

Spring 5-2019

# The Impact of Exposure to the Thin Ideal on Chocolate Cravings in U.S. -born Women

Kathryn M. Helm

*University at Albany, State University of New York*, khelm@albany.edu

Follow this and additional works at: [https://scholarsarchive.library.albany.edu/honorscollege\\_psych](https://scholarsarchive.library.albany.edu/honorscollege_psych)



Part of the [Psychology Commons](#)

---

## Recommended Citation

Helm, Kathryn M., "The Impact of Exposure to the Thin Ideal on Chocolate Cravings in U.S. -born Women" (2019). *Psychology*. 40.  
[https://scholarsarchive.library.albany.edu/honorscollege\\_psych/40](https://scholarsarchive.library.albany.edu/honorscollege_psych/40)

This Honors Thesis is brought to you for free and open access by the Honors College at Scholars Archive. It has been accepted for inclusion in Psychology by an authorized administrator of Scholars Archive. For more information, please contact [scholarsarchive@albany.edu](mailto:scholarsarchive@albany.edu).

# **The Impact of Exposure to the Thin Ideal on Chocolate Cravings in U.S. -born Women**

An honors thesis presented to the  
Department of Psychology,  
University at Albany, State University of New York  
in partial fulfillment of the requirements  
for graduation with Honors in Psychology  
and  
graduation from The Honors College

Kathryn Helm

Research Mentor: Martha Niemiec, M.A.

Research Advisor: Julie Hormes, Ph.D.

Second Reader: Laurie Feldman, Ph.D

May 2019

## **Abstract**

Food cravings are experienced by a large proportion of the population and have a variety of negative implications- including overweight/ obesity, heart disease, and type 2 diabetes. Prior research has shown a lack of support for biological causes of craving. As such, we look to other factors such as culture, cognition, and sex, to explore why such factors have an influence on craving. The purpose of this study is to look at the impact of viewing thin ideal images on chocolate cravings in United States born women-including (but not restricted to) their reports of ambivalence towards chocolate. Participants were randomized to view a slideshow containing images of either shoes or women fitting the ‘thin ideal’ (both conjunction with chocolate imagery) which is valued in the U.S. Participants in both conditions were also exposed to sensory chocolate cues, in the form of a craving induction and a taste test. We assessed the cognitive factors of mood, craving intensity, different aspects of the craving experience, and the behavioral factor of dietary restraint. We predicted that women in the condition exposed to thin ideal imagery in conjunction with chocolate cues would experience more ambivalence, and as a result have stronger cravings for chocolate. Our results showed a statistically non- significant, but still interesting, increase in feelings of desire to eat chocolate and increase in fear of losing control while eating in those exposed to the thin ideal. There was also a significant inverse correlation between ratings of sweet craving intensity and amount of chocolates taken home from the lab. Results support our hypothesis that women who view this imagery experience feelings of ambivalence towards chocolate.

## **Acknowledgements**

I would like to thank my research mentor, Martha Niemiec, and my research advisor, Julia Hormes. Martha's dissertation served as the inspiration and model for my thesis, she was extremely helpful with the entire process, and always willing to answer any questions I might have- related to my thesis or not. I truly would not have been able to write this paper and go through this process without Julia. She helped me figure out my interests, taught me everything there was to know about writing a thesis, offered me important materials and resources, and was crucial in helping me analyze data.

I would also like to thank Dr. Feldman, who along with Julia taught crucial skills for writing a thesis. The intro course gave me a solid foundation for beginning (and completing) this project. I also thank Dr. Feldman for being the second reader of this paper.

Next, I would like to thank the Health Behaviors Lab and everyone who assisted with this process from beginning to end. I am deeply appreciative of my instructors and organizations who allowed me to advertise and recruit for this study.

Lastly, I need to thank my parents, friends, and boyfriend. My parents were the ones who initially pushed me to join the Honors College, and they have continued to push and support me all throughout college. To my friends and boyfriend, thank you for dealing with me and offering all of your love and support during this stressful, but rewarding, time.

## List of Figures

<b>Figure 1</b> .....	17
<b>Figure 2</b> .....	19
<b>Figure 3</b> .....	20
<b>Figure 4</b> .....	21
<b>Figure 5</b> .....	22
<b>Figure 6</b> .....	23

## List of Tables

<b>Table 1</b> .....	24
----------------------	----

## Table of Contents

<b>Abstract</b> .....	ii
<b>Acknowledgements</b> .....	iii
<b>List of Figures</b> .....	iv
<b>List of Tables</b> .....	v
<b>Introduction</b>	
A. Craving.....	1
B. Implications of Craving .....	2
C. Perimenstrual & Pregnancy Chocolate Cravings.....	3
D. Cognitive Factors Involved in Craving.....	4
E. Craving & the Thin Ideal .....	5
F. Present Study .....	6
<b>Methods</b>	
A. Participants.....	6
B. Procedures.....	7
C. Measures .....	8
D. Craving Induction .....	10
E. Taste Test .....	11
<b>Results</b> .....	11
<b>Discussion</b> .....	13
<b>References</b> .....	17

## Introduction

### Craving

Food cravings are a common phenomenon, but their causes have long been debated. Food cravings are an intense desire or urge to eat a specific type of food (Hormes & Rozin, 2010). It is the specificity of craving that differentiates it from typical hunger, and in many cases we crave foods even when we are not hungry (Kemps & Tiggemann, 2010). For some time, many looked to biology for answers as to their origins. A common hypothesis was that cravings were related to caloric or nutritional need states –and consuming the craved substance was postulated to resolve these ‘deficiencies.’ One study found that when fed a monotonous- but nutritionally and calorically sufficient- diet, young people had a large increase in food cravings. This suggested that cravings are due to sensory, rather than nutritional or caloric deprivation (Pelchat & Schaefer, 2000).

There are a wide variety of other potential explanations drawing from biology, such as the mood- enhancing effects or other pharmacologically active ingredients in commonly craved foods, but there is a lack of empirical support for such hypotheses (Hormes, 2014; Hormes & Niemiec, 2017; Orloff & Hormes, 2014;). Chocolate is often the focus of cravings. A notable study on cravings for chocolate was done by Michener and Rozin (1994). They had participants consume a capsule filled with cocoa powder equivalent to one serving of chocolate, which contains all of the active ingredients in chocolate. There was no reduction in chocolate cravings after consuming the capsule. Interestingly, when participants consumed white chocolate – which contains almost none of the same active ingredients as regular chocolate, besides being a high-fat treat, but has all of the same sensory properties- their craving was reduced about half as much as regular chocolate would. Clearly, biology and pharmacology cannot fully account for the properties of cravings we experience, and as such other explanations are needed.



## **Implications of Craving**

Craving can be such an intense feeling and often subjectively impossible to resist, and as such there are several negative implications as a result. From a psychological perspective, individuals experience feelings of guilt and ambivalence due to craving (Weingarten & Elston, 1991). Furthermore, as already mentioned, food cravings can occur even when we are not hungry (Kemps & Tiggemann, 2010). This finding means that cravings can lead to excess and unnecessary eating of unhealthy, high fat foods. Relating to this, cravings have been implicated in disordered eating habits such as overeating and binge eating (Ng & Davis, 2013). Much of the concern with food craving comes not from the amount of food being consumed, but rather the type of food (calorie dense, high fat) individuals choose to eat during craving episodes (Lowe, Vincent, & Hall, 2017). In a general way, overeating leads to overweight and obesity, issues which can cause a variety of health problems- such as heart disease, stroke, and diabetes- on their own. According to data from the CDC, in 2015-2016, obesity prevalence in the adult population was 39.8%, with 93.3 million being affected. The estimated annual medical cost of obesity in America was \$147 billion in 2008 (Center for Disease Control, 2018). Overweight and obesity rates are at an all time high in the United States, which makes the question of whether or not craving plays a role in obesity crucial to tackling this issue.

In summary, craving is now widely considered a transdiagnostic construct that is implicated in a number of pathologies (Hormes, 2017). Food craving shares some similar characteristics with addictions to substances such as alcohol, cigarettes, drugs, and more. If we are able to identify the underlying causes of craving, there is the possibility to apply this model to treating other types of addictions as well.

## **Perimenstrual & Pregnancy Chocolate Cravings**

Chocolate is the most commonly craved food in the United States, especially in women. One reason for this is the marked increase in chocolate craving around the time of menstruation in about 50% of women who regularly experience chocolate craving (Hormes & Rozin, 2009). With hypotheses regarding biological causes of craving being unsupported, researchers look to other factors. There has been a lack of evidence for biological causes of perimenstrual cravings, such as hormonal fluctuations during the menstrual cycle (Rodin, Mancuso, Granger, Nelbach, 1991). One area of interest is perimenstrual chocolate cravings- a phenomenon seen primarily in the United States (Hormes & Rozin, 2009). Although there have been some reports of perimenstrual chocolate craving in other countries, rates are much lower than in the United States and associated weight- related concerns may not be as pronounced (Osman & Sobal, 2006; Zellner, Garriga- Trillo, Centeno, & Wadsworth, 2004). If hormone fluctuations during menstruation played a role, then one would expect that post-menopausal women would experience significantly lower levels of craving. However, one study found that women of three different age groups (45 year old women who were premenopause were compared to post-menopausal women aged 65 and 80 years old) crave chocolate at largely comparable rates, and that there was not a significant drop in craving after menopause (Hormes & Rozin, 2009).

Another interesting concept is that even in other cultures which commonly report experiencing craving, there are not any marked gender differences like we see in the US. In the United States, cravings seem to be linked to female reproductive states. A large amount of women report experiencing cravings for specific foods at some point during their pregnancy. (Orloff, Flammer, Hartnett, Liquorman, Samelson & Hormes, 2016; Pope, Skinner & Carruth, 1992). While pregnancy cravings are seen throughout a variety of cultures, culture does play a

role in *what* pregnant women crave (Orloff & Hormes, 2014), with women in the U.S. typically endorsing cravings for high- calorie, fatty and sugary foods. The pronounced gender differences in craving in the U.S., along with links between cravings and female reproductive states (that do not appear to be driven by biological or physiological factors), leads us to hypothesize that cognitive beliefs and social norms about what is acceptable (e.g., when, what, and why women are expected to crave and consume) can influence cravings. As such, we must question factors relating to our culture, and whether such factors play a role in the craving experience.

Interestingly, many other cultures do not even have a word for craving which suggests that the concept does not exist universally or at least is uncommon in other cultures (Hormes & Rozin, 2010).

### **Cognitive Factors Involved in Craving**

There also is significant evidence for cognitive factors causing chocolate cravings. Cue-reactivity and thought elaboration are cognitive processes that have been implicated in craving. Those who crave chocolate show strong attentional bias for chocolate related cues, and cue-elicited craving interferes with cognitive resources. One study showed that asking participants to imagine a food- related scenario can induce cravings, and that the vividness with which they envisioned the scenario impacted how strong their cravings were (Kemps & Tiggemann, 2010). The *Elaborated Intrusion (EI)* theory of desire explains craving as resulting from elaboration (which uses effortful cognitive processes) which arise from intrusive thoughts and the affective response associated with these thoughts (Kavanagh, Andrade, & May, 2005). As an example, an intrusive thought would be “I really want to eat chocolate right now”, which would prompt an individual to elaborate on this thought by imagining eating the chocolate, thinking about when they last had chocolate, etc.

Restraint is highly valued in the US, and failure to restrict consumption of calorically dense foods can make one appear weak and even induce feelings of guilt (Hormes, 2014). Women often hold ambivalent views of ‘unhealthy foods’- wanting it (because it is palatable and enjoyable) but feeling as though they cannot have it (in order to conform with social standards regarding restraint so as to maintain a slim figure). One study showed that the more conflicted an individual felt, the more they desired chocolate, but the less likely they were to actually consume it (Hormes & Rozin, 2011). It has also been shown that dietary restraint (restriction of food intake) is positively associated with chocolate cravings (Hill et. al, 1991). We therefore postulate that ambivalence encourages thought elaboration, as individuals are trying to figure out if they should or should not have the food and thus ruminate on it more. This elaboration then maintains and presumably strengthens the craving.

### **Craving & the Thin Ideal**

In the United States, we tend to hold thinness in high regard. Advertisements frequently feature thin models, even in ads for food. Literature suggests that associating thin models with chocolate could prompt women to feel ambivalent towards chocolate. For example, a study that looked at the effect of exposing women to thin models interacting with chocolate (by exposing participants to images of women eating or handling chocolate), found that women who reported high dietary restraint and who were exposed to chocolate + thin models reported the highest levels of approach towards chocolate, avoidance, and guilt (Durkin, Hendry, & Stritzke, 2012). Women feel ‘approach’ towards chocolate when they feel a desire to eat it due to its appetizing nature. Despite these feelings of ‘approach’, women can also feel the need to avoid chocolate, because of the message society sends that all women should be thin. As such, they desire to eat chocolate but avoid doing so to avoid conflicting with society’s norms. Interestingly, women

who reported high dietary restraint also consumed the most chocolate out of all the groups. Although this study explored many factors relating to craving (approach and avoidance to chocolate, feelings of guilt), it did not explicitly look at the factors that underlie craving- which is what we seek to do in the present study.

## **Present Study**

In the present study, we seek to examine the role of ambivalence in the thought elaboration as the basis of chocolate craving. We make the approach- avoidance conflict more salient by juxtaposing thin ideal and chocolate stimuli. Our hypothesis is that those exposed to the thin ideal in conjunction with chocolate cues will experience more ambivalence towards chocolate than those exposed to shoes in conjunction with chocolate cues, and thus endorse greater craving for chocolate. We are looking only at US- born women, in order to capture culture-specific norms.

## **Methods**

All methods were reviewed and approved by the local Institutional Review Board. Participants were informed of the nature and purpose of the research and provided consent prior to participation.

## **Participants**

A sample of 36 females (who self- identified as liking chocolate) aged between 18 and 30 ( $M = 20.37$  years,  $SD = 2.59$ ) participated in this study. The majority of these women were juniors in college (25.7%), with others identifying as freshmen, sophomore, senior, or “other”.

Mean body mass index (BMI) was 27.15 kg/m<sup>2</sup> (SD = 7.15), and 54.3% were overweight or obese (i.e., BMI  $\geq$  25 kg/m<sup>2</sup>).

## **Procedures**

Participants were recruited through an online system (University at Albany “Sona Systems” Research Pool) in which they signed up for desired time slots and received credit towards class requirements upon completion of the experimental session. Additional participants were recruited through advertising to student organizations. Upon arrival at the lab, participants went through an in-person check to make sure they met the following eligibility criteria: female, 18 years old or older, no consumption of chocolate in the last 24 hours and no consumption of food in the last 3 hours. Following that, they went on to complete the first set of questionnaires through the secure online server SurveyMonkey while seated at an individual computer station for privacy, providing information about demographics, experiences of craving, mood, and food avoidance as outlined in detail below. After completing these questionnaires, they went through a craving induction facilitated by the research assistant as described in more detail in the next section.

Following the craving induction, participants returned to the online survey to rate their current chocolate, sweet, and salty cravings and hunger, and to report on their mood. After this was completed, participants were shown a slide show which varied based on the condition to which they were randomized (see Figure 1). Both slideshows contained images of chocolate; the experimental condition included images of thin models, whereas the control condition was shown pictures of shoes as was done in similar prior work (Werthmann, Field, Roefs, Nederkoorn & Jansen, 2014). Shoes were used in conjunction with chocolate due to the fact that

it is a non- food item thought to be equally attractive to women. When the slideshow was finished participants again reported on craving, hunger, and mood. Participants were then presented with two bowls of chocolate chips, one semi- sweet and one milk chocolate, and instructed to perform a “taste test” as described below. They were told to eat as much of the chocolate as they would like in order to answer all of the questions on the screen. After delivering instructions, the researcher stepped out of the room until the participant reached the end of the study. While the participant completed the final questionnaires, the researcher weighed a bowl of individually wrapped chocolates which were to be provided to the participant at the end of the study along with a small bag, and participants were told to take home as much chocolate as they would like due to the lab ‘having an excess of chocolate.’ Following completion of the study, and after participants left the lab, the researcher would weigh the amount of chocolate taken home by the participant. After completing the taste test and final questionnaires, participants were then asked to report on what they believed to be the purpose of the study, and following that they were free to go and to take as much chocolate as they would like.

## **Measures**

**Demographics.** Participants were asked questions about their age, year in school, whether or not they had any allergies, feelings about chocolate, frequency of chocolate consumption, typical amount of chocolate consumption, and questions more specifically focusing on craving. In regard to craving, participants were asked to complete a questionnaire on whether or not they experience cravings, what they crave, how frequently they experience cravings for specific foods in general, as well as the frequency and intensity of chocolate

cravings. They were also asked whether they smoke, consume alcohol, or drink coffee. At the end of the study, participants were asked for their height, weight, ideal weight, and current dieting/ weight loss efforts.

**Visual Analog Scale (VAS).** At three points in the study, participants completed different VAS, all on a scale of zero through 100 (with 100 being the most extreme). The first VAS asked about cravings for different types of food (chocolate, salty, sweet, etc.) and their hunger level at that moment. The second set of VAS was identical and administered as a manipulation check to determine if the craving induction was successful. The third set of VAS was identical to the first two and administered to quantify changes in craving and hunger after the participant viewed the slideshow.

**Positive and Negative Affect Scale (PANAS).** The PANAS is a 20-item self-report questionnaire which measures positive (PA) and negative affect (NA) at that particular moment in time. High NA is epitomized by subjective distress and unpleasurable engagement, and low NA indicates an absence of these feelings. PA represents the extent to which an individual experiences pleasurable engagement, and low PA indicates feelings such as sadness and lethargy. (Watson & Clark, 1984)

**Food Craving Questionnaire- Trait.** The Food Craving Questionnaire- Trait consists of 39 items whose scores have been found to be positively associated with eating pathology, body mass index (BMI), low dieting success and increases in state food craving during cognitive tasks involving appealing food stimuli (Meule et al., 2014).

**Food Craving Questionnaire- State.** The FCQ- S assesses state-dependent cravings - whether these cravings are experienced in response to momentary situations or physiological/



psychological states (Nijs, Franken & Muris, 2007). FCQ-S (Cepeda- Benito et. al, 2000) contains questions about whether or not they were experiencing chocolate cravings in that moment (“I have an urge for chocolate”), questions on how they think they would feel if they were to fulfill these cravings (“Eating chocolate would make things seem just perfect”), and how strong their desires for chocolate were in that moment (“My desire to eat chocolate seems overpowering”). These items were rated on a five- point scale ranging from ‘strongly agree’ to ‘strongly disagree’.

**Dietary Restraint.** This section contained 10 questions relating to dieting (“How often are you dieting?”), weight (“In a typical week how much does your weight fluctuate?”), and feelings related to weight and eating (“Do you give too much time and thought to food?”)

### **Craving Induction**

Participants received a tray with five pieces of chocolate on it and were asked to unwrap them while taking in their appearance and smell, and then to place them in the order which they would like to eat them. Once this task was completed, they were asked to close their eyes and think back to the last time they had consumed their favorite kind of chocolate. They were given a minute to recall this memory, and then asked by the researcher if they had a specific instance of eating chocolate that they recall as being very pleasant. If they responded yes, they were then asked to remember what eating the chocolate felt like, and to try to relive the smell, the taste and feeling of eating it. If they responded no, the participant was given more time to envision a pleasant experience of eating chocolate. The participant then closed their eyes and envisioned this experience for one moment.

## Taste Test

At the conclusion of the experimental task, participants were given two bowls of chocolate chips (milk chocolate and semi- sweet) and told to eat as much as they would like as they answer a set of questions about the characteristics of each chocolate as well as which chocolate was their favorite. The questions were used as a placeholder to give the participant the opportunity to eat chocolate, and to make the different qualities of the chocolate salient in their mind. Participants were then invited to take chocolate home. Once the participant left the laboratory, the researcher weighed the bowls of chocolate chips as well as the bowl of individually wrapped chocolates participants were offered to take home. These were compared to the initial weights of the bowls, and recorded.

## Results

There were 18 participants randomly assigned to each condition (Figure 2). There were no significant between- group differences at baseline in mean BMI (*Control*  $M = 27.32 \text{ kg/m}^2$ ,  $SD = 6.87$ ; *Thin ideal*  $M = 26.99 \text{ kg/m}^2$ ,  $SD = 7.61$ ;  $t(33) = .14$ ,  $p = .89$ , Cohen's  $d = .05$ ) or dietary restraint (*Control*  $M = 13.12$ ,  $SD = 6.62$ ; *Thin ideal*  $M = 14.53$ ,  $SD = 6.29$ ;  $t(32) = -.64$ ,  $p = .53$ , Cohen's  $d = -.22$ ). There was no significant multivariate main effect of condition on combined FCQ- T subscale scores [ $F(9, 19) = .63$ ,  $p = .76$ ,  $\eta_p^2 = .23$ ], suggesting no between- group differences in trait craving.

To test whether the craving induction was successful, we looked at the change score for the VAS for chocolate craving at time point 1 (prior to induction) versus time point 2 (after the induction). Based on these results, it was indicated that the craving induction was successful in both conditions (Change score- *Control*  $M = 28.80$ ,  $SD = 21.18$  ; *Thin Ideal*  $M = 23.80$ ,  $SD =$

17.54 ). We next looked at whether there were differences in craving between groups as a result of the experimental manipulation (i.e., exposure to the thin ideal versus control (shoe) images) by looking at the change score for the VAS at time point 2 and time point 3 (following the viewing of the slideshows). There were no significant between- group differences (Control  $M = -4.29$ ,  $SD = 25.93$ ; Thin ideal  $M = -7.89$ ,  $SD = 22.51$ ;  $t(33) = .44$ ,  $p = .66$ , Cohen's  $d = .15$  ) (Figure 3).

Next, we performed a t- test to see if there were differences between conditions in changes in mood as captured by change scores on the PANAS from time 2 to time 3. There were no significant differences between the two conditions for positive and negative affect (PA: Control  $M = -1.81$ ,  $SD = 4.2$ ; Thin ideal  $M = -1.75$ ,  $SD = 2.98$ ;  $t(30) = -.049$ ,  $p = .96$ , Cohen's  $d = -.05$  ) (NA: Control  $M = 1.19$ ,  $SD = 2.46$ ; Thin ideal  $M = 1.5$ ,  $SD = 2.68$ ;  $t(32) = -.35$ ,  $p = .73$ , Cohen's  $d = .16$  ).

When looking at changes in scores on the FCQ-S from time 2 to time 3, we observed a non- significant main effect. In spite of overall non- significant findings, it is worth noting that there was an increase on the desire subscale for the thin ideal group ( $M = .28$ ,  $SD = 1.9$ ) and a decrease in the control group ( $M = -.67$ ,  $SD = 1.5$ ). There was also an increase on the control subscale for the thin ideal group ( $M = .24$ ,  $SD = 1.52$ ) and a decrease in the control group ( $M = -.6$ ,  $SD = 1.72$ ) (Figure 4). This suggests an overall increase in the desire to consume chocolate and fear of losing control over consumption in the experimental groups, compared to an overall decrease in the control group.

Finally, there were no significant between- group differences in amount of chocolate consumed during the taste test (Control  $M = 16.09$ ,  $SD = 11.76$ ; Thin ideal  $M = 17.95$ ,  $SD =$

13.87;  $t(31) = -.41, p = .68$ , Cohen's  $d = -.14$  ). While there were no statistically significant differences between the two groups, we did observe that the thin ideal condition took home more chocolate (about 20g) than the control group (Control  $M = 70.09$  g,  $SD = 67.78$ , Thin ideal  $M = 98.49$  g,  $SD = 236.73$ ;  $t(31) = -.46, p = .65$ , Cohen's  $d = -.16$ ).

In those randomized to the thin ideal condition, there was a statistically significant inverse correlation ( $r = -.49, p = .05$ ) between craving for sweet and the amount of chocolate consumed during the taste test. The same was not true for the control group.

## Discussion

This study sought to explore how viewing thin ideal imagery in conjunction with chocolate cues influences feelings of craving in US- born women. We hypothesized that women in the thin ideal condition would experience more feelings of ambivalence, and as a result of this ambivalence, experience a greater craving for chocolate. Ambivalence was induced by making chocolate craving much more salient to the participant, and then presenting the craved food alongside images of thin models. This makes the 'thin ideal' that we value in the U.S. (and which is not thought to be attainable if one is eating high- fat, sugary foods such as chocolate) more salient to the participant as well. Looking at the data, it is clear that the craving induction was successful for both conditions, however. Both conditions reported significantly increased chocolate craving intensity from time point 1 to time point 2, meaning before and after the induction. We were next curious about whether there were differences between the groups on self- reported craving following the viewing of the slideshows. We had expected that those in the thin ideal condition would report stronger craving for chocolate than those in the control condition. While there were no statistically significant differences, we did observe that self-

reported chocolate craving decreased slightly more in the thin ideal condition (Figure 3). We next looked at mood (through individuals' self-report on PANAS), as we were expecting an increase in negative affect as a result of viewing thin ideal images, as well as an increase in craving in those randomly assigned to the thin ideal condition. Looking at the PANAS results, we found that there were no differences between the conditions in self-reported positive or negative affect.

FCQ-S (which is a measure of state chocolate craving and was expected to change dynamically throughout the study) results showed that the thin ideal condition experienced an increase in desire for chocolate from time point 2 to time point 3 (Figure 4), while the control group experienced a decrease- keeping in mind that these results were not statistically significant. Participants randomized to the thin ideal condition also had an increase in worry of losing control over chocolate consumption during this time, and the control condition reported a decrease (see Figure 5). These findings are interesting because while the individuals in the experimental condition may not actively recognize feelings of craving (as reflected by their lower than expected self-reported craving) they had more of a desire for chocolate but also worried about losing control if they were to eat the craved food. Thus, self-report of craving may not always be an accurate measure, and exposure to thin ideal media may prompt individuals to underreport craving (perhaps due to social desirability and concerns about being judged by the experimenter). This relates to our hypothesis because while those in the thin ideal group felt a greater desire to consume chocolate (a critical aspect of the craving experience), they still reported that they did not feel a significant increase in craving for chocolate. As mentioned, because we value dietary restraint in the U.S. there is a certain amount of pressure on women to restrict food intake and maintain a slim figure- which may be why participants underreported

craving. While these findings are not in line with our hypothesis that the thin ideal group would experience an increase in craving, desire for chocolate is certainly a component of craving and as such it is significant that we see an increase in this in the thin ideal condition. The fact that participants were experiencing feelings of fear of losing control while eating chocolate in conjunction with feeling a desire to eat chocolate points to the feelings of ambivalence which we expected to see in the thin ideal condition.

The thin ideal condition was found to have taken more chocolate home overall than the control (approximately 20g more, which is equivalent to about 4 Hershey's kisses, or about 80-100 calories of chocolate). At the same time, there were no significant differences in the amount of chocolate consumed in the lab (Figure 6). Amount of chocolates consumed in the lab in those randomized to the thin ideal condition was inversely correlated with self-reported cravings for sweet food (Table 1). It is interesting that as craving for sweets increases, participants eat less in the lab. Previous research has shown that the more ambivalent an individual feels regarding food (wanting it but feeling as though they cannot have it), that they may desire the food more but eat less. In fact, these feelings of ambiguity are a known marker for craving. These findings can be interpreted in terms of a possible role for social desirability and suggests that those exposed to the thin ideal were especially concerned about being observed consuming chocolate in the lab, but may have been less worried about doing so in private, following completion of the study.

There were a few limitations in this study. First of all was the fact that primarily self-report measurements were utilized. While these are often reliable indicators of the factors being studied, it is difficult to account for differences in individual reporting. As we saw based on the results, participants in the thin ideal condition felt a desire to eat chocolate, but their cravings for

sweets caused them to eat less chocolate in the lab. Individuals may unknowingly underreport their feelings of craving or their reporting may be influenced by social desirability.

This study also had a relatively small sample size ( $N = 36$ ). The number necessary for this sample was predetermined in an a priori power analysis, but perhaps in a larger sample we would have seen more significant results and be able to observe different patterns. If repeated, this type of study should seek to utilize a larger sample. We could have also, perhaps, restricted participants to the 'normal' BMI range. This sample was slightly more overweight/ obese than the average population.

There is also difficulty in isolating the influence of culture. Although all participants were US- born, we did not account for their cultural background, or even how much they identify with/ are exposed to US culture. Say an individual was raised by immigrants, lived in an area of primarily one race or culture, or simply were exposed to different kinds of media. This could have a significant effect on how they are impacted by the thin ideal. Although participants were randomly assigned to conditions, future studies should seek to look more thoroughly into an individual's cultural background, and account for any differences in exposure to US culture.

In conclusion, although few of the results were statistically significant, this study has some findings of potential interest. Observing that there is an inverse correlation between sweet cravings and chocolate consumption, as well as the thin ideal experiencing more desire for chocolate as well as fear of losing control is in line with one of the cognitive factors for craving- feelings of ambivalence. Future studies might attempt to replicate this study with a larger sample size in order to, hopefully, find more statistically significant findings.

## Appendix

**Figure 1.** Photos from each of the conditions slideshows.

*Condition 1*



*Condition 2*



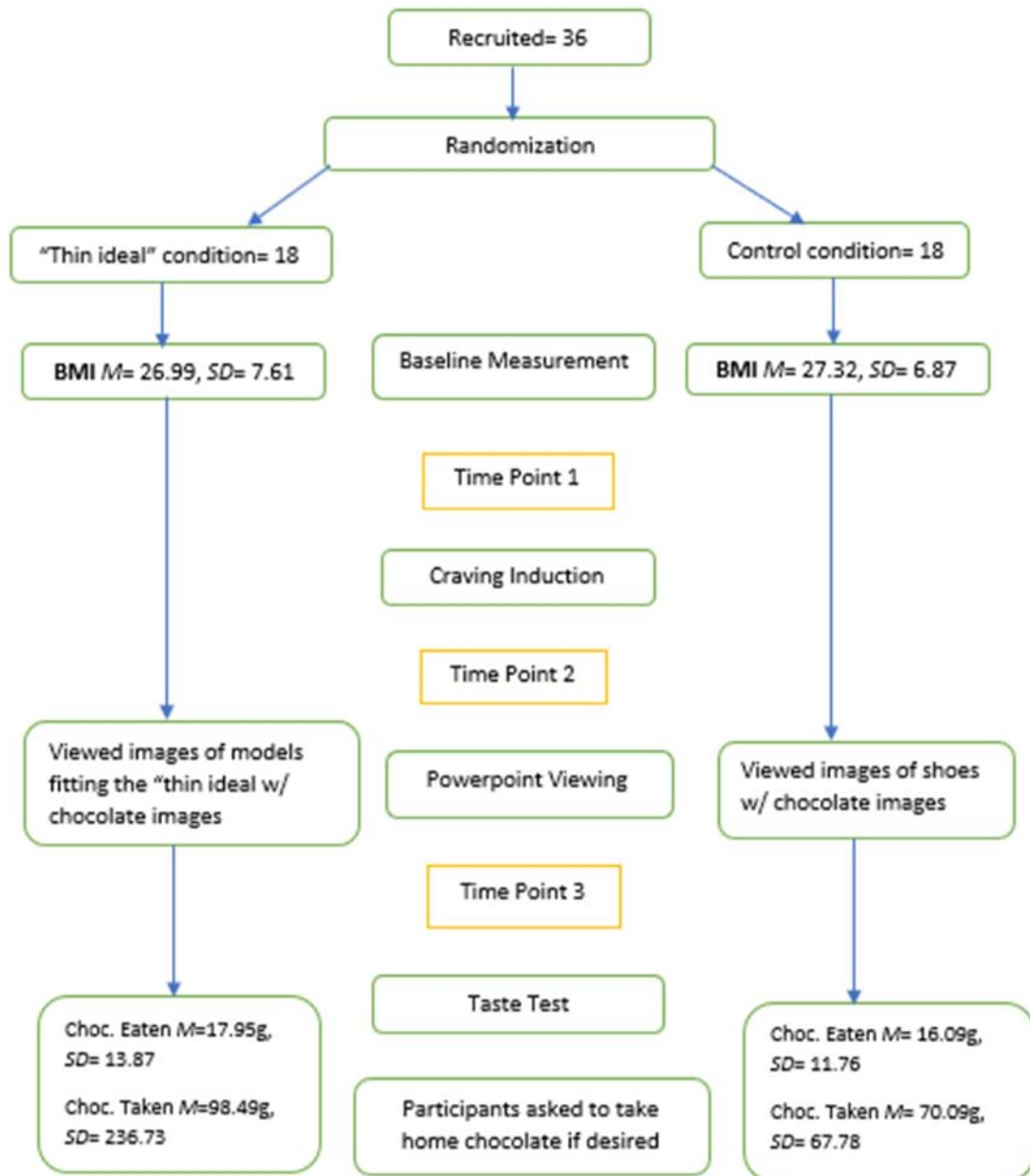


**Figure 1 (cont.)**

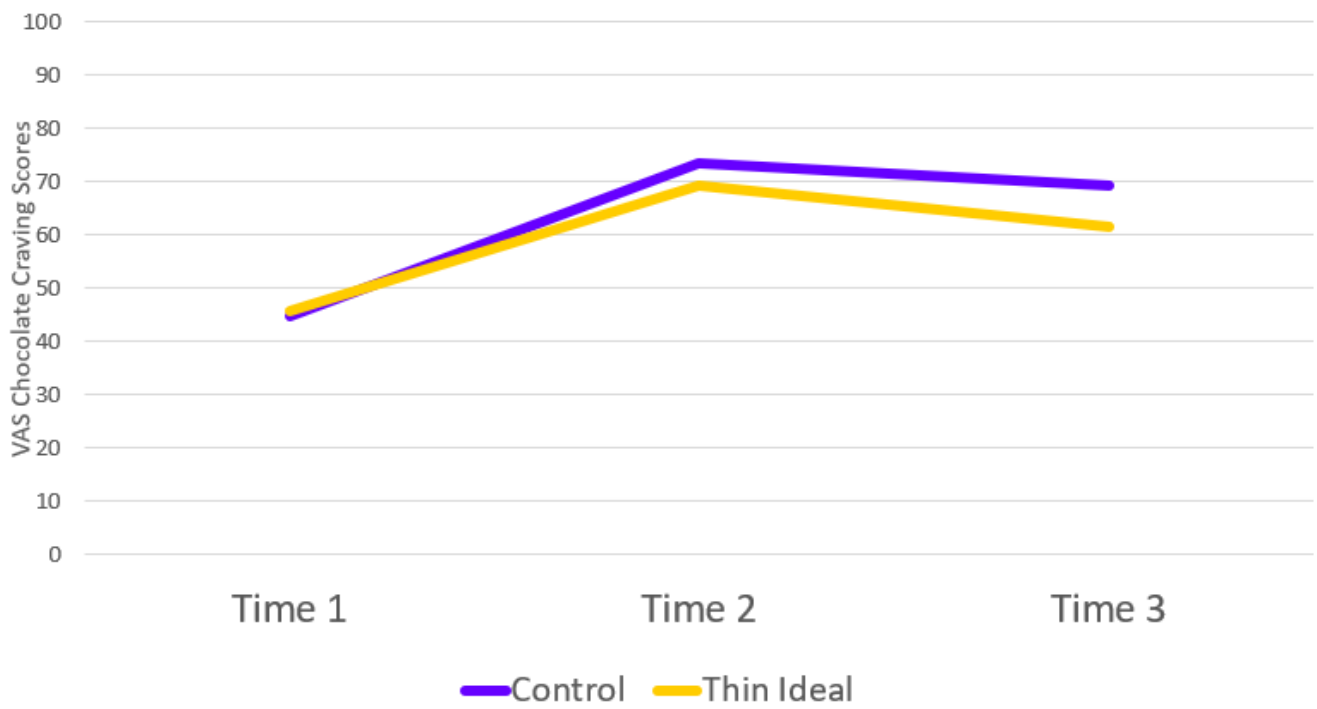
*Chocolate shown in conjunction with images from both conditions*



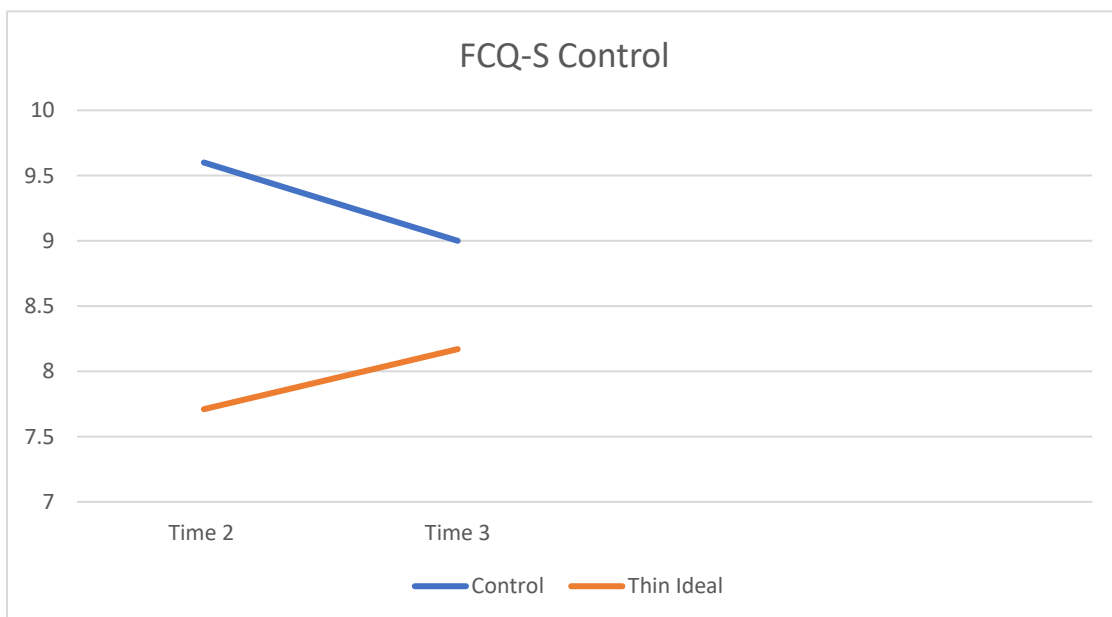
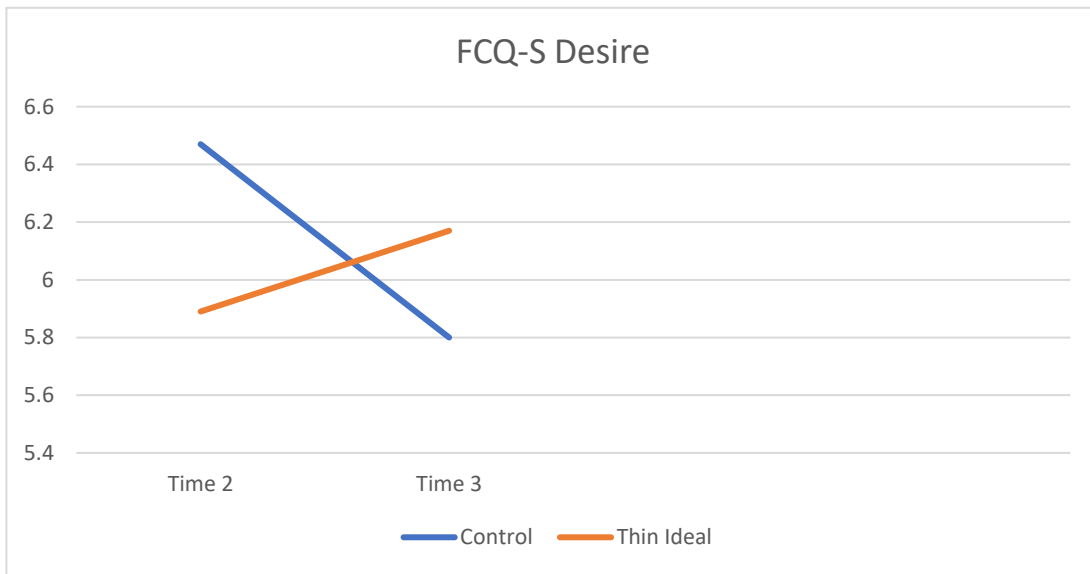
**Figure 2.** Full experimental design.



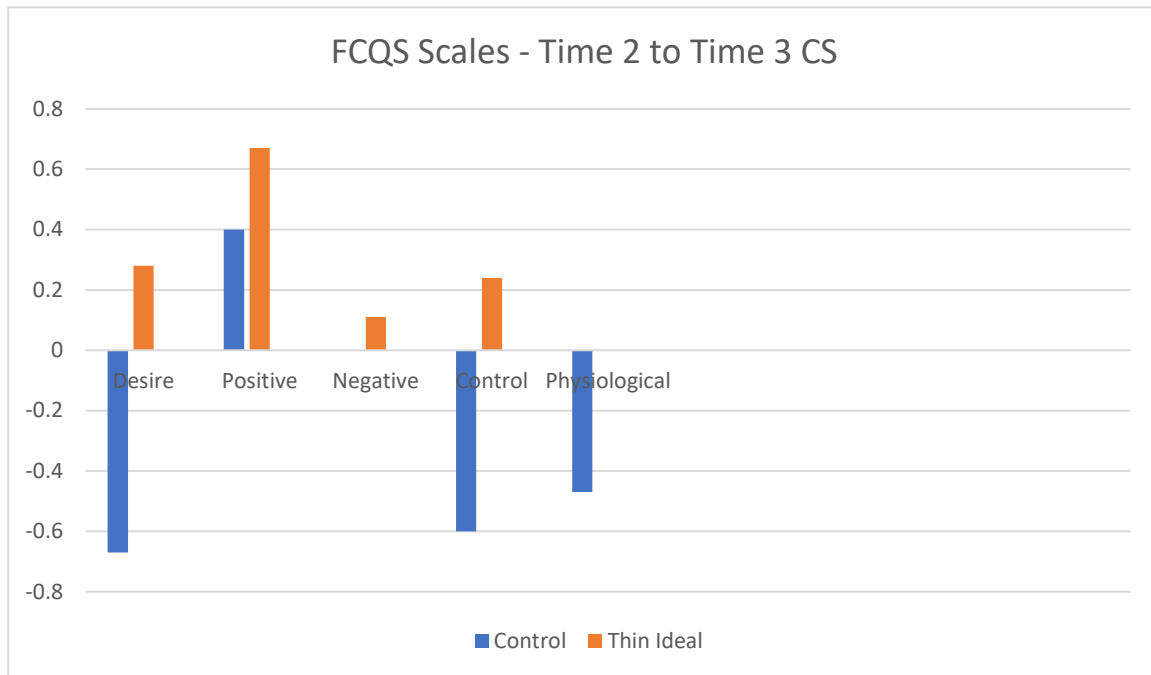
**Figure 3.** Mean scores for each condition at each of the three time points for VAS on chocolate cravings.



**Figure 4.** Change in means from Time 2 to Time 3 on FCQ-S subscales ‘desire’ and ‘control’



**Figure 5.** Change scores for each condition on FCQS subscales from time point 2 to time point 3.



Note: “Desire” refers to an intense desire to eat.

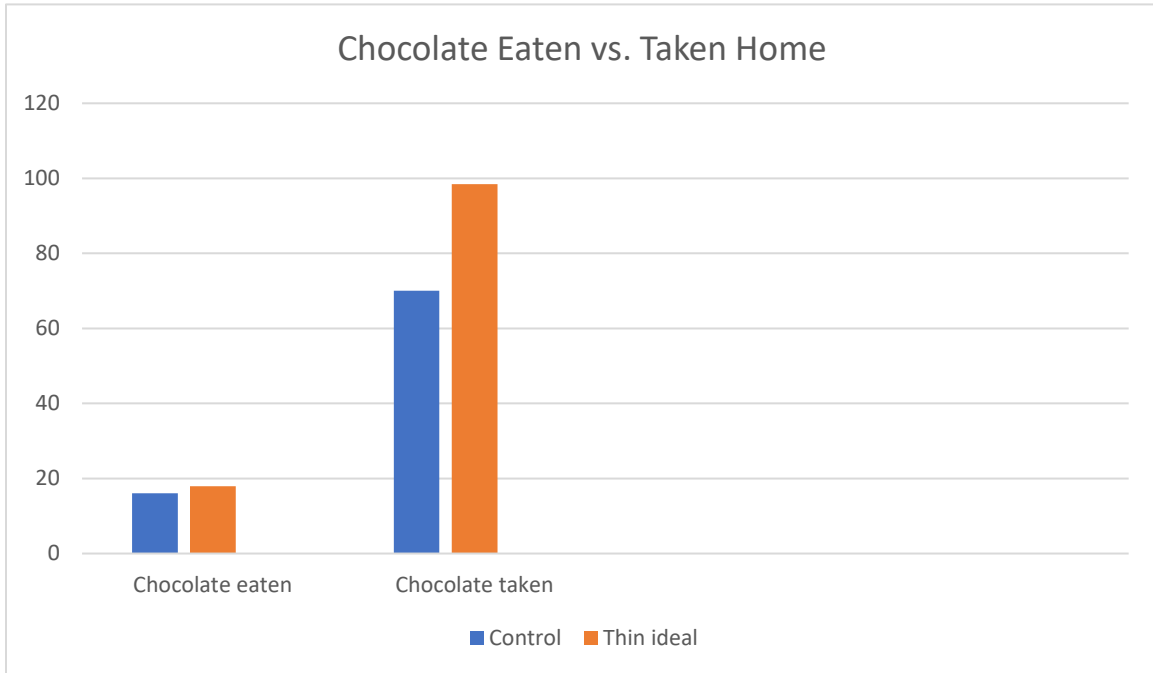
“Positive” refers to anticipation of positive reinforcement that may result from eating.

“Negative” refers to anticipation of relief from negative states and feelings as a result of eating.

“Control” refers to obsessive preoccupation with food or lack of control over eating.

“Physiological” refers to craving as a physiological state.

**Figure 6.** Weight of chocolate consumed during the taste test vs. weight of chocolate taken home. Measurements taken in grams.



**Table 1.** Correlation between craving for sweet foods and amount of chocolate taken home by participant.

	<b>On a scale from 0-100, where 100 refers to extreme craving, please rate your current craving for sweet foods</b>	
<b>Record amount of chocolates consumed during taste test</b>	Pearson Correlation	-.399
	Sig. (2-tailed)	.125
	N	16

## References

- Centers for Disease Control and Prevention. (2018). Adult obesity facts.  
<https://www.cdc.gov/obesity/data/adult.html>
- Cepeda-Benito, A., Gleaves, D. H., Williams, T. L., & Erath, S. A. (2000). The development and validation of the state and trait food-cravings questionnaires. *Behavior therapy, 31*(1), 151-173.
- Durkin, K., Hendry, A., & Stritzke, W. G. (2013). Mixed selection. Effects of body images, dietary restraint, and persuasive messages on females' orientations towards chocolate. *Appetite, 60*, 95-102.
- Hill, A. J., Weaver, C. F., & Blundell, J. E. (1991). Food craving, dietary restraint and mood. *Appetite, 17*(3), 187-197.
- Hormes, J. M. (2014). Perimenstrual chocolate craving: from pharmacology and physiology to cognition and culture. In C. Hollins-Martin, O. Van Den Akker, C. Martin, & V. R. Preedy (Eds.), *Handbook of diet and nutrition in the menstrual cycle, periconception and fertility* (pp. 61-70). Wageningen Academic Publishers.
- Hormes, J.M. (2017). The clinical significance of craving across the addictive behaviors: A review. *Current Addiction Reports, 4*(2), 132-141.
- Hormes, J. M., & Rozin, P. (2009). Perimenstrual chocolate craving. What happens after menopause?. *Appetite, 53*(2), 256-259.
- Hormes, J. M., & Rozin, P. (2010). Does “craving” carve nature at the joints? Absence of a synonym for craving in many languages. *Addictive Behaviors, 35*(5), 459-463.



- Hormes, J. M., & Rozin, P. (2011). The temporal dynamics of ambivalence: Changes in positive and negative affect in relation to consumption of an “emotionally charged” food. *Eating Behaviors, 12*(3), 219-221.
- Kavanagh, D. J., Andrade, J., & May, J. (2005). Imaginary relish and exquisite torture: the elaborated intrusion theory of desire. *Psychological Review, 112*(2), 446.
- Kemps, E., & Tiggemann, M. (2010). A cognitive experimental approach to understanding and reducing food cravings. *Current Directions in Psychological Science, 19*(2), 86-90.
- Lowe, C. J., Vincent, C., & Hall, P. A. (2017). Effects of noninvasive brain stimulation on food cravings and consumption: a meta-analytic review. *Psychosomatic Medicine, 79*(1), 2-13.
- Meule, A., Hermann, T., & Kübler, A. (2014). A short version of the Food Cravings Questionnaire—Trait: the FCQ-T-reduced. *Frontiers in Psychology, 5*, 190.
- Michener, W., & Rozin, P. (1994). Pharmacological versus sensory factors in the satiation of chocolate craving. *Physiology & Behavior, 56*(3), 419-422.
- Ng, L., & Davis, C. (2013). Cravings and food consumption in binge eating disorder. *Eating Behaviors, 14*(4), 472-475.
- Nijs, I. M., Franken, I. H., & Muris, P. (2007). The modified Trait and State Food-Cravings Questionnaires: Development and validation of a general index of food craving. *Appetite, 49*(1), 38-46.
- Orloff, N.C., Flammer, A., Hartnett, J., Liquorman, S., Samelson, R., & Hormes, J.M. (2016). Food cravings in pregnancy: Preliminary evidence for a role in excess gestational weight gain. *Appetite, 105*(1), 259-265

- Orloff, N. C., & Hormes, J. M. (2014). Pickles and ice cream! Food cravings in pregnancy: hypotheses, preliminary evidence, and directions for future research. *Frontiers in Psychology, 5*, 1076.
- Osman, J. L., & Sobal, J. (2006). Chocolate cravings in American and Spanish individuals: Biological and cultural influences. *Appetite, 47*(3), 290-301.
- Pelchat, M. L., & Schaefer, S. (2000). Dietary monotony and food cravings in young and elderly adults. *Physiology & Behavior, 68*(3), 353-359.
- Pope, J. F., Skinner, J. D., & Carruth, B. R. (1992). Cravings and aversions of pregnant adolescents. *Journal of the American Dietetic Association, 92*(12), 1479-1482.
- Rodin, J., Mancuso, J., Granger, J., & Nelbach, E. (1991). Food cravings in relation to body mass index, restraint and estradiol levels: a repeated measures study in healthy women. *Appetite, 17*(3), 177-185.
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin, 96*, 465-490.
- Weingarten, H. P., & Elston, D. (1991). Food cravings in a college population. *Appetite, 17*(3), 167-175.
- Werthmann, J., Field, M., Roefs, A., Nederkoorn, C., & Jansen, A. (2014). Attention bias for chocolate increases chocolate consumption—an attention bias modification study. *Journal of Behavior Therapy and Experimental Psychiatry, 45*(1), 136-143.
- Zellner, D. A., Garriga-Trillo, A., Centeno, S., & Wadsworth, E. (2004). Chocolate craving and the menstrual cycle. *Appetite, 42*(1), 119-121.