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The Influence of Hunger on Attitudes: Does it Go Beyond Foods?

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Abstract

The purpose of this research was to investigate the influence of hunger on attitudes (self-reports and corresponding reaction times) toward foods and non-foods (people). Participants rated their attitudes toward pictures of foods and pictures of people (older and younger males and females) along several evaluative scales (global attitudes and attitudinal bases) while reaction times were recorded. This was done twice (once when hungry, once not), in sessions separated by one week. Consistent with previous research, hunger differentially impacted ratings of the information underlying attitudes. For example, for foods, ratings of negative affect information changed more as a function of hunger than ratings of other bases. The expected effect of hunger on practice effects was also significant, with participants having greater practice effects when they were not hungry in the first session than participants who were hungry in the first session. Findings from this study may help us understand how hunger has the potential to impact how we perceive and interact with our worlds.

Acknowledgements

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TABLE OF CONTENTS

CHAPTER I. INTRODUCTION.

Background.

Attitudes are stored positive/negative evaluations of objects that help guide behavior regarding those objects. Attitudes are stable over time (e.g., Fazio & Powell, 1997) but also changeable (e.g., Fazio, Ledbetter, & Towles-Schwen, 2000) depending on the circumstances under which the attitudes are reported. For example, food attitudes change as a function of hunger (a motivational state; Lozano, Crites, & Aikman, 1999). Accordingly, if you have a positive attitude toward baked potatoes, then over time you will continue to have a positive attitude - but, you will like baked potatoes even more when you are hungry.

The stable property of attitudes makes them useful in daily life as behavioral guides (Kraus, 1995). For example, an individual would not have to taste every single one of the foods available for sale at a grocery in order to buy a favorable selection of foods because his or her attitudes about the foods provide ready judgments that help make those favorable selections. Additionally, an individual would not have to taste every single one of the dishes being served at a restaurant in order to make a favorable choice because his or her attitudes about certain dishes provide ready judgments that help make a favorable choice.

Although attitudes are generally stable, they are also changeable (e.g., Fazio, Ledbetter, & Towles-Schwen, 2000) depending on various circumstances (e.g., time, place, motivational states). For instance, an individual may have overall positive judgments for pizza and hamburgers but those judgments may change depending on the time of day. More specifically, an individual may

generally like pizza and hamburgers but may dislike those foods in the morning (Aikman & Crites, 2005). Attitudes are also changeable depending on one's hunger level. For instance, one's attitude toward pizza and hamburgers may be different as a function of his or her hunger level.

Another type of attitude we frequently use in our everyday life is attitudes toward people. Attitudes toward people may also be generally stable, but changeable depending on various circumstances. Attitudes toward people may be considered to be stereotypes, which are generalized beliefs about a group of individuals (Kanahara, 2006). Stereotypes are also prone to instability depending on various circumstances. To illustrate a general example of how the use of stereotypes may be changeable under a different circumstance one can consider an individual who has negative stereotypes about, and a general negative attitude towards, Chinese people. The use of those stereotypes and their subsequent attitude may change depending upon the context within which he or she meets a Chinese person. For example, if an individual needs to work with a Chinese person on a task at a workplace, he or she may try to base their attitude on more positive stereotypes, resulting in his or her attitude toward the person becoming more positive.

Given these scenarios, attitudes are functional in everyday life because they provide ready judgments of a broad range of items (e.g., foods and people) that can adapt to various circumstances and then help guide behavior toward those items. It should be recognized that there are a number of factors that impact attitudes. Previous research demonstrated that a cognitive load impacts attitudes

(Biernat, Kobrynowicz, & Weber, 2003). Any mental process that takes mental resources is a cognitive load. The research conducted by Biernat et al. (2003) suggests that, overall, there is more stereotype use under high cognitive load conditions compared to low cognitive load conditions. The researchers of this study manipulated the level of cognitive load, using time pressure; participants who were under high cognitive load were informed that their session would involve time pressure, and participants who were under low cognitive load were not informed about their session involving time pressure. Participants who were under time pressure (high cognitive load) reported a greater perceived difference between men's and women's heights (one type of gender stereotype) than those who were not under time pressure (low cognitive load). This finding implies that people tend to use stereotypes more often when they are cognitively busy. More recent research also showed evidence for increased stereotype activation under heavy cognitive load conditions as opposed to low cognitive load conditions (Wigboldus, Sherman, Franzese, & Knippenberg, 2004). Stereotypes are more likely to be activated when cognitive resources are already attending to another activity (Wigboldus et al., 2004).

Hunger (a motivational state) has been found to influence attitudes (Lozano, Crites, & Aikman, 1999), and previous research by Humphreys and Revelle (1984) suggests that hunger may be like an arousal condition that takes up mental resources worsening working memory capability. For instance, when people are hungry their immediate cognitive resources are mostly used up by their focus on their hunger and it can be difficult for them to think about any other

issues. Given this, it is possible that if a person is hungry (cognitively busy), he or she would be more likely to use stereotypes than when a person is not hungry (not cognitively busy).

Statement of the Problem.

The present study is investigating whether or not hunger influences how people respond to food and non-food stimuli. Lozano et al. (1999) had participants report their attitudes toward foods, animals, colors, and beverages and found that food attitudes changed as a function of hunger, but attitudes toward non-foods did not. This suggests that the influence of hunger may be specific to foods. However, only explicit measures (self reports) of attitudes were applied in this study. Another recent study (Aikman, 2003) found that hunger influenced more than overt measures of attitudes. Ratings of attitudes towards foods, ratings of the information underlying food (e.g., healthiness), and the reaction times associated with those ratings were impacted by hunger. That is, overall food attitudes were more positive when participants were hungry and attitudes were reported more quickly when participants were hungry. This study did not examine attitudes toward non-foods, but the findings suggest that hunger could impact reaction times associated with self-reports (an implicit measure of attitudes) even if the self-reports themselves (an explicit measure of attitudes) were not influenced.

The Aikman (2003) study also provides suggestive evidence that hunger might function as a cognitive load (any process that demands mental resources). In Aikman's (2003) study, the task improvement benefits of practice (i.e., quicker reaction times the second time the task was performed compared to the first) were greater for participants who engaged in the task for the first time when they were not hungry as compared to participants who engaged in the task for the first time

when they were hungry. This finding could suggest that hunger acted as a cognitive load, using up mental resources so that practice benefits of performing the task were not gained when participants engaged in the task for the first time when they were hungry. This was an unexpected finding, and therefore another goal of the present research is to replicate this effect of hunger as a cognitive load.

If hunger does act as a cognitive load, there could be many implications for how hunger influences our perceptions and responses to the world around us and people in particular. For example, research demonstrates that people are more likely to use stereotypes when they are under high cognitive load (e.g., Sherman, Lee, Bessenoff, & Frost, 1998; Biernat, Kobrynowicz, & Weber, 2003). If hunger acts as a cognitive load, people may be more likely to use stereotypes when hungry.

There is relatively solid evidence that hunger influences self-reports of evaluations of foods (Aikman, 2003; Lozano et. al, 1999). However, there is limited evidence on whether or not hunger influences self-reports and reaction times associated with evaluations of people. The present study is investigating whether hunger influences self-reported evaluations of foods and people and/or reaction times associated with those evaluations. The purpose of this study is to answer three primary questions: (1) Does hunger impact ratings of global attitudes, for both foods and people? (2) Does hunger impact ratings of attitudinal bases, for both foods and people? and (3) Does hunger change reaction times for these ratings, for both foods and people?

CHAPTER II. METHOD.

Participants.

Participants were 76 (22 males, 51 females, 3 unreported) undergraduate Introductory Psychology students from Syracuse University who participated in partial fulfillment of a course requirement. The mean age of participants was 19.11 years (*SD* = 1.30). The majority of participants self-identified as Anglo American (63.2%, 7.9% self-identified as African American, 15.8% Asian American, 7.9% Hispanic, 7.9% Native American, and 5.3% who indicated their ethnicity as "other"). The majority of participants were within the normal range of BMI (77.6%, 1.3% underweight, 15.8% overweight, and 5.3% obese).

Stimuli.

Color pictures of 24 common food items and 24 older and younger adults (both males and females) were presented (selected from the lifespan database of adult facial stimuli; Minear & Park, 2004).

Evaluative scales.

For both foods and people, global attitudes (positive/negative and good/bad) were measured. For foods, four attitudinal bases were measured (see Aikman, Crites, & Fabrigar, 2006): general sensory (appearance and taste), abstract cognitive (health and safety), positive affect (joyful and relaxed), and negative affect (guilty and nauseated). For people, stereotypically positive female traits (friendly, nurturing), stereotypically positive male traits (distinguished, wise), stereotypically negative female traits (isolated, fragile), and stereotypically

negative male traits (forgetful, stubborn) were measured (e.g., Kite & Johnson, 1988).

Procedure.

Two experimental sessions were required. Before participants arrived for their first session, they were contacted via email to remind them not to eat for 12 hours before arriving for their session and to assess any dietary restrictions that needed to be addressed. A copy of the informed consent was included with this email. When participants arrived for their first session, the experimenter explained that the study was investigating whether physiological states, such as hunger, impact reaction times associated with evaluating various stimuli. The experimenter then went over the procedures and the informed consent form with the participant and obtained informed consent.

At the beginning of both experimental sessions, the participant was asked to complete a questionnaire that assessed various aspects of their current physiological state: hunger, fullness, thirst, tiredness, and mood (the Positive Affect Negative Affect Scale [PANAS]; Watson, Clark, & Tellegen, 1988). Both experimental sessions consisted of two sets of attitude rating tasks that were completed using a computer (mouse and keyboard responses). Each task assessed participants' attitudes toward pictures of foods and individuals (the order of rating the stimuli, foods first or people first, was varied across participants and across sessions) using several evaluative rating scales (e.g., How healthy do you think this food is? How nice do you think this person is?) In the first task, participants responded to the attitude measures (for both the foods and people) using a 2-point

bipolar scale (e.g., disagree/agree, dislike/like); in the second task participants responded to the attitude measures (again, for both foods and people) using a 7-point bipolar scale (e.g., "-3: extremely disagree" to "3: extremely agree"). Responses and reaction times were recorded during these tasks. The participant completed both of these tasks when hungry (in one session) and when not hungry (in another separate session). In one session, the participants were provided with a meal and then completed the rating tasks; in the other session, participants immediately completed the rating tasks and then were provided with a meal.

These meals consisted of pre-packaged frozen meals (i.e., TV dinners), chips, cookies, and a beverage (Sprite or bottled water). The food was kept in a locked office that contained a refrigerator and microwave used only for the purposes of this study. Participants were allowed to choose their meal from a variety of choices and prepared the food themselves (to assure the cleanliness and safety of the food).

At the end of the second session, participants were asked to complete additional measures: (1) the three factor eating questionnaire to assess cognitive restraint, disinhibition, and susceptibility to hunger (Stunkard & Messick, 1985), and (2) a demographic information questionnaire to assess gender, age, height, weight, and ethnicity. At the end of both experimental sessions, participants were asked to complete the physiological state questionnaire and PANAS again (Watson, Clark, & Tellegen, 1988). In total, participants completed the PANAS four times (at the beginning of the two sessions and at the end of the two

sessions). Finally, each participant was debriefed on the purpose of the experiment.

CHAPTER III. RESULTS.

Manipulation checks.

We first examined the responses to the physiological state and mood questionnaire to ensure that: (1) participants had complied with experimental instructions not to eat for twelve hours prior to their session and (2) to ensure that participants were hungry (not hungry) when they were supposed to be completing the measures in the hungry (not hungry) condition. This procedure resulted in our excluding data from five participants (one who did not refrain from eating for a full twelve hours before participating, one who did not indicate how long it had been since they ate, and three who self-reported higher degrees of hunger in the not hungry condition than in the hungry condition). The remaining participants had gone an average of 15.27 hours without eating (SD = 2.04) before arriving for the study. Further, participants were more hungry before completing the measures in the hungry session (*M* hunger rating = 3.52, *SE* = 0.11) than in the not hungry session (after having been fed, *M* hunger rating = 1.41, *SE* = 0.09), t (70) = 14.67, $p < .001$. There were also significant differences in negative mood, t (70) = 2.97, $p = .004$, with participants reporting more negative mood in the hungry condition (*M* negative mood rating = 1.54, *SE* = .05) than in the not hungry condition (*M* negative mood rating = 1.34, *SE* = .05). There were no significant differences in positive mood between the hungry (*M* positive mood rating = 2.36, *SE* = 0.07) and not hungry conditions (*M* positive mood rating = 2.19, *SE* = 0.09), t (70) = 1.63, $p = .108$.

For the analyses that follow, only results related to the goals and hypotheses of this study will be discussed in the interest of simplicity.

The effect of hunger on global attitude ratings.

ANOVAs were conducted to examine the main effect of hunger on global attitude responses. First, a 2 (hunger: hungry or not) x 2 (stimuli type: food, people) ANOVA was conducted. As can be seen in Figure 1, there was no significant main effect of hunger, F (1,70) = 0.05, p = 0.827, nor was there an interaction of hunger and stimulus type, F (1,70) = 0.49, p = 0.489. Next, a 2 (hunger) x 2 (age of target: younger, older) x 2 (gender of target: male, female) ANOVA was conducted to examine the effect of hunger on global attitudes toward older and younger males and females. There was no significant main effect of hunger, F (1,70) = 0.01, p = 0.909, nor were any of the interactions involving hunger significant.

The effect of hunger on ratings of the attitude bases.

ANOVAs were also conducted to examine the main effect of hunger on attitudinal bases. First, a 2 (hunger) x 4 (attitudinal bases: general sensory, abstract cognitive, positive affect, negative affect) ANOVA was conducted to examine the main effect of hunger on bases for foods. The results of this analysis are presented in Figure 2. There was no main effect of hunger F (1,70) = 2.32, p = 0.132, but a significant main effect of base, F (3,68) = 87.59, p < .001. The expected hunger by base interaction was also significant, F (3,68) = 2.91, p = .041. The significant hunger by base interaction suggests that hunger does not

impact all of the bases equally; specifically, negative affect changed more as a function of hunger than the other bases.

Next, a 2 (hunger) x 2 (age) x 2 (gender) x 4 (attitudinal bases: stereotypically positive female, stereotypically positive male, stereotypically negative female, stereotypic negative male traits) ANOVA was conducted to examine the main effects of hunger on bases for people. The results of this analysis are presented in Figure 3. There was not a significant main effect of hunger, F (1,70) = 0.19, p = 0.667. There was a marginally significant interaction between hunger and target gender, F (1,70) = 3.53, p = 0.064. This interaction can be found in the top half of Figure 3 and demonstrates that when participants are hungry, they rate female targets more positively than male targets. There was also a marginally significant interaction between hunger and base, F (3,68) = 2.69, p = 0.053. This interaction is presented in the bottom half of Figure 3 and demonstrates that the stereotypically negative female traits change the most as a function of hunger.

The effect of hunger on reaction times: global attitudes.

ANOVAs were conducted to examine the main effect of hunger on global attitude reaction times. A 2 (hunger) x 2 (stimuli type: food, people) x 2 (hunger session order: hungry then not hungry; not hungry then hungry) ANOVA was conducted to examine reaction times for the main effect of hunger on food and people; the inclusion of hunger order allows us to look at practice effects. There was a marginally significant main effect of hunger F (1,69) = 3.61, p = 0.061, with reaction times being quicker in the hungry session (M = 842.60, SE = 25.59)

as compared to the not hungry session (M = 905.47, SE = 38.60). A significant hunger by stimuli type interaction was also found, F (1,69) = 4.77, p = 0.032, with reactions times for ratings of food changing more as a function of hunger (i.e., quicker in the hungry session than the not hungry session) than reaction times for ratings of people. The expected hunger by hunger order interaction was also significant, F (1,69) = 5.93, p = 0.017. As can be seen in Table 1, the practice effect was larger for participants who had the not hungry session first (approximately 143 ms faster in session 2 than session 1) than it was for the participants who had the hungry session first (approximately 44 ms faster in session 2 than session 1).

The effect of hunger on reaction times: attitude bases.

A 2 (hunger) x 4 (attitudinal bases) x 2 (hunger order) ANOVA was conducted to examine the main effect of hunger on bases for foods, including hunger order to look at practice effects. There was no significant main effect of hunger F (1,69) = 0.32, p = 0.576. The hunger by hunger order interaction was again significant, F (1,69) = 13.98, $p < .001$, and consistent with that reported above. The expected hunger by base interaction was significant, F (3,67) = 2.84, p = .044. As can be seen in Figure 4, general sensory information seems to be the most impacted by hunger.

A 2 (hunger) x 2 (age) x 2 (gender) x 4 (attitudinal bases) x 2 (hunger order) ANOVA was conducted to examine the main effects of hunger on bases for people, including hunger order to look at practice effects. There was not a significant main effect of hunger F (1,68) = 1.26, p = .265, but the hunger by

hunger order interaction was again significant, F (1, 68) = 18.61, p < .001, and consistent with that reported above.

CHAPTER IV. DISCUSSION.

The purpose of the present study was to investigate whether hunger influences self-reported evaluations of foods and of people and/or reaction times associated with those evaluations. Although there is relatively solid evidence that hunger influences self-reported evaluations of foods (Aikman, 2003; Lozano et. al, 1999), there is limited information on whether or not hunger influences self-reported evaluations of people and/or reaction times associated with those evaluations. Given the paucity of research on these issues, the specific questions to be answered from this study were three-fold: (1) Does hunger impact ratings of global attitudes, for both foods and people? (2) Does hunger impact ratings of attitudinal bases, for both foods and people? and (3) Does hunger change reaction times for these ratings, for both foods and people? The results specific to each of these questions will be discussed in turn.

Does hunger impact ratings of global attitudes, for both foods and people? Surprisingly, the current study failed to find a main effect of hunger on either food attitudes or attitudes toward people. This finding is unexpected given that the effect of hunger on global food attitudes has been well documented in previous research. This lack of main effect of hunger could be due to some methodological differences in this study compared to other studies. The current study used pictures to represent the stimuli, while words were used to represent stimuli in past research. By providing pictures we may have limited participants to our images of foods and people, which could be different from their representations of

foods and people. The pictures of food and people may have then limited participants' range of attitudes regarding these stimuli.

Another potential explanation for not finding the expected main effect of hunger on food attitudes is that negative affect varied significantly as a function of hunger, confounding our manipulation. Previous research using the same manipulation of hunger as the present study did not find that negative mood varied with hunger (Aikman, 2003). It is possible that negative affect outweighed any influence hunger may have had.

Does hunger impact ratings of attitudinal bases, for both foods and people? As expected, and consistent with previous research, hunger differentially impacted the bases of food attitudes. Specifically, participants rated the foods as having less negative affective qualities when they were hungry than when they were not. This could suggest a mechanism through which people convince themselves to eat foods they would normally have negative affect associated with eating (i.e., they decide that the food would not cause negative affect, though when they are not hungry they report that it does). Hunger also differentially impacted the bases of attitudes toward people. Specifically, hunger changed ratings of the stereotypically female traits most, in particular the negative female traits. Specifically, participants, when hungry, disagreed that targets possessed the negative female traits. Although we expected hunger to differentially impact the bases underlying attitudes toward people, this particular finding was unexpected. That is, we predicted that hunger would interact with both the bases and the target

gender, such that female-specific bases would change the most for female targets and male-specific bases would change the most for male targets.

Does hunger change reaction times for these ratings, for both foods and people? A main effect of hunger on global attitude reaction times was found, which suggested that reaction times were quicker for both foods and people when participants were hungry; however, this effect was stronger for foods. This is not surprising given that foods are the motivationally relevant stimuli and likely a greater focus of attention. Further, consistent with previous research, hunger differentially impacted the bases and had more of an impact on general sensory information. This is also not surprising given past research (e.g., Aikman, 2003) and given that when hungry, the sensory information of foods is likely an important determinant of food selection and therefore should be more accessible.

Importantly, the impact of hunger on practice effects that had been demonstrated in a previous study (Aikman, 2003) was replicated in the present study. Practice effects were greater (bigger decreases in reaction times from Session 1 to Session 2) when the not hungry session was first and when the hungry session was second. Because this had been an unexpected finding in previous research, it was necessary to replicate the effect of hunger on practice to ensure it was a reliable finding. This was a primary goal of this research. Future research can now explore this effect further to determine the extent of hunger's influence on information processing.

Overall, this study suggests that the impact of hunger on attitudes extends beyond foods; however, the nature of the hunger effect does not appear to be

entirely consistent across stimuli. Because this study constitutes a first attempt to explore the impact of hunger on attitudes other than food, more research is needed. For instance, it would be useful to further explore the influence of hunger on attitudes toward people by examining a wider range of stereotypic and non-stereotypic traits. Future research might also examine other categories of attitudes, such as attitudes toward beverages or attitudes toward various issues.

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Table 1

Mean reaction times in milliseconds as a function of hunger and order (standard errors of the means are presented in parentheses and session 1 data are bolded).

	Hungry	Not Hungry
Hungry-Not Hungry	**844.33 (34.43)**	800.15 (50.44)
Not Hungry-Hungry	1004.68 (51.78)	**861.16(35.34)**

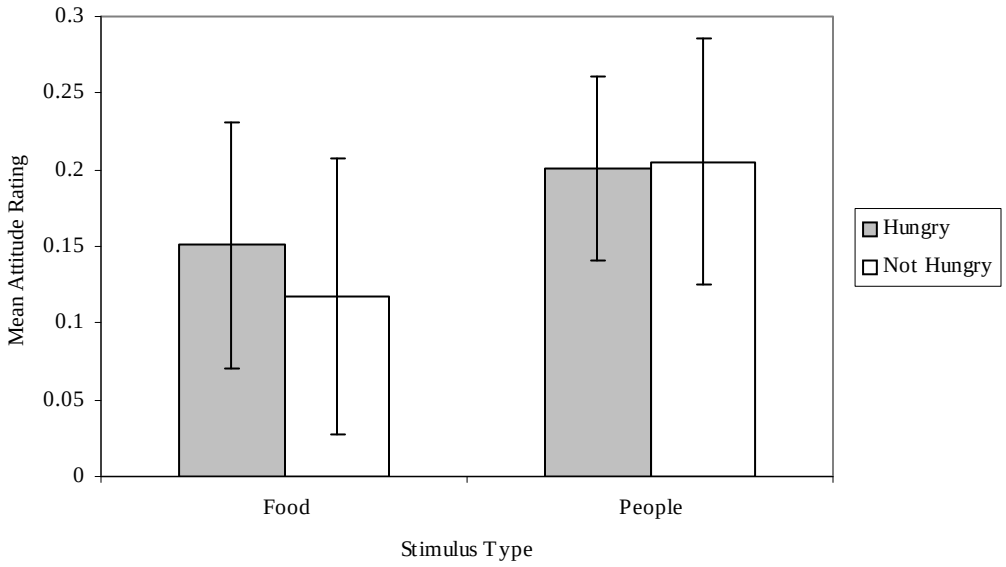
Figure Caption

Figure 1. The effect of hunger on global attitude ratings.

Figure 2. Foods: The effect of hunger on ratings of the attitude bases.

Figure 3. People: The effect of hunger on ratings of the attitude bases.

Figure 4. Foods: The effect of hunger on reaction times for the attitude base ratings.


0.3
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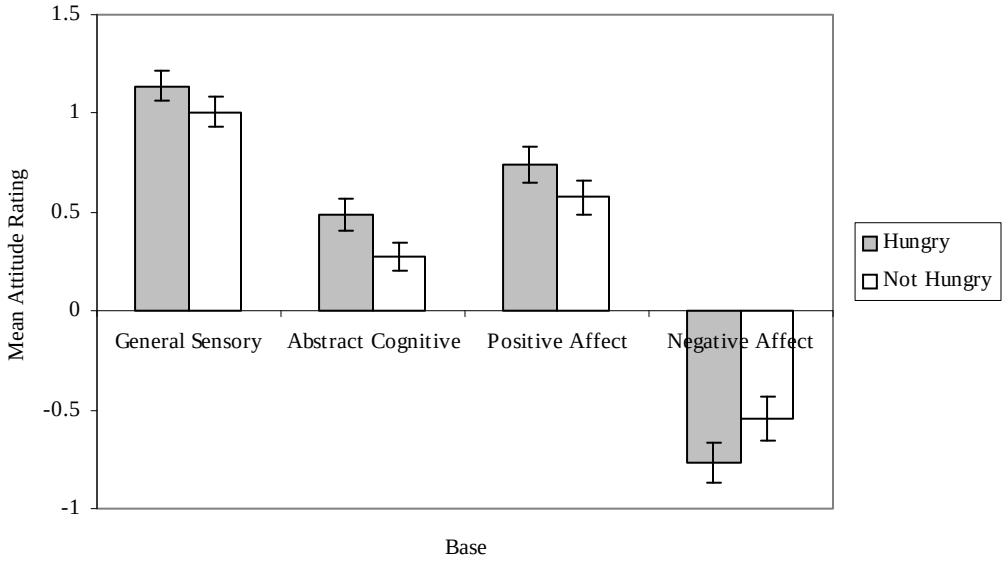
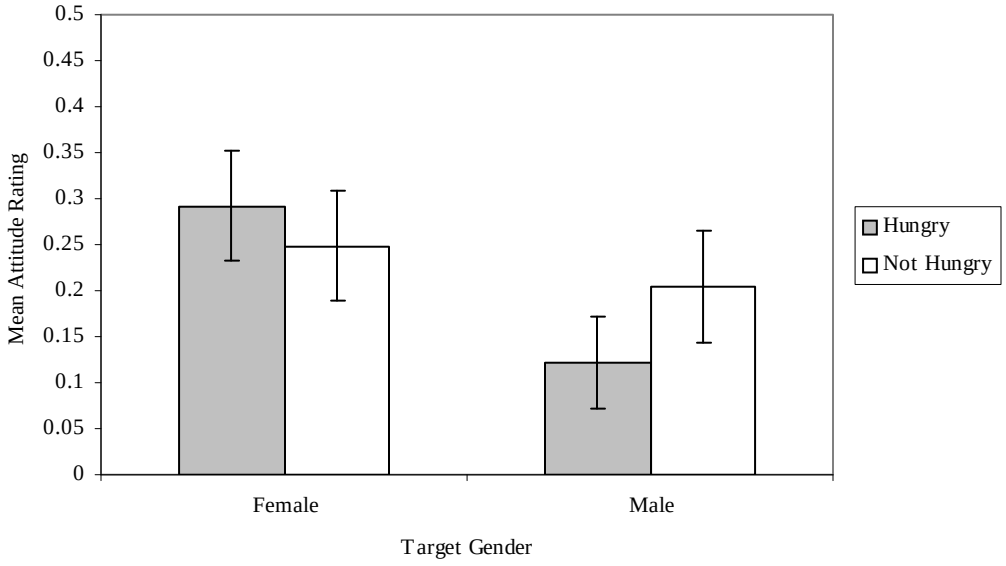
0.15
0.1
0.05
0
Mean Attitude Rating
Food
People
Stimulus Type
Hungry
Not Hungry


1.5
1
0.5
0
-0.5
-1
Mean Attitude Rating
General Sensory
Abstract Cognitive
Positive Affect
Negative Affect
Base
Hungry
Not Hungry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0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Mean Attitude Rating
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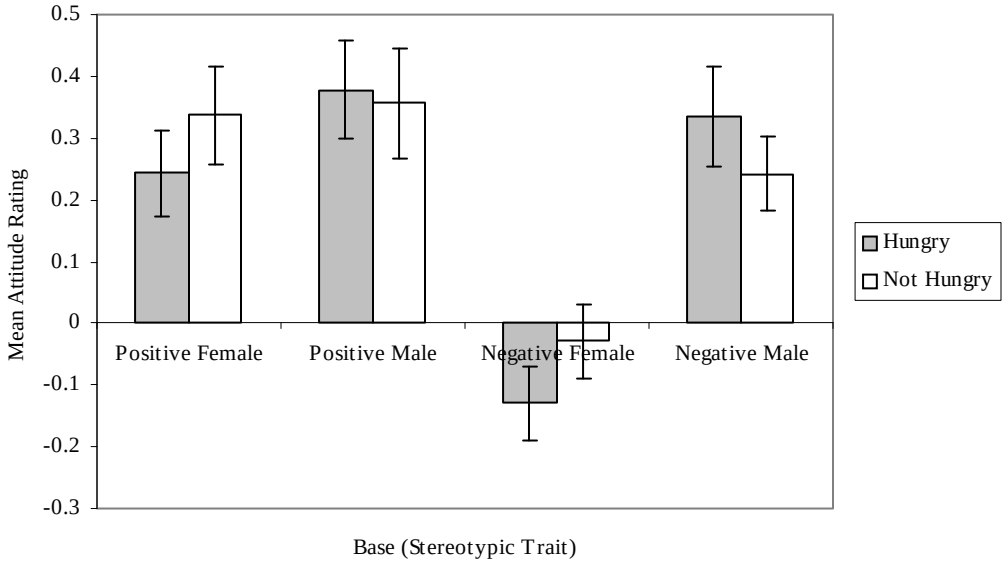
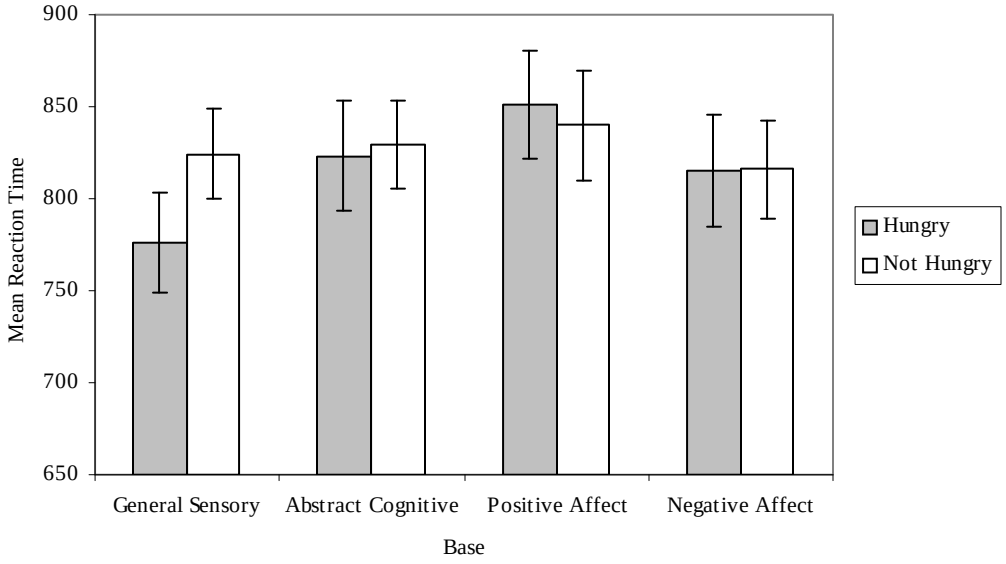
Male
Target Gender
Hungry
Not Hungry


0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
Mean Attitude Rating
Positive Female
Positive Male
Negative Female
Negative Male
Base (Stereotypic Trait)
Hungry
Not Hungry


900
850
800
750
700
650
Mean Reaction Time
General Sensory
Abstract Cognitive
Positive Affect
Negative Affect
Base
Hungry
Not Hungry

Appendix A

Preliminary e-mail

You are required to respond to this email so that we can make any necessary meal arrangements.

This is a reminder that you are signed up to participate in a Psychology research study on [insert date]. This study will take place in [insert location].

Remember, you are required to refrain from eating for 12 hours prior to attending this session. If you feel you may suffer any adverse consequences due to this requirement, please cancel your scheduled participation in this study – there will be no penalty for canceling.

For your information, an informed consent form is attached to this email so that you can look over it before you take part in the study. Once you arrive for your experimental session, the experimenter will go over this form with you before you are asked to sign it.

Please answer the questions below. And remember – DO NOT EAT FOR 12 HOURS BEFORE YOUR EXPERIMENTAL SESSION!

1) Participation in this study requires that you refrain from eating for 12 hours. Do you have any health considerations that would preclude you from participating in this study?

Yes **No**

If yes, please specify:

2) Do you have any food allergies? (For example, are you lactose intolerant, are you allergic to shellfish, etc.)

Yes **No**

If yes, please specify:

2) Do you have any religious considerations when choosing the foods you eat?

Yes **No**

If yes, please specify:

3) Do you have any health considerations when choosing the foods you eat (for example, diabetes, high blood pressure, etc.)?

Yes **No**

If yes, please specify:

4) Do you follow any other special/restricted diet? (For example, do you follow a vegetarian diet; do you eat fish and beans but not beef and pork; do you limit your sodium intake; etc.)

Yes **No**

If yes, please describe:

5) Is there anything else we should know about?

Yes **No**

If yes, please describe:

Informed Consent

My name is Shelley Aikman, and I am an Assistant Professor of Psychology at Syracuse University. I am inviting you to participate in a research study entitled: The Impact of Physiological States on Reaction Times. Involvement in the study is voluntary, so you may choose to participate or not. This sheet will explain the study to you. Please feel free to ask questions about the research if you have any. I would be happy to explain anything in greater detail if you wish.

I am interested in learning more about how physiological states, such as being hungry, influence how people respond to common stimuli. You will be asked to rate various stimuli (pictures/words of various foods or individuals) along several attitude dimensions (e.g., like/dislike, positive/negative, healthy/unhealthy) while reaction times are recorded. Participation in this study requires that you take part in two experimental sessions, both of which will take approximately 1 hour of your time. Furthermore, participation in these sessions requires that you refrain from eating for 12 hours prior to arriving for the sessions. During the sessions you will be required to eat a meal you will select from a variety of choices (frozen "TV Dinners", chips, cookies, crackers, beverages). All information will be kept confidential. This means that your name will not appear in any reports of the data and no one will be able to associate your name with your responses.

The benefit of this research is that you will be helping us to understand how naturally occurring physiological states such as hunger influence how we perceive and respond to the world around us – an important topic to address because most people experience hunger to some extent daily. The risks to you of participating in this study are minimal and are similar to those you encounter regularly. That is, your participation will require that you complete paper and pencil response measurements that are similar to the format of multiple-choice exams and quizzes and that you complete tasks that require you to press keys on a keyboard or buttons on a mouse in response to stimuli presented on a monitor. These are tasks you encounter often as a student. The risks have been minimized by carefully crafting the wording of the questions to reduce any stress or discomfort you may experience as a result of expressing your attitudes. Your participation also requires that you refrain from eating for 12 hours prior to each experimental session, which means only that you not snack late at night the night before your sessions or eat breakfast the morning of your sessions. Although you may feel hunger as a result of refraining from eating for 12 hours, the requirements are the same as those involved in standard medical procedures

(e.g., blood glucose assessment). If you no longer wish to continue, you have the right to withdraw from the study, without penalty, at any time. If at some point during the course of the experiment you wish to withdraw, you will be given partial credit equal to the amount of time you have engaged in the experiment, rounded to the nearest half of an hour.

If you have questions or concerns following the research you can contact the researcher listed below or contact the Institutional Review Board at (315) 443-3013.

If you are at least 18 years of age, if all of your questions have been answered, and if you would like to participate in this study, please complete the following:

_____ _____

Signature of participant Date

_____

Printed name of participant

_____ _____

Signature of Experimenter Date

_____

Printed name of Experimenter

Principal Investigator: Shelley N. Aikman, Ph.D.
Department of Psychology
430 Huntington Hall
phone: (315) 443-3667
email: saikman@syr.edu

Appendix C
Physiological State Questionnaire

1) How tired are you right now?

Not at all Tired **Very Tired**

1 2 3 4 5

3) How hungry are you right now?

Not at all Hungry **Very Hungry**

1 2 3 4 5

4) How thirsty are you right now?

Not at all Thirsty **Very Thirsty**

1 2 3 4 5

5) How full are you right now?

Not at all Full **Very Full**

1 2 3 4 5

6) How many hours has it been since your last meal? _____

7) Have you had a snack since your last meal? **Yes** **No**

8) If you have had a snack, how many hours has it been? _____

9) How many hours has it been since you've had something to drink? _____

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

1	**2**	**3**	**4**	**5**
Very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested
_____ distressed
_____ excited
_____ upset
_____ strong
_____ guilty
_____ irritable
_____ alert
_____ ashamed
_____ inspired
_____ nervous
_____ determined

_____ scared _____ attentive

_____ hostile _____ jittery

_____ enthusiastic _____ active

_____ proud _____ afraid

Appendix D
Demographic Information Questionnaire

Please complete the following:

1) Gender Male Female

2) Age: _____

3) Height: _____

4) Weight: _____

5) Please indicate your race/ethnic group:

a. African American
b. Anglo American
c. Asian American
d. Hispanic American
e. Native American
f. Other (specify): _____

Appendix E

Description Form for Experiment #: _____

Experiment Title: The Impact of Physiological States on Reaction Times
Experimenter: Aikman
Phone: 443-3667
Email: saikman@syr.edu

Special Requirements: You must be at least 18 years of age and you must refrain from eating for 12 hours prior to each session.

You will receive 2 hours of participation credit for completing this experiment.

Description

The purpose of this study is to examine the effect of physiological states (e.g., hunger) on reaction times. Participation in this study requires that you (1) attend 2 experimental sessions, each lasting approximately 1 hour, (2) refrain from eating for 12 hours prior to each experimental session, (3) eat the meals provided for you during the experimental sessions and (4) provide an email address and respond to a pre-session email from the experimenter that will assess dietary concerns so that meal arrangements can be made. You will be scheduled for your second session when you arrive for this session.
The tasks in this study will require that you view picture/words of various stimuli (e.g., food, people) and evaluate these stimuli. Reaction times will be recorded.