1, 341) = 0.93$, $p = .34$, η_p^2 = .003, and no significant difference based on an interaction between temperature and disease, $F(1, 341) = 0.40$, $p = .53$, η_p^2 = .001.

Taste and texture characteristics

Participants were asked to rate how (1) sweet (2) bitter (3) slimy (4) chewy (5) dry and (6) sour each candy tasted (see Table 13 for means and Standar deviations). Each item was analyzed using a repeated measures ANOVA with temperature and disease and independent variables (see Table 14).

For sweetness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 341) = 0.24$, $p = .62$, η_p^2 = .001, or disease prime condition, $F(1, 341) = 0.22$, $p = .64$, η_p^2 = .001, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 341) = 3.11$, $p = .08$, η_p^2 = .009. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition,

$F(1, 328) = 0.36$, $p = .55$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 328) = 0.30$, $p = .59$, $\eta_p^2 = .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 328) = 2.44$, $p = .12$, $\eta_p^2 = .007$.

For bitterness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 341) = 0.40$, $p = .53$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 341) = 0.45$, $p = .50$, $\eta_p^2 = .001$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 341) = 0.97$, $p = .33$, $\eta_p^2 = .003$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 328) < .001$, $p = .98$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 328) = 0.56$, $p = .46$, $\eta_p^2 = .002$, and no significant difference based on an interaction between temperature and disease, $F(1, 328) = 1.21$, $p = .27$, $\eta_p^2 = .004$.

For sliminess, there was a significant difference in ratings of each candy based on temperature condition, $F(1, 341) = 6.18$, $p = .03$, $\eta_p^2 = .018$, and a significant difference based on disease prime condition, $F(1, 341) = 4.69$, $p = .03$, $\eta_p^2 = .014$. There was no significant differences based on an interaction between temperature condition and disease prime, $F(1, 341) = 0.26$, $p = .61$, $\eta_p^2 = .001$. When controlling for climate variables correlated with temperature there remained significant differences in ratings of sweetness of the gummy bug and gummy animal based on temperature condition, $F(1, 328) = 3.92$, $p = .05$, $\eta_p^2 = .012$, and disease prime condition, $F(1, 328) = 4.59$, $p = .03$, $\eta_p^2 = .014$. There was no significant difference based on an interaction between temperature and disease, $F(1, 328) = 0.14$, $p = .71$, $\eta_p^2 < .001$.

For chewiness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 341) = 0.19$, $p = 0.69$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 341) = 1.06$, $p = .31$, $\eta_p^2 = .003$. There were significant differences based on an interaction between temperature condition and disease prime, $F(1, 341) = 5.24$, $p = .02$, $\eta_p^2 = .015$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 328) = 1.58$, $p = .21$, $\eta_p^2 = .005$, or disease prime condition, $F(1, 328) = 1.17$, $p = .28$, $\eta_p^2 = .004$, and there was still a significant difference based on an interaction between temperature and disease, $F(1, 328) = 5.65$, $p = .02$, $\eta_p^2 = .017$.

For dryness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 341) = 0.01$, $p = .94$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 341) = 0.67$, $p = .41$, $\eta_p^2 = .002$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 341) = 0.001$, $p = .97$, $\eta_p^2 < .001$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 328) = 0.04$, $p = .85$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 328) = 0.82$, $p = .38$, $\eta_p^2 = .002$, and no significant difference based on an interaction between temperature and disease, $F(1, 328) = 0.02$, $p = .88$, $\eta_p^2 < .001$.

For sourness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 341) = 0.22$, $p = .64$, $\eta_p^2 = .001$. There was a marginal main effect of disease prime condition, $F(1, 341) = 3.61$, $p = .06$, $\eta_p^2 = .007$. There were no significant differences based on an interaction between temperature condition and disease prime, $F(1, 341) = 2.77$, $p = .10$, $\eta_p^2 = .008$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 328) = 0.05$, $p = .82$, $\eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 328) = 2.19$, $p = .14$, $\eta_p^2 = .007$. There was a significant main effect of disease prime condition, $F(1, 328) = 3.73$, $p = .05$, $\eta_p^2 = .009$.

Overall assessment

Participants were asked two items to give an overall assessment of each candy. They were asked to rate their overall enjoyment of the candy and "how likely would you be to purchase the candy?"

There were no significant differences in enjoyment of each candy based on temperature, $F(1, 341) = 0.42$, $p = .52$, $\eta_p^2 = .001$, or disease prime, $F(1, 341) = 0.08$, $p = .77$, $\eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease prime, $F(1, 341) = 0.004$, $p = .95$, $\eta_p^2 < .001$. Even when controlling for climate variables correlated with temperature there were no still significant differences in ratings of enjoyment of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 328) = 0.44$, $p = .51$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 328) = 0.13$, $p = .72$, $\eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 328) = 0.06$, $p = .80$, $\eta_p^2 < .001$.

There were no significant differences in likelihood to purchase of each candy based on temperature, $F(1, 341) = 0.92$, $p = .34$, $\eta_p^2 = .003$, or disease prime, $F(1, 341) = 0.20$, $p = .66$, $\eta_p^2 = .001$, and no significant difference based on an interaction between temperature and disease prime, $F(1, 341) < 0.001$, $p = .98$, $\eta_p^2 < .001$. Even when controlling for climate variables correlated with temperature there were no still significant differences in ratings of enjoyment of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 328) = 0.13$, p

$= .72$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 328) = 0.29$, $p = .59$, $\eta_p^2 = .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 328) = 0.02$, $p = .89$, $\eta_p^2 < .001$.

APPENDIX G

DATA RESULTS WITH SELF-REPORTED SUBJECTIVE FEEL FILTER

When including the subjective feel filter, 84 of the 365 participants were excluded from the analyses (non-heated control condition $n = 37$; non-heated disease condition $n = 43$; heated control condition $n = 97$; heated disease condition $n = 104$). The subjective feel cut-off was chosen because this would be a good indicator that the temperature was having an effect in the heated conditions and was not having an effect in the non-heated conditions (for means and standard deviations see Tables 15 & 18).

Perceived vulnerability to disease

For overall PVD, there were no significant effects of temperature, $F(1, 277) = 0.10, p = .75, \eta_p^2 < .001$, no significant effects of disease, $F(1, 277) = 2.24, p = .14, \eta_p^2 = .008$, and no significant interactions between temperature and disease prime, $F(1, 277) = 0.10, p = .75, \eta_p^2 < .001$.

For germ concern, there was a significant effect of disease prime, $F(1, 277) = 3.97, p = .05, \eta_p^2 = .014$ (See Table 16). There were no significant effects of temperature, $F(1, 277) = 0.08, p = .78, \eta_p^2 < .001$, or a significant interaction between temperature and disease prime, $F(1, 277) = 0.02, p = .89, \eta_p^2 < .001$.

For vulnerability, there were no significant main effects of temperature, $F(1, 277) = 0.67, p = .42, \eta_p^2 = .002$, disease prime, $F(1, 277) = 0.15, p = .70, \eta_p^2 = .001$, or a significant interaction between temperature and disease prime, $F(1, 277) = 0.45, p = .50, \eta_p^2 = .002$.

The significant main effect of disease prime on germ concern and lack of effects for the other PVD variables is similar to the results seen when analyzing the data using all 365 participants.

Because other climate related variables could be suppressing possible temperature effects, PVD, germ concern, and vulnerability were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code (i.e. the amount of clothing the participant was wearing coded for heaviness) were included as covariates since they were all significantly correlated with lab room temperature.

When incorporating the climate covariates, for overall PVD there were still no significant effects of temperature, $F(1, 262) = 0.16.$, $p = .69$, $\eta_p^2 = .001$. Disease prime was marginally significant, $F(1, 262) = 2.86$, $p = .09$, $\eta_p^2 = .005$ (See table 11). There was no significant interaction between disease prime and temperature, $F(1, 262) = 0.26$, $p = .61$, $\eta_p^2 = .001$.

For germ concern disease prime remained significant, $F(1, 262) = 4.66$, $p = .03$, $\eta_p^2 = .017$ (see Table 11). Temperature, $F(1, 262) = 0.05$, $p = .82$, $\eta_p^2 < .001$, and the interaction between temperature and disease prime, $F(1, 262) = 0.01$, $p = .91$, $\eta_p^2 < .001$, remained non-significant.

For vulnerability, temperature, $F(1, 262) = 0.79$, $p = .37$, $\eta_p^2 = .003$, disease prime, $F(1, 262) = 0.45$, $p = .58$, $\eta_p^2 = .001$, and the interaction between temperature and disease prime, $F(1, 262) = 0.89$, $p = .35$, $\eta_p^2 = .003$, all remained non-significant.

Similar to original analyses, when controlling for other climate variables there were no significant effects of temperature and no significant interactions of temperature and disease for PVD or the subscales of germ concern and vulnerability.

Disgust Sensitivity

For overall disgust sensitivity, there were no main effects of temperature, $F(1, 348) = 0.002$, $p = .96$, $\eta_p^2 < .001$, or disease prime, $F(1, 277) = 0.06$, $p = .43$, $\eta_p^2 = .002$, and no significant interaction between temperature and disease prime, $F(1, 277) = 0.53$, $p = .47$, $\eta_p^2 = .002$.

For pathogen disgust, there was a marginal significant main effect of temperature, $F(1, 277) = 3.15$, $p = .08$, $\eta_p^2 = .011$ (See table 16). There was no significant main effect of disease on pathogen disgust, $F(1, 277) = 2.23$, $p = .14$, $\eta_p^2 = .008$. There was no significant interaction between temperature and disease, $F(1, 277) = 0.39$, $p = .53$, $\eta_p^2 = .001$.

For sexual disgust, there was no significant main effect of temperature, $F(1, 277) = 0.33$ $p = .57$, $\eta_p^2 = .001$, or disease prime, $F(1, 277) = 0.57$, $p = .45$, $\eta_p^2 = .002$, and no significant interaction between temperature and disease prime, $F(1, 277) = 1.12$, $p = .28$, $\eta_p^2 = .004$.

There were also no effects of temperature or disease on moral disgust. For moral disgust, there were no significant effects of temperature, $F(1, 277) = 0.33$, $p = .56$, $\eta_p^2 = .001$, disease prime, $F(1, 277) = 0.14$, $p = .70$, $\eta_p^2 = .001$, or a significant interaction between temperature and disease prime, $F(1, 277) = 0.59$, $p = .44$, $\eta_p^2 = .002$.

Since other climate related variables could be suppressing possible temperature effects, overall disgust sensitivity, pathogen disgust, sexual disgust, and moral disgust were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code as covariates since they were all significantly correlated with lab room temperature.

There were no significant changes from the initial analyses. For overall disgust, there were still no main effects of temperature, $F(1, 262) = 0.34$, $p = .56$, $\eta_p^2 = .001$, or disease prime, $F(1, 262) = 0.44$, $p = .51$, $\eta_p^2 = .002$, and no significant interaction between temperature and disease prime, $F(1, 262) = 1.11$, $p = .29$, $\eta_p^2 = .004$.

For pathogen disgust, when covarying climate variables there was not a significant main effect of temperature, $F(1, 262) = 1.30$, $p = .26$, $\eta_p^2 = .005$, or a disease prime, $F(1, 262) = 2.55$, $p = .11$, $\eta_p^2 = .010$, and no significant interaction between temperature and disease prime, $F(1, 262) = 0.41$, $p = .52$, $\eta_p^2 = .002$.

For sexual disgust there was still no main effects for temperature, $F(1, 262) = 1.02$, $p = .31$, $\eta_p^2 = .004$, or disgust prime, $F(1, 262) = 0.38$, $p = .54$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(1, 262) = 1.77$, $p = .19$, $\eta_p^2 = .007$.

For moral disgust there were no significant main effects of temperature, $F(1, 262) = 1.30$, $p = .26$, $\eta_p^2 = .005$, or disease, $F(1, 334) = 0.30$, $p = .59$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(1, 262) = 1.34$, $p = .25$, $\eta_p^2 = .005$.

Even when controlling temperature overlaps between conditions there are still no significant interactions of temperature and disease for disgust sensitivity, pathogen disgust, sexual disgust, or moral disgust.

Big Five Personality Inventory (BFI)

Extroversion, Openness, and Agreeableness

For openness, there was no significant main effect of temperature, $F(1, 277) = 0.41$, $p = .53$, $\eta_p^2 = .001$, or disease prime, $F(1, 277) = 0.15$, $p = .70$, $\eta_p^2 = .001$, and no significant interaction between temperature and disease prime, $F(1, 277) = 0.37$, $p = .54$, $\eta_p^2 = .001$. For extroversion, there were no main effects of temperature, $F(1, 277) = 1.20$, $p = .27$, $\eta_p^2 = .004$, or disease prime, $F(1, 277) = 1.32$, $p = .25$, $\eta_p^2 = .005$, and no significant interaction between temperature and disease prime, $F(1, 277) = 0.06$, $p = .81$, $\eta_p^2 < .001$.

For agreeableness there was no longer a significant main effect of temperature, $F(1, 277) = 1.98$, $p = .16$, $\eta_p^2 = .007$ (See Table 16), and still no main effect of disease prime, $F(1, 277) = 0.004$, $p = .95$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(1, 277) = 0.48$, $p = .49$, $\eta_p^2 = .002$.

Since other climate related variables could be suppressing possible temperature effects, openness, extroversion, agreeableness were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code as covariates since they were all significantly correlated with lab room temperature.

There was little change in the results for all three personality variables. For openness, there were still no main effects of temperature, $F(1, 262) = 0.24$, $p = .62$, $\eta_p^2 = .001$, or disease prime, $F(1, 262) = 0.02$, $p = .88$, $\eta_p^2 < .001$, and no significant interaction between temperature and disease prime, $F(1, 262) = 0.58$, $p = .45$, $\eta_p^2 = .004$. For extroversion, there were no main effects of temperature, $F(1, 262) = 0.70$, $p = .40$, $\eta_p^2 = .003$, or disease prime, $F(1, 262) = 0.71$, $p = .40$, $\eta_p^2 = .003$, and no significant interaction between temperature and disease prime, $F(1, 262) = 0.15$, $p = .70$, $\eta_p^2 = .001$. The main effect of temperature on agreeableness remained non-significant, $F(1, 262) = 0.65$, $p = .42$, $\eta_p^2 = .002$ (See Table 16). The effect of disease prime on agreeableness, $F(1, 262) = 1.29$, $p = .26$, $\eta_p^2 = .005$, and the interaction between temperature and disease prime remained non-significant, $F(1, 262) = 0.41$, $p = .53$, $\eta_p^2 = .002$.

There were no significant main effects of temperature condition or disease prime and no significant interactions of temperature and disease prime. The hypothesis that disease prime affects personality factors related to social interactions, like openness, extroversion, and agreeableness, was still not supported when filtering by subjective temperature of the lab room.

Taste preferences

As seen in Table 17, the logistic regression was not significant for temperature , $b = 0.39$, $p = .33$, disease prime, $b = 0.24$, $p = .60$, or the interaction between temperature and disease prime, $b = - 0.25$, $p = .65$. When climate covariates (lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code) were included as covariates in the logistic regression the results remained non-significant for temperature, $b = 0.36$, $p = .39$, disease prime, $b = 0.29$, $p = .54$, or the interaction between temperature and disease prime, $b = -0.30$, $p = .59$. Refer to Table 17 for a complete table of results.

In addition, before eating each gummy candy the participants were asked to rate how appetizing each candy appeared on a 7-point likert scale. A repeated measures analysis was used to test the difference between the candies in ratings of appetizing appearance. There was a marginally significant main effect of disease prime, $F(1, 271) = 3.11$, $p = .08$, $\eta_p^2 = .011$ (See Table 19). There was no significant main effects of temperature, $F(1, 271) = 0.72$, $p = .40$, $\eta_p^2 = .003$, and no significant interaction between temperature and disease prime, $F(1, 271) = 0.17$, $p = .68$, $\eta_p^2 = .001$.

There is still no evidence of an avoidance of the disgust eliciting food item based on the data from these additional analyses.

Additional Variables

In addition to the variables related directly to the hypotheses discussed, additional variables were also measured.

Conscientiousness and Neuroticism

For neuroticism, there are no significant main effects of temperature, $F(1, 277) = 3.06$, $p = .81$, $\eta_p^2 < .001$, or disease prime, $F(1, 277) = 1.74$, $p = .19$, $\eta_p^2 = .006$, and no significant interaction between temperature and disease prime, $F(1, 277) = 1.81$, $p = .37$, $\eta_p^2 = .003$. These remained non-significant when accounting for other climate variables correlated with lab room temperature (lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code). There were still no main effects for temperature, $F(1, 262) = 1.80$, $p = .30$, $\eta_p^2 = .004$, disease prime, $F(1, 262) =$

0.001, p = .98, η_p^2 < .001, and no significant interaction between temperature and disease prime, $F(1, 262) = 0.005$, p = .95, η_p^2 < .001.

There were also no significant effects of temperature or disease on conscientiousness. There were no significant main effects of temperature, $F(1, 277)$ = 0.14, p = .71, η_p^2 = .001, or disease prime, $F(1, 277) = 0.53$, p = .47, η_p^2 = .002, and no significant interaction between temperature and disease prime, $F(1, 277) = 0.31$, p = .58, η_p^2 = .001. These remained non-significant when accounting for the climate variables that were correlated with lab room temperature. There were still no significant main effects of temperature, $F(1, 262) = 0.62$, p = .43, η_p^2 = .002, and disease prime, $F(1, 262) = 1.54$, p = .26, η_p^2 = .006, and no significant interaction between temperature and disease prime, $F(1, 262) = 1.44$, p = .23, η_p^2 = .005.

Taste characteristics

In addition to asking the participants to report which gummy candy they preferred, participants were asked to rate both candies on several taste, texture, and appearance characteristics, (See appendix C). For means and STANDAR DEVIATIONS see Table 13; for full results see Table 14.

Appearance

There was no significant difference in the rating of pleasing appearance based on temperature, $F(1, 271) = 0.13$, p = .72, η_p^2 < .001, or disease prime, $F(1, 271) = 0.22$, p = .64, η_p^2 = .001, and no significant differences based on an interaction between temperature and disease prime, $F(1, 271) = 0.15$, p = .70, η_p^2 = .001. These remained non-significant when accounting for climate variables correlated with lab room temperature. There were no significant differences based on temperature conditions, $F(1, 257) = 0.35$, p = .56, η_p^2 = .001, or disease prime conditions, $F(1, 257) = 0.04$, p = .84,

$\eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 257) = 0.004$, $p = .95$, $\eta_p^2 < .001$.

There was no longer a significant difference in the ratings of how much the participants looked forward to eating each candy based on disease prime condition, $F(1, 271) = 2.39$, $p = .12$, $\eta_p^2 = .009$. There was still no significant difference based on temperature condition, $F(1, 271) = 0.03$, $p = .87$, $\eta_p^2 < .001$, and no significant differences based on an interaction between temperature and disease prime, $F(1, 271) = 0.13$, $p = .72$, $\eta_p^2 < .001$. These results remained similar when accounting for climate variables correlated with lab room temperature. There was still no significant differences based on disease prime condition, $F(1, 257) = 2.41$, $p = .12$, $\eta_p^2 = .009$, and still no significant difference based on temperature condition, $F(1, 257) = 0.94$, $p = .33$, $\eta_p^2 = .004$, and no significant difference based on an interaction between temperature and disease, $F(1, 257) = 0.08$, $p = .77$, $\eta_p^2 < .001$.

Taste and texture characteristics

Participants were asked to rate how (1) sweet (2) bitter (3) slimy (4) chewy (5) dry and (6) sour each candy tasted (see Table 18 for means and standard deviations). Each item was analyzed using a repeated-measures ANOVA with temperature and disease and independent variables (see Table 19).

For sweetness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 271) = 0.08$, $p = .77$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 271) = 0.23$, $p = .63$, $\eta_p^2 = .001$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 271) = 1.54$, $p = .22$, $\eta_p^2 = .006$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition,

$F(1, 257) = 0.11$, $p = .74$, $\eta_p^2 < .001$, or disease prime condition, $F(1, 257) = 0.57$, $p = .45$, $\eta_p^2 = .002$, and no significant difference based on an interaction between temperature and disease, $F(1, 257) = 0.71$, $p = .40$, $\eta_p^2 = .003$.

For bitterness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 271) = 0.24$, $p = .62$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 271) = 0.23$, $p = .63$, $\eta_p^2 = .001$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 271) = 0.001$, $p = .95$, $\eta_p^2 < .001$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 257) = 0.37$, $p = .54$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 257) < .001$, $p = .99$, $\eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 257) = 0.19$, $p = .67$, $\eta_p^2 = .001$.

For sliminess, there was still a significant difference in ratings of each candy based on temperature condition, $F(1, 271) = 6.68$, $p = .01$, $\eta_p^2 = .024$. There was no longer a significant difference based on disease prime condition, $F(1, 271) = 1.51$, $p = .22$, $\eta_p^2 = .006$. There was no significant differences based on an interaction between temperature condition and disease prime, $F(1, 271) = 1.71$, $p = .19$, $\eta_p^2 = .006$. When controlling for climate variables correlated with temperature there remained significant differences in ratings of sweetness of the gummy bug and gummy animal based on temperature condition, $F(1, 257) = 4.28$, $p = .04$, $\eta_p^2 = .016$, and disease prime condition, $F(1, 257) = 1.16$, $p = .28$, $\eta_p^2 = .004$. There was no significant difference based on an interaction between temperature and disease, $F(1, 257) = 1.24$, $p = .27$, $\eta_p^2 = .005$.

For chewiness, there were no significant differences based on temperature condition, $F(1, 257) = 1.44$, $p = .23$, $\eta_p^2 = .005$, or disease prime condition, $F(1, 257) =$

0.20, p = .65, η_p^2 = .001, and a marginally significant difference based on an interaction between temperature and disease, $F(1, 257) = 3.59$, p = .06, η_p^2 = .013. When controlling for climate variables correlated with lab temperature there was a marginally significant differences in ratings of each candy based on temperature condition, $F(1, 271)$ = 3.70, p = .06, η_p^2 = .014, or disease prime condition, $F(1, 271) = 0.24$, p = .63, η_p^2 = .001. There was a marginally significant differences based on an interaction between temperature condition and disease prime, $F(1, 271) = 3.03$, p = .08, η_p^2 = .012.

For dryness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 271) = 0.26$, p = .61, η_p^2 = .001, or disease prime condition, $F(1, 271) = 0.07$, p = .90, $\eta_p^2 < .001$, and no significant differences based on an interaction between temperature condition and disease prime, $F(1, 271) = 0.58$, p = .45, η_p^2 = .002. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 257) = 0.27$, p = .60, η_p^2 = .001, or disease prime condition, $F(1, 257) = 0.002$, p = .96, $\eta_p^2 < .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 257) = 0.54$, p = .46, η_p^2 = .002.

For sourness, there were no significant differences in ratings of each candy based on temperature condition, $F(1, 271) = 0.54$, p = .50, η_p^2 = .002. There was a significant main effect of disease prime condition, $F(1, 271) = 4.07$, p = .05, η_p^2 = .015, and there was a significant difference based on an interaction between temperature condition and disease prime, $F(1, 271) = 4.75$, p = .03, η_p^2 = .017. When controlling for climate variables correlated with temperature, there were no significant differences based on temperature condition, $F(1, 257) = 0.31$, p = .58, η_p^2 = .001, and no main effect of disease prime condition, $F(1, 257) = 0.75$, $p = .39$, $\eta_p^2 = .003$, and no significant difference based on an interaction between temperature and disease, $F(1, 257) = 0.08$, $p = .78$, $\eta_p^2 < .001$.

Overall assessment

Participants were asked two items to give an overall assessment of each candy. They were asked to rate their overall enjoyment of the candy and "how likely would you be to purchase the candy?"

There were no significant differences in enjoyment of each candy based on temperature, $F(1, 271) = 0.09$, $p = .77$, $\eta_p^2 < .001$, or disease prime, $F(1, 271) = 0.35$, $p = .56$, $\eta_p^2 = .001$, and no significant difference based on an interaction between temperature and disease prime, $F(1, 271) = 0.71$, $p = .40$, $\eta_p^2 = .003$. Even when controlling for climate variables correlated with temperature there were no still significant differences in ratings of enjoyment of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 257) = 0.51$, $p = .48$, $\eta_p^2 = .002$, or disease prime condition, $F(1, 257) = 0.14$, $p = .71$, $\eta_p^2 = .001$, and no significant difference based on an interaction between temperature and disease, $F(1, 257) = 0.12$, $p = .72$, $\eta_p^2 < .001$.

There were no significant differences in likelihood to purchase of each candy based on temperature, $F(1, 271) = 1.11$, $p = .29$, $\eta_p^2 = .004$, or disease prime, $F(1, 271) = 1.07$, $p = .30$, $\eta_p^2 = .004$, and no significant difference based on an interaction between temperature and disease prime, $F(1, 271) = 0.56$, $p = .45$, $\eta_p^2 = .002$. Even when controlling for climate variables correlated with temperature there were no still significant differences in ratings of enjoyment of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $F(1, 257) = 0.31$, $p = .58$, $\eta_p^2 = .001$, or disease prime condition, $F(1, 257) = 0.75$, $p = .39$, $\eta_p^2 = .003$, and no significant difference based on an interaction between temperature and disease, $F(1, 257) = 0.08$, $p = .78$, $\eta_p^2 < .001$.

APPENDIX H

DATA RESULTS OF LAB ROOM TEMPERATURE REGRESSION ANALYSES

There was little difference between the initial analysis and the regression with lab temperature as a categorical variable. A regression was used because it addresses the issue of the large range of temperatures in both temperature conditions.

Perceived vulnerability to disease

For overall PVD, there were no significant effects of temperature, $b = 0.01$, $p = .66$, no significant effects of disease, $b = 0.14$, $p = .15$, and no significant interactions, $b = 0.008$, $p = .73$, $\eta_p^2 < .001$. As seen in Table 20, for germ concern, there was a significant effect of disease prime, $b = -.01$, $p = .66$. There was also a marginally significant effect of temperature on germ concern, $b = 0.22$, $p = .06$, and a marginally significant interaction between temperature and disease on germ concern, $b = 0.04$, $p = .08$. For vulnerability, there were no significant effects of temperature, $b = 0.03$, $p = .24$, disease prime, $b = 0.06$, $p = .66$, or a significant interaction between temperature and disease prime, $b = -.02$, $p = .44$.

Since other climate related variables could be suppressing possible temperature effects, PVD, germ concern, and vulnerability were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code (i.e., the amount of clothing the participant was wearing coded for heaviness) were included as covariates since they were all significantly correlated with lab room temperature.

As seen in Table 21, when incorporating the climate covariates, for overall PVD there were still no significant effects of temperature, $b = 0.001$, $p = .98$, disease prime , $b = 0.15$, $p = .13$, or a significant interaction between temperature and disease prime, $b = 0.003$, $p = .89$. For germ concern, disease prime became only marginally significant, $b =$

0.22, $p = .07$. Main effect of temperature, $b = - .02$, $p = .29$, and the interaction between temperature and disease prime, $b = 0.03$, $p = .23$, remained non-significant. For vulnerability, temperature, $b = 0.03$, $p = .26$, disease prime, $b = 0.080$, $p = .54$, and the interaction between temperature and disease prime, $b = - .03$, $p = .33$, all remained non-significant.

Similar to original analyses, when controlling for other climate variables there were no significant effects of temperature and no significant interactions of temperature and disease for PVD or the subscales of germ concern and vulnerability. There was a marginally significant effect of temperature on germ concern indicating that perhaps with more power a main effect of temperature and an interaction would be observed. This is not consistent with the previous analyses.

Disgust Sensitivity

For overall disgust sensitivity, there were no main effects of temperature, $b = -.002$, $p = .91$, or disease prime, $b = 0.08$, $p = .35$, and no significant interaction between temperature and disease prime, $b = 0.03$, $p = .13$. For pathogen disgust, there were no significant main effects of temperature, $b = - .10$, $p = .55$, and no significant interaction between temperature and disease prime, $b = 0.01$, $p = .64$. There was a marginally significant main effect of disease on pathogen disgust, $b = 0.16$, $p = .10$. For sexual disgust, there was no significant main effects of temperature, $b = 0.004$, $p = .88$, or disease prime, $b = 0.11$, $p = .46$, and no significant interaction between temperature and disease prime, $b = 0.06$, $p = .12$. There were also no effects on moral disgust. For moral disgust, there were no significant effects of temperature, $b = 0.001$, $p = .96$, disease prime, $b = - 0.02$, $p = .84$, or a significant interaction between temperature and disease prime, $b = 0.03$, $p = .30$.

Since other climate related variables could be suppressing possible temperature effects, overall disgust sensitivity, pathogen disgust, sexual disgust, and moral disgust were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code as covariates since they were all significantly correlated with lab room temperature.

There were no significant changes from the initial analyses. For overall disgust, there were still no main effects of temperature, $b = -0.002$, $p = .93$, or disease prime, $b = 0.10$, $p = .29$, and no significant interaction between temperature and disease prime, $b = 0.03$, $p = .16$. For pathogen disgust, there was still no main effect of temperature, $b = -.01$, $p = .45$, or a significant interaction between temperature and disease prime, $b = 0.01$, $p = .84$. The main effect of disease prime on pathogen disgust remained marginally significant, $b = 0.18$, $p = .08$. For sexual disgust there was still no main effects for temperature, $b = 0.002$, $p = .93$, or disgust prime, $b = 0.13$, $p = .41$, and no significant interaction between temperature and disease prime, $b = 0.05$, $p = .14$. For moral disgust there was no significant main effects of temperature, $b = 0.01$, $p = .77$, and no main effect of disease, $b = -.010$, $p = .93$, and no significant interaction between temperature and disease prime, $b = 0.03$, $p = .26$.

Big Five Personality Inventory (BFI)

Extroversion, Openness, and Agreeableness

For openness, there was no significant main effect of temperature, $b = 0.009$, $p = .33$, or disease prime, $b = 0.04$, $p = .51$, and no significant interaction between temperature and disease prime, $b = -.012$, $p = .37$. For extroversion, there were no main effects of temperature, $b = 0.004$, $p = .73$. There was a marginally significant main effect of disease prime, $b = -0.123$, $p = .09$. There was no significant interaction between temperature and disease prime, $b = 0.01$, $p = .58$.

For agreeableness there was no significant main effect of temperature, $b = 0.008$, $p = .35$, and no main effect of disease prime, $b < .001$, $p = .99$, and no significant interaction between temperature and disease prime, $b = 0.01$, $p = .25$.

Since other climate related variables could be suppressing possible temperature effects, openness, extroversion, agreeableness were analyzed incorporating lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code as covariates since they were all significantly correlated with lab room temperature.

There was little change in the results for all three personality variables. For openness, there were still no main effects of temperature, $b = 0.01$, $p = .48$, or disease prime, $b = 0.01$, $p = .92$, and no significant interaction between temperature and disease prime, $b = -0.01$, $p = .37$. For extroversion, there was a marginal main effect of temperature, $b = 0.003$, $p = .83$, or disease prime, $b = -0.14$, $p = .06$, and no significant interaction between temperature and disease prime, $b = 0.01$, $p = .55$. The main effect of temperature on agreeableness remained non-significant, $b = 0.01$, $p = .37$, and no effect of disease prime, $b = -0.02$, $p = .69$, and the interaction between temperature and disease prime remained non-significant, $b = 0.01$, $p = .36$.

Avoidance of disease vectors (gummy bug)

As seen in Table 22, the logistic regression was not significant for lab room temperature, $b = 0.34$, $p = .28$, disease prime, $b = 0.41$, $p = .21$, or the interaction between temperature and disease prime, $b = -0.40$, $p = .36$. When climate covariates (lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code) were included as covariates in the logistic regression the results remained non-significant for temperature, $b = 0.39$, $p = .26$, disease prime, $b = 0.42$, $p = .20$, or the interaction between temperature and disease prime, $b = -0.46$, $p = .30$. Refer to Table 23 & 24 for complete table of results.

In addition, before eating each gummy candy the participants were asked to rate how appetizing each candy appeared on a 7-point likert scale. A difference score was calculating by subtracting the score of the gummy animal by the score of the gummy bug. Linear regression of this difference score was used to analyze the significance of the difference between the candies in ratings of appetizing appearance. There was a marginally significant main effect of disease prime, $b = -0.32$, $p = .08$ (See Table 23). There was no significant main effect of temperature, $b = 0.03$, $p = .39$, and no significant interaction between temperature and disease prime, $b = -0.06$, $p = .15$.

There is no evidence that temperature affects the avoidance of the disgust eliciting food item based on the data from this additional analysis. There is slight evidence that participants in the disgust conditions found the gummy bug less appetizing than the gummy animal.

Additional Variables

In addition to the variables related directly to the hypotheses discussed, additional variables were also measured.

Conscientiousness and Neuroticism

There was a significant main effect of temperature, $b = -0.02$, $p = .05$, on neuroticism. There was no significant effect of disease prime, $b = 0.10$, $p = .16$, and no significant interaction between temperature and disease prime, $b = 0.03$, $p = .13$. These remained non-significant when accounting for other climate variables correlated with lab room temperature (lab room humidity, waiting room temperature, outside temperature, outside humidity, and clothing code). There were no main effects for temperature, $b = -.02$, $p = .19$, disease prime, $b = 0.11$, $p = .13$, and no significant interaction between temperature and disease prime, $b = 0.03$, $p = .14$.

There were also no significant effects of temperature or disease on conscientiousness. There were no significant main effects of temperature, $b = 0.003$, $p = .78$, or disease prime, $b = -0.03$, $p = .63$, and no significant interaction between temperature and disease prime, $b = 0.003$, $p = .85$. These remained significant when accounting for the climate variables that were correlated with lab room temperature. There were still no significant main effects of temperature, $b = 0.004$, $p = .70$, and disease prime, $b = -0.04$, $p = .55$, and no significant interaction between temperature and disease prime, $b = 0.001$, $p = .99$.

Taste characteristics

In addition to asking the participants to report which gummy candy they preferred, participants were asked to rate both candies on several taste, texture, and appearance characteristics, (See appendix C). For each characteristic a difference score was calculated by subtracting the score for the gummy animal from the score for the gummy bug. See Table 6 for means, difference scores and standard deviations; for full results see Tables 23 & 24.

Appearance

There was no significant difference in the rating of pleasing appearance based on temperature, $b = 0.03$, $p = .39$, or disease prime, $b = -0.15$, $p = .46$, and no significant differences based on an interaction between temperature and disease prime, $b < 0.001$, $p = .87$. When accounting for climate variables correlated with lab room temperature, there was no significant difference based on temperature conditions, $b = -0.02$, $p = .62$, or disease prime conditions, $b = -0.14$, $p = .49$, and no significant difference based on an interaction between temperature and disease, $b = 0.02$, $p = .74$.

There was a significant difference in the ratings of how much the participants looked forward to eating each candy based on disease prime condition, $b = -0.41$, $p =$

.02. There was no significant difference based on temperature condition, $b = -.03$, $p = .33$, and no significant differences based on an interaction between the temperature and disease prime, $b = 0.01$, $p = .82$. These results remained similar when accounting for climate variables correlated with lab room temperature. There was still a significant difference based on disease prime condition, $b = -.41$, $p = .03$, and still no significant difference based on temperature condition, $b = -.01$, $p = .79$, and no significant difference based on an interaction between temperature and disease, $b = 0.01$, $p = .77$.

Taste and texture characteristics

Participants were asked to rate how (1) sweet (2) bitter (3) slimy (4) chewy (5) dry and (6) sour each candy tasted (see Table 8 for means and standard deviations). For each characteristic a difference score was calculated by subtracting the score for the gummy animal from the score for the gummy bug.

For sweetness, there were no significant differences in ratings of each candy based on room temperature, $b = 0.03$, $p = .38$, or disease prime condition, $b = -0.07$, $p = .71$, and no significant difference based on an interaction between temperature condition and disease prime, $b = -0.10$, $p = .30$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $b = 0.02$, $p = .61$, or disease prime condition, $b = -0.09$, $p = .65$, and a marginally significant difference based on an interaction between temperature and disease, $b = 0.08$, $p = .07$.

For bitterness, there were no significant differences in ratings of each candy based on temperature condition, $b = 0.04$, $p = .20$, or disease prime condition, $b = 0.10$, $p = .60$, and no significant differences based on an interaction between temperature condition and disease prime, $b = -0.03$, $p = .54$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $b = 0.03$, $p = .34$, or disease prime condition, $b = 0.14$, $p = .46$, and no significant difference based on an interaction between temperature and disease, $b = -0.03$, $p = .43$.

For sliminess, there was no significant difference in ratings of each candy based on temperature condition, $b = 0.05$, $p = .12$, there was a significant difference based on disease prime condition, $b = -0.38$, $p = .04$. There were no significant differences based on an interaction between temperature condition and disease prime, $b = -0.02$, $p = .71$. When controlling for climate variables correlated with temperature, there was a marginally significant difference in ratings of sweetness of the gummy bug and gummy animal based on temperature condition, $b = 0.04$, $p = .23$, and a significant difference based on disease prime condition, $b = -0.38$, $p = .05$. There was no significant difference based on an interaction between temperature and disease, $b = 0.01$, $p = .76$.

For chewiness, there were no significant differences in ratings of each candy based on temperature condition, $b = 0.04$, $p = .22$, or disease prime condition, $b = 0.17$, $p = .30$. There were significant differences based on an interaction between temperature condition and disease prime, $b = -0.08$, $p = .04$. When controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $b = 0.05$, $p = .14$, or disease prime condition, $b = 0.20$, $p = .23$, and there was still a significant difference based on an interaction between temperature and disease, $b = -0.09$, $p = .03$.

For dryness, there were no significant differences in ratings of each candy based on temperature condition, $b = 0.02$, $p = .66$, or disease prime condition, $b = 0.12$, $p = .56$, and no significant differences based on an interaction between temperature condition and disease prime, $b = -0.01$, $p = .87$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $b = 0.01$, $p = .77$, or disease prime condition, $b = 0.16$, $p = .46$, and no significant difference based on an interaction between temperature and disease, $b = -0.02$, $p = .75$.

For sourness, there were no significant differences in ratings of each candy based on temperature condition, $b = 0.02$, $p = .41$, and no main effect of disease prime condition, $b = 0.26$, $p = .14$. There were no significant differences based on an interaction between temperature condition and disease prime, $b = -0.03$, $p = .45$. Even when controlling for climate variables correlated with temperature there were no significant differences in ratings of sweetness of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $b = 0.01$, $p = .68$, and a marginal main effect of disease prime condition, $b = 0.29$, $p = .09$, and no significant difference based on an interaction between temperature and disease, $b = -0.03$, $p = .50$)

Overall assessment

Participants were asked two items to give an overall assessment of each candy. They were asked to rate their overall enjoyment of the candy and “how likely would you be to purchase the candy?”

There were no significant differences in enjoyment of each candy based on temperature, $b = -0.02$, $p = .54$, or disease prime, $b = -.07$, $p = .72$, and no significant difference based on an interaction between temperature and disease prime, $b = -0.01$, $p = .80$. Even when controlling for climate variables correlated with temperature there were no still significant differences in ratings of enjoyment of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $b = 0.03$, $p = .47$, or disease prime condition, $b = -0.05$, $p = .77$, and no significant difference based on an interaction between temperature and disease, $b = -0.01$, $p = .76$.

There were no significant differences in likelihood to purchase of each candy based on temperature, $b = 0.06$, $p = .15$, or disease prime, $b = 0.07$, $p = .78$, and no significant difference based on an interaction between temperature and disease prime, $b = 0.002$, $p = .98$. Even when controlling for climate variables correlated with temperature there were no still significant differences in ratings of enjoyment of the gummy bug and gummy animal. There were no significant differences based on temperature condition, $b = -0.05$, $p = .47$, or disease prime condition, $b = 0.11$, $p = .63$, and no significant difference based on an interaction between temperature and disease, $b = -0.01$, $p = .90$)