Great Expectations: The Effects of Mental Simulation on Affective Experience

by

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ABSTRACT

Research has examined how thinking about the future makes us feel as well as how we think that the future will make us feel. However, the effects of thinking about the future on our future experiences have not been investigated. The current research introduces a model to explain how thinking about pleasant future events might influence our experience of those events. The model holds that representations of pleasant future events may be idealized, and that thinking about pleasant future events may result in more extreme affective expectations for those events. However, the effects that expectations have on experience will depend on whether or not a discrepancy between expectations and experience is noticed. When a discrepancy is not noticed, positive expectations result in more positive experiences. However, when a discrepancy is noticed, positive expectations result in less positive expectations.

Various predictions of the model were tested in a series of four experiments. In all experiments, participants ate a mediocre chocolate-chip cookie and reported their enjoyment of the cookie. As previous research has demonstrated that cognitive load makes noticing a discrepancy between expectations and experience more likely, some participants ate the cookie while under cognitive load. Experiment 1 found that only participants low in need for cognition who ate the cookie under cognitive load showed assimilation to expectations. In Experiment 2, participants who provided their expectations after simulating the cookie did not report significantly higher expectations for the cookie than those who provided their expectations before simulating the cookie. Experiment 3 provided some evidence that cookie simulation resulted in greater

enjoyment of the cookie, but no evidence that cookie simulation resulted in more positive expectations for the cookie, or that cognitive load moderated the relationship between expectations and experience. Experiment 4 provided no support for any of the predictions of the model. Possible problems related to operationalization of the model are discussed, as are the theoretical implications of both the obtained and unobtained results.

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CHAPTER I: INTRODUCTION

Monday comes, and already, we cannot wait for Friday. Each day brings us closer to the weekend, and the contents of consciousness fill with thoughts, feelings, and plans for Friday night. The imagination of those events may bring with it the good feelings associated with them. But what effects might the imagination of Friday night have on our actual experience of Friday night?

The above illustration is composed of many psychological elements. First, there is the pervasive tendency for humans to engage in "mental time travel" (Sheldon & Vansteenkiste, 2005), or mental simulation of the future (Sanna, Carter, & Burkley, 2005). Some, such as philosopher Daniel Dennett, have even proposed mental simulation as the basis for the evolution of consciousness: "…the fundamental purpose of brains is to produce future" (Dennett, 1991, p. 177).

Second, the simulation of a future event requires some initial representation of the event (e.g., Wilson & Gilbert, 2003). Each person's representation of Friday night will include a variety of elements and the feelings associated with those elements, and this mental schema will guide the mental simulation of Friday night. These schemas are the foundation of our expectations for future events (e.g., Lowenstein & Schkade, 1999). To the extent that our schema for Friday night is composed of positive elements, we will likely expect to enjoy Friday night.

Finally, simulations involve the active elaboration of these schemas in consciousness. A person whose schema for Friday night includes a few beers at the pool hall with friends may actually imagine the event unfolding in time: "Mental simulation refers to the imitative representation of the process of an event…it includes the cognitive

construction of hypothetical scenarios (and) rehearsals of likely future events" (Taylor & Pham, 1996).

Literature Review

The question for the current research is this: How does the mental simulation of a future event influence our affective experience of the event? Several theoretical perspectives bear on this question. Counterfactual thinking—or the imagination of alternative realities—can have an impact on emotional experience (e.g., Roese & Olson, 1997; Sanna, et al., 2005). The intensity bias (e.g., Buehler & McFarland, 2001), or the overestimation of our affective reactions to future events, suggests a tendency to represent idealized versions of future events. The attitude polarization literature (see Tesser, Martin, & Mendolia, 1995, for a review) demonstrates some possible affective consequences of elaborating those representations via mental simulation. Finally, the affective expectation model (e.g., Wilson & Klaaren, 1992) and decision-affect theory (e.g., Mellers & McGraw, 2001) highlight the affective consequences of our expectations for future events. Each of these literatures will be considered with regard to the current research question: How does the mental simulation of a future event influence our affective experience of the event?

Mental Simulation and Counterfactual Thinking

Counterfactuals are simulations of past events that did not happen, but can be imagined to have happened (Sanna, 2000). The relationship of counterfactual thinking to affect has its roots in norm theory. According to norm theory (Kahneman & Miller, 1986), the comparison of experienced outcomes with easily imagined alternative outcomes can have affective consequences. Thus, the impact an alternative outcome has

on emotion is in part determined by how easily the alternative outcome is brought to mind. Consider this classic example from Kahneman and Tversky (1982): Given two airport-bound individuals who miss their respective flights—one by 5 minutes, the other by 30—who is likely to feel worse? According to norm theory, the former will feel worse, because it is easier to imagine having actually made the flight when one is only 5 minutes late.

Counterfactual thinking can lead to affective contrast, such that downward counterfactuals, or the comparison of an obtained outcome with a more negative imagined outcome, lead to increased positive affect. Likewise, upward counterfactuals, or the comparison of an obtained outcome with a more positive imagined outcome, lead to increased negative affect. Perhaps the most well-known example of the effects of counterfactual thinking on emotion is the finding that bronze-medal Olympians appear happier than silver-medal Olympians (Medvec, Madley, & Gilovich, 1995; cf. McGraw, Mellers, & Tetlock, 2005). At first counterintuitive, norm theory provides one possible explanation: Silver medalists may more easily produce upward counterfactuals (e.g., "I could have won the gold"), while bronze medalists may more easily make downward counterfactuals (e.g., "I could have won nothing at all"). Thus, bronze medalists feel better than silver medalists.

Counterfactual thinking can also result in affective assimilation. Assimilation occurs when imagining a better outcome leads to increased positive affect and imagining a worse outcome leads to increased negative affect. According to the reflection and evaluation model of comparative thinking (Markman & McMullen, 2003), affective contrast is a result of what the model terms *evaluation*, which occurs when that which is

imagined to have happened is compared with what did actually happen. Assimilation is a result of what the model terms *reflection*, which occurs when that which is imagined to have happened is not compared with what did actually happen. Rather, people simply reflect on the imagined alternative. In support of the model, McMullen (1997) observed affective assimilation when participants were asked to "vividly imagine what might have happened" in regard to a negative life event. That is, there was no comparison of the imagined event with the actual event. With these instructions, participants who imagined better outcomes actually felt better and participants who imagined worse outcomes actually felt worse. However, affective contrast was obtained when participants were instructed to think about the imagined alternative in relation to the actual event, such that those who imagined better outcomes felt worse and those who imagined worse outcomes felt better.

Counterfactual thinking typically refers to the imagination of events that could have happened but did not. Conversely, prefactual thinking involves the imagination of events that could happen in the future. As Sanna (2000) observes, the principles that explain the affective consequences of counterfactual thinking may generally operate the same way for prefactual thinking. Thinking about the future can result in affective assimilation: Participants who imagine positive outcomes to various problems experience increased positive affect (Oettingen, Pak, & Schnetter, 2001). Likewise, participants who list possible negative outcomes to topics of worry experience increased anxiety and discomfort (Vasey & Borkovec, 1992). Simulation can also have consequences for the future: Participants who simulate coping with an interpersonal or academic problem show increased positive affect immediately after simulation and after one week daily five-

minute simulation exercises (Rivkin & Taylor, 1999). However, the effect of mentally simulating a future event on the actual affective experience of that event has not been investigated.

While it is not well-documented how thinking about the future makes us feel, there is research on how we think the future will make us feel. For the most part, people are rather accurate in determining whether something will be pleasant or unpleasant (e.g., Robinson & Clore, 2001), but they are not necessarily accurate in determining how pleasant or unpleasant something will be. Rather, people show a general tendency to overestimate how much they will enjoy pleasant future experiences (see Wilson & Gilbert, 2003, for a review). In the affective forecasting literature, this is known as the intensity bias (Buehler & McFarland, 2001); it has also been termed rosy prospection (Miller & Thompson, 1994). Importantly, research on the intensity bias highlights a fundamental source of error in the way that people represent future affective experiences.

Error and Bias in the Representation of Future Affective Experience

Research has well documented a pervasive tendency to overestimate both the duration (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000) and intensity (Buehler & McFarland, 2001) of affective experiences. This work has been conducted in the affective forecasting paradigm, which involves asking people to predict how they will feel after a specific future event takes place (see Wilson & Gilbert, 2003, 2005, for reviews).

Importantly, Buehler and McFarland (2001, Study 2) have provided evidence for the intensity bias over a very short period of time. At the beginning of a class period, participants were asked to predict their affective reactions to receiving their midterm

grade, which was revealed later in the class period. Specifically, participants judged how intensely they would feel a series of positive and negative emotions after learning they had received the grade they expected to receive, one grade lower and one grade higher than they expected to receive, and two grades lower and higher than they expected to receive. Participants made these same affect judgments immediately after learning the actual midterm grade. Results provided evidence for the intensity bias: Participants predicted more extreme affective reactions than they reported experiencing for both positive (better grades than expected) and negative (worse grades than expected) outcomes.

Buehler and McFarland (2001) suggest that the intensity bias is due to a tendency for people to misrepresent future events when making affective forecasts. Specifically, mental representations of future events tend to be idealized – that is, they tend to be better than actual. Buehler and McFarland (2001, Study 3) provided support for this hypothesis by measuring temporal focus in affective forecasts. Participants completed an open-ended thought listing measure in which they were asked to list all of their thoughts about how they would feel on the upcoming Christmas day. They then completed an affect measure to assess their predicted feelings on Christmas day. Thoughts were coded as to whether they focused more on the upcoming Christmas holiday or previous Christmas holidays. Participants then completed a take-home questionnaire shortly after Christmas which consisted of a retrospective affect measure. Results indicated an intensity bias, such that participants made more extreme forecasts of positive affect than they reported experiencing. Furthermore, this intensity bias was significantly greater for those who focused on the upcoming Christmas than those who focused on past Christmas vacations,

as assessed by the open-ended thought listing measure. These results suggest that participants generated more idealized representations of the upcoming Christmas when they did not consider the events of past Christmas days.

These results are also consistent with those of Van Boven and Ashworth (in press), who demonstrated that participants experience more positive affect when imagining future experiences than when recalling those same experiences, such as the Thanksgiving holiday. Because in Buehler and McFarland (2001, Study 3) affect measures were taken sometime after Christmas day, the results of Van Boven and Ashworth (in press) suggest that the results of Buehler and McFarland (2001, Study 3) may in part be due to a retrospective bias. That is, participants may have simply remembered less positive affect than they actually experienced. However, a retrospective bias does not easily account for the greater intensity bias among those who listed more future-oriented Christmas thoughts. Additionally, people both predict and remember more intense emotions than they actually report experiencing (Wirtz, Kruger, Scollon, & Diener, 2003), and the intensity bias, or the tendency to overestimate affective reactions to future events, has been obtained with on-line measures of affect—that is, as events unfold. College students tend to overestimate how much positive and negative affect they will experience over spring break than they actually report experiencing over spring break (Wirtz et al., 2003), and people predict more positive vacations than they actually have (Mitchell, Thompson, Peterson, & Kronk, 1997).

Drawing on research that highlights the biases that shape and color our representations of the past (see Johnson & Sherman, 1990, and Ross & Buehler, 2001, for reviews), Mitchell and Thompson (1994) have identified several common principles that

may tend to bias our representations of the future. For instance, self-enhancement biases may play a role in the intensity bias, or what Mitchell and Thompson (1994) call rosy prospection. Self-enhancement biases occur when the idealized representation of an event makes one feel or look better. The idealization of positive events may serve a "positive illusion" function (e.g., Taylor & Brown, 1988) that allows us to believe good things will happen for us. It may also be the case that idealized versions of positive events are more easily brought to mind than more realistic versions (e.g., Mitchell & Thompson, 1994). According to the availability heuristic (Kahneman & Tversky, 1984), evaluations are guided by information that is easily brought to mind. In the case of Christmas, for instance, to the extent that participants focused on the future Christmas to the neglect of past Christmases (e.g., Buehler & McFarland, 2001), affective forecasts may have been guided by a highly idealized Western-prototypical Christmas schema.

Thus, there is reason to believe that people's representations of future affective experiences tend to be idealized. Such idealized representation may be at least one mechanism that underlies affective forecasting errors, and these errors may represent unrealistic expectations for future events. But what effects might the mental simulation of the future experience have on the actual experience of the event? The foregoing analysis suggests that the representation of Friday night is already idealized to some degree. In reality, though, we do not simply imagine how we are going to feel about an upcoming event and then forget about it. As the anecdote at the beginning illustrates, we may actually imagine the event taking place in a particular way (see also Lowenstein & Schkade, 1999). What happens to that representation of Friday night when it is actively elaborated via mental simulation?

Thought tends to polarize feelings – that is, to make them more extreme, such that positive feelings become more positive, and negative feelings become more negative (see Tesser, 1978, and Tesser, Martin, & Mendolia, 1995, for reviews). Sadler and Tesser (1973) found that when participants were given time to spend thinking about an interaction partner their attitudes toward the partner became more polarized. Specifically, participants were paired with a confederate who acted in either a friendly or cold manner toward them. Participants paired with a cold partner developed more negative attitudes when given time to think about the partner. Likewise, participants paired with a friendly partner developed more positive attitudes when given time to think about the partner. In a later study, Tesser and Conlee (1975) manipulated the amount of time spent thinking. Participants were instructed to think about a variety of attitude objects (e.g., prostitution) for varying lengths of time. In two experiments, attitude polarization was directly related to the amount of time spent thinking about the attitude object, with greater amounts of time associated with more extreme attitudes.

A more recent demonstration of the tendency for thought to polarize evaluations comes from research on the unpacking effect (Savistky, Van Boven, Epley, & Wright, 2005; Van Boven & Epley, 2003), or the tendency for more detailed descriptions to increase frequency and likelihood judgments. Of most relevance, Van Boven and Epley (2003, Study 2) provide evidence for an analogous unpacking effect in affective forecasts. Participants who "unpacked" a water sports vacation in the Bahamas, by listing as many water sports as they could think of, subsequently evaluated the vacation more favorably than those who completed the unpacking task after evaluating the vacation. That is, thinking about the vacation led to more positive feelings about the vacation.

To sum, mental representations of future events may already be idealized (e.g., Buehler & McFarland, 2001). These idealized representations may underlie intensity biases in affective forecasts. Furthermore, thinking tends to polarize feelings (Tesser, 1978; Tesser, Martin, & Mendolia, 1995). Accordingly, mental simulation of a future event may polarize the already-idealized representation of that event. To the extent that intensity biases reflect extreme affective expectations for future events, mental simulation may result in even more extreme affective expectations for future events. Furthermore, these affective expectations may have consequences for people's affective experiences. Decision affect theory (e.g., Mellers & McGraw, 2001) and the affective expectation model (Wilson & Klaaren, 1992) illuminate the processes by which affective expectations influence affective experience.

Affective Expectations

How pleasant is winning $8? Intuition dictates that winning $8 is an unambiguously pleasant event. What if, however, a person won $8 when expecting to win $32? Perhaps in this case, winning $8 is not quite as pleasant. This is exactly what was found by Mellers, Schwartz, Ho, and Ritov (1997). Participants who won a given amount of money on a gamble experienced less pleasure when expecting to win an even greater amount of money, relative to losing money. According to decision affect theory (Mellers & McGraw, 2001; Mellers et al., 1997; Mellers, McGraw, & Tetlock, 2004; Mellers, Schwartz, & Ritov, 1999), affective reactions are determined by both obtained and unobtained outcomes. As such, the more pleasant the unobtained outcome is, the less pleasure a person will experience, even if the obtained outcome is pleasant (e.g., winning

$8). In short, a comparison of unobtained with obtained outcomes leads to affective contrast.

As previously noted, however, comparative thinking does not always lead to affective contrast (e.g., Markman & McMullen, 2003). If the unobtained outcome is not evaluated in reference to the obtained outcome, affective assimilation may occur. Furthermore, according to the affective expectation model (e.g., Wilson & Klaaren, 1992), even if our experiences are discrepant from our expectations, affective contrast will only occur if the discrepancy is noticed. Otherwise, affective assimilation occurs. That is, someone who holds a positive expectation for a future experience may enjoy the experience more than someone who does not hold a positive expectation, even if the experience is not as positive as expected.

In an investigation of this prediction of the affective expectation model, Wilson, Lisle, Kraft, & Wetzel (1989, Study 1), showed participants a panel of six cartoons selected from the *New Yorker* magazine. Pretesting had revealed that the first three of the cartoons in the panel were moderately funny, but the second three cartoons were not particularly funny. Some participants rated how funny they felt each of the cartoons were with no prior expectations. In this condition, as expected, participants rated the first three cartoons moderately funny and the second three cartoons unfunny. Other participants, however, rated how funny they felt each of the cartoons were after being given expectations. Specifically, the experimenter mentioned that previous participants in the study had found all of the cartoons to be funny. In this condition, participants rated the second three cartoons—that is, those that pretesting had revealed to be relatively unfunny—to be just as funny as the first three. Furthermore, people in this condition

spent less time evaluating the second three cartoons than participants in the no-expectancy condition. Wilson et al. (1989, Study 1) interpreted this finding to mean that because participants were given expectations, they did not perform a careful evaluation of the stimuli, and thus did not notice any discrepancy between their affective expectations and their affective experience of the cartoons. Instead, they simply evaluated the second three cartoons consistent with their expectations.

Accordingly, the affective expectation model predicts that if the discrepancy between an affective expectation and the affective experience is noticed, affective contrast will occur. That is, if participants who were given expectations in Wilson et al. (1989, Study 1) performed a more careful examination of the cartoons, they may have noticed the discrepancy that existed between their expectations and their experience of the second three cartoons. In this case, they may have rated those cartoons as less funny than participants who were given no expectations. This prediction of the model was investigated by Geers and Lassiter (1999). Participants viewed a six-minute film clip that pre-testing had revealed to be relatively unfunny. Some participants were asked to evaluate how funny the film was without any prior expectations. Other participants, however, were asked to evaluate how funny the film was after being told that the video was very popular and widely considered to be funny. Furthermore, Geers and Lassiter (1999) manipulated how carefully participants evaluated the film stimulus by employing the unitization of perception/behavior procedure developed by Newtson (1973). In this procedure, participants are asked to evaluate some sequence of action by analyzing the sequence into the smallest segments of meaning (e.g., fine-unitization) or largest segments of meaning (gross-unitization). For participants who were given no

expectations, unitization strategy was not expected to make a difference in the way participants evaluated the film. However, for participants with expectations, it was expected that fine-unitization of the film would make noticing the discrepancy between their positive expectations and the relatively unfunny film more likely, resulting in affective contrast. Conversely, it was expected that gross-unitization of the film would make noticing the discrepancy between their positive expectations and the relatively unfunny film less likely, resulting in affective assimilation. These hypotheses were supported. Participants who used a fine-unitization strategy and had positive expectations enjoyed the film less than those who used this strategy but did not have expectations, while participants who utilized a gross-unitization strategy and had positive expectations enjoyed the film more than those who utilized this strategy but were not given expectations.

More recent research has replicated and extended these findings (Geers & Lassiter, 2002, 2003, 2005). For instance, prior stimulus exposure has also been shown to moderate the relationship between affective expectations and experience (Geers & Lassiter, 2005). When participants viewed a target film clip two weeks before they were given positive expectations for the film, their affective experience upon a subsequent viewing of the same clip was contrasted away from their expectations. That is, they enjoyed the film less than those given no expectations. Conversely, those who had not previously viewed the target film clip assimilated their affective reactions to their expectations. That is, they enjoyed the film more than those given no expectations.

Another factor that may determine whether contrast or assimilation effects occur is the degree of discrepancy between expectations and experience (e.g., Wilson &

Klaaren, 1992). The greater the discrepancy between the stimulus and the context in which it is presented, the more likely it is that judgments of the stimulus will be contrasted away from the context. Conversely, the less of a discrepancy between the stimulus and the context in which it is presented, the more likely it is that judgments of the stimulus will be assimilated to the context. In the social judgment literature, for instance, assimilation effects are more likely when only moderate examples are primed, but contrast effects are more likely when extreme examples are primed (Herr, Sherman, & Fazio, 1983; see also Herr, 1986). For instance, people judge imaginary animals as less ferocious when they are presented in a context of extremely ferocious animals, such as the grizzly bear, but more ferocious when presented in a context of only moderately ferocious animals, such as the wolf (Herr, Sherman, & Fazio, 1983; see also Herr, 1986).

Finally, individual differences have also been shown to moderate the effects of affective expectations on affective experience. The need for cognition (Cacioppo & Petty, 1982) refers to the tendency to enjoy thought and thought-related problem solving. Geers and Lassiter (2003) have found that individuals high in need for cognition are more likely to notice a discrepancy and individuals low in need for cognition are less likely to notice a discrepancy between expectations and experience. That is, high need for cognition individuals are more likely to show affective contrast from and low need for cognition individuals affective assimilation to their affective expectations. This is consistent with work showing that individuals high in need for cognition are more likely to show contrast in their impressions of a target person (Martin, Seta, & Crelia, 1990, Experiment 3).

Summary

Research on counterfactual thinking demonstrates that mental simulation can lead to affective contrast or assimilation in a current emotional state (see Markman & McMullen, 2003, for a review). However, this work has not investigated the effects of mentally simulating a future event on the actual affective experience of that event. Some insight into what effects this might have is provided by the research on the intensity bias in affective forecasting (Buehler & McFarland, 2001). The intensity bias may be the result of a tendency to hold idealized representations of future events. The tendency of thought to polarize feelings (Tesser, 1978, Tesser, Martin, & Mendolia, 1995) suggests that mental simulation of a future event may further polarize these representations, resulting in extreme expectations for future events.

According to the affective expectation model (Wilson et al., 1989), affective experience is almost always a function of affective expectations, and expectations can result in either assimilation or contrast in affective experience (Geers & Lassiter, 1999; Wilson et al., 1989). Thus, mental simulation may also have affective consequences, such that mental simulation of a future event may lead to assimilation or contrast in the actual affective experience of the event.

Specifically, mental simulation of a future event may lead to affective assimilation in the actual affective experience of the event, to the extent that any discrepancy that may exist between simulation-generated extreme affective expectations and actual affective experience is not noticed. On the other hand, mental simulation of a future event may lead to affective contrast in the actual affective experience of the event,

to the extent that any discrepancy between simulation-generated extreme affective expectations and actual affective experience is noticed.

Overview of the Proposed Research

The purpose of the proposed research is to examine the effects of mentally simulating a future event on the actual affective experience of that event. Specifically, the research will attempt to illuminate the conditions under which mental simulation leads to affective contrast vs. assimilation in affective experience. Affective assimilation will occur to the extent that a person who simulates a future event enjoys the experience more than someone who does not simulate the event. Conversely, affective contrast will occur to the extent that a person who simulates a future event enjoys the experience less than someone who does not simulate the event.

Participants in the simulation condition will mentally simulate eating a chocolate-chip cookie. Although previous research has investigated affective expectations with affective stimuli such as cartoons (e.g., Wilson et al., 1989) and film clips (e.g., Geers & Lassiter, 1999, 2005), the chocolate-chip cookie was chosen because a chocolate-chip cookie is a relatively unambiguous stimulus. As such, participants will likely have stronger schemas for a chocolate-chip cookie than for cartoons or film clips that they have never seen, and stronger schemas are necessary for thought-induced polarization of feelings to occur (see Tesser, 1978, for a review). For instance, when men are given time to think about their attitudes toward football or fashion, only men who think about football show attitude polarization, while the opposite pattern is obtained for women (Tesser & Leone, 1977). In that men have better developed schemas for football than women, men show greater attitude polarization when thinking about football because

they have stronger schemas for football than for fashion. Thus, mental simulation may not be expected to polarize feelings toward more ambiguous stimuli for which people have weaker schemas, such as cartoons or film clips that they have not seen.

Whereas Geers and Lassiter (1999, 2003, 2005) used Newtson's (1973) unitization procedure to manipulate how likely participants would be to notice a discrepancy between their expectations and experience, a more externally valid manipulation might be cognitive load. Dual-process models of information processing maintain that cognitive load increases schema-based processing and reliance on heuristics (e.g., Chaiken & Trope, 1999). In the person perception literature, a wealth of research has demonstrated that cognitive load increases the tendency to use stereotypes when forming impressions (e.g., Devine, 1989; Gilbert & Hixon, 1991, Macrae, Milne, & Bodenhausen, 1994, Pratto & Bargh, 1991). That is, when cognitive resources are low, people tend to make judgments in terms pre-existing knowledge structures. For instance, Martin, Seta, & Crelia (1990) found that participants who were provided with positive information about a target person and who formed an impression of the target under cognitive load formed more positive impressions than participants not under cognitive load, while participants who were provided with negative information about a target person and who formed an impression of the target under cognitive load formed more negative impressions than participants not under cognitive load.

Thus, research suggests that assimilation occurs with less effortful processing, because when cognitive resources are low, people tend to evaluate in terms of previously stored information. If mental simulation tends to make people expect that eating a cookie will be more enjoyable than it actually is, cognitive load will determine whether these

extreme expectations lead to contrast or assimilation in affective experience. It is hypothesized that a cognitive load manipulation will make noticing the discrepancy between the expected enjoyment of the cookie and the actual cookie less likely, resulting in affective assimilation, or increased enjoyment of the cookie. The absence of a cognitive load manipulation, on the other hand, is expected to make noticing the discrepancy between expected enjoyment of the cookie and the actual cookie more likely, resulting in affective contrast, or reduced enjoyment of the cookie. Figure 1 provides a general schematic of the model outlined above.

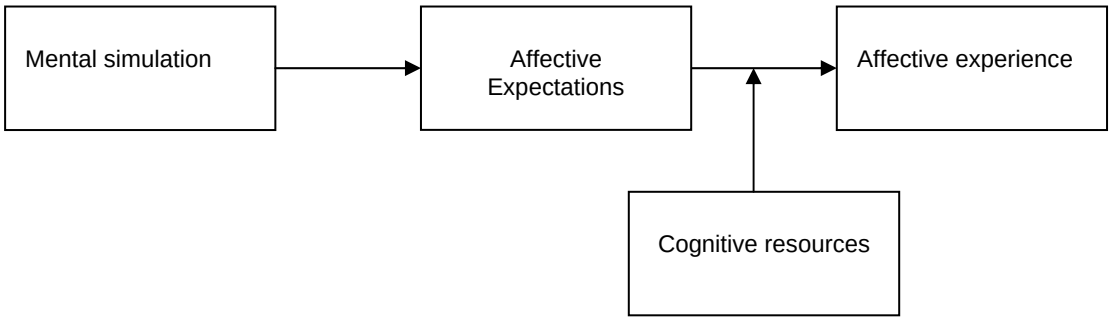

Figure 1. The effect of mental simulation on affective experience is predicted to be mediated by affective expectations, and this mediation is further predicted to be moderated by the availability of cognitive resources.

Before testing the full model, however, two preliminary experiments were conducted. The first was an examination of the effectiveness of the proposed cognitive load manipulation as a determinant of whether participants notice a discrepancy between affective expectations and experience. Thus, Experiment 1 was an investigation of the right half of the full model (Figure 2).

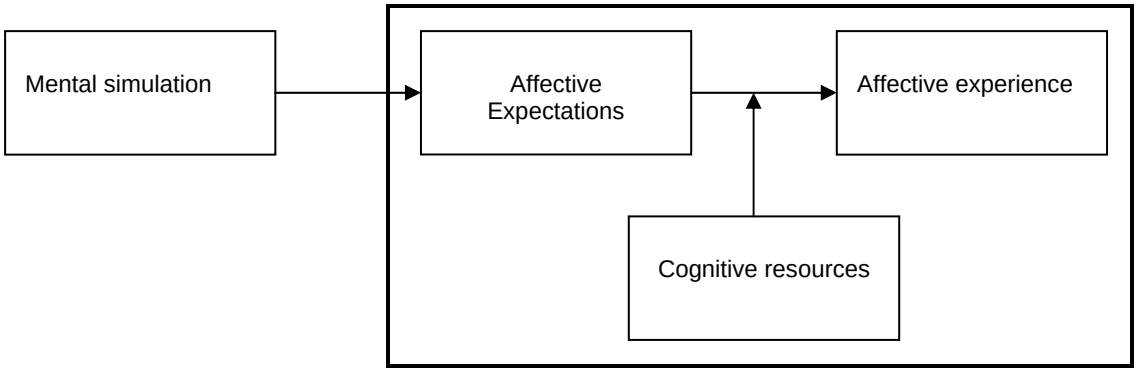

Figure 2. Availability of cognitive resources is predicted to moderate the effects of affective expectations on affective experience, such that cognitive load will make assimilation to expectations more likely.

Participants in Experiment 1 will be provided with either neutral or extremely positive expectations for the cookie. However, the model predicts that such extremely positive expectations will develop as a result of mentally simulating the cookie. The purpose of Experiment 2 was to examine the effects of mental simulation on affective expectations. Thus, Experiment 2 was an investigation of the left half of the model (Figure 3).

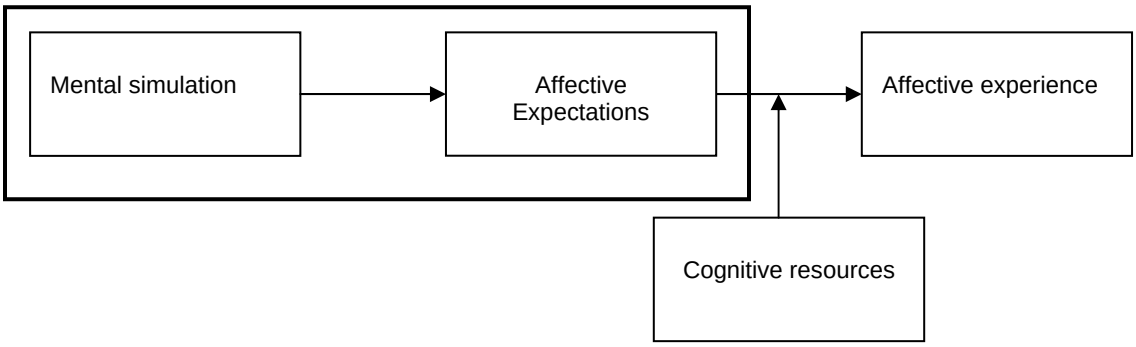

Figure 3. Mental simulation is hypothesized to result in more extreme affective expectations for the imagined event.

Affective expectations have been proposed as the mechanism by which mental simulation has affective consequences. Thus, expectations should mediate the effects of simulation on the enjoyment of the cookie. Specifically, participants with more extreme affective expectations should show a stronger tendency toward assimilation while under cognitive load and contrast when not under cognitive load. In addition to examining this crucial component of the proposed model, participants in Experiment 3 will report their expectations for the cookie immediately following simulation. This is in order to investigate the proposed mediating effects of expectations on the relationship between mental simulation and affective experience (see Figure 1).

Experiment 4 will follow the same general procedure as Experiment 3. However, participants in Experiment 3 will not report their expectations for the cookie before eating and evaluating the cookie. This will allow for an investigation of the proposed moderating effects of cognitive load on the relationship between mental simulation and affective experience in the event that explicitly reporting affective expectations influences the subsequent affective experience and evaluation (see Figure 4).

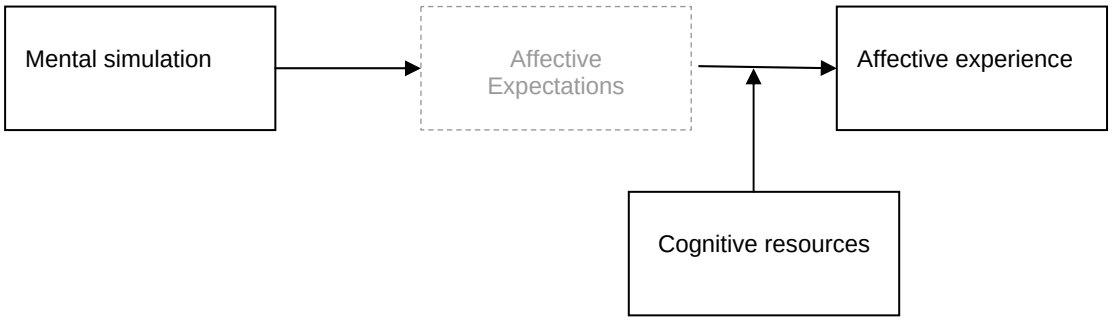

Figure 4. Level of analysis is predicted to moderate the effects of mentally simulating a future event on the affective experience of that event, when participants do not explicitly report expectations.

CHAPTER II: EXPERIMENT 1

Method

Overview

Participants were told that the experiment was a taste perception task and that they would eat and evaluate a freshly baked chocolate-chip cookie. They were then provided either relatively neutral or extreme expectations for the cookie. Participants ate a mediocre store-bought cookie while under cognitive load or not. It was expected that participants under cognitive would show assimilation to their expectations, such that participants with extreme affective expectations would report greater enjoyment of the cookie than those with neutral expectations, and that participants not under load would be more likely to show contrast from their expectations, such that participants with extreme expectations would report lesser enjoyment of the cookie than participants with neutral expectations.

Participants

A total of 44 Introductory Psychology students at Texas Tech University participated and were compensated with course credit. Six participants were excluded from the analyses for different reasons. Three participants voiced suspicion of the experimental procedure, two participants had incomplete data due to computer or equipment malfunction, and one participant in the cognitive load condition did not follow the instructions and count the number of low tones during the tone counting task. All reported analyses were conducted with the remaining sample of 38 participants.

Materials

Cookie. The experimental stimulus was a Shur-Shine generic brand imitation Chips-Ahoy Chewy chocolate-chip cookie. Cookies were purchased from a local grocery store in packages of 24. Because participants were told that the cookie would be fresh-baked (see below) the cookie was warmed in the microwave for approximately 15-sec. This particular cookie was chosen because pilot testing revealed that it was an only moderately tasty cookie, thus precluding the possibility of ceiling effects and providing a stimulus that could potentially be evaluated as more or less enjoyable as a function of the experimental manipulations.

Cognitive load task. The cognitive load task was modeled after Gilbert and Silvera (1996). Participants are presented with three auditory tones: a low, medium, and high-pitched tone at three successive octaves. Each tone lasts approximately 500-ms and all three tones are presented randomly at 500-ms intervals. Participants are instructed to listen to the tones over a pair of headphones and count the cumulative number of low tones presented.

Procedure

Upon arrival at the laboratory, participants were greeted by the experimenter and seated at a computer workstation. Participants provided informed consent and indicated their age and gender on a short biographical questionnaire. Included in this questionnaire were two items that participants responded to on a 15-point scale (from "not at all" to "extremely"): "How hungry are you right now?" and "How much do you like chocolate-chip cookies?" Participants were randomly assigned to one of four conditions: neutral

expectations, no cognitive load; neutral expectations, cognitive load; extreme expectations, no cognitive load; extreme expectations, cognitive load.

The experimenter began the session by retrieving a toaster-oven tray from a refrigerator located in an office cluster adjacent to the laboratory. The tray contained fresh cookie dough fashioned into a round ball, ready for baking. The experimenter explained to the participant that the purpose of the study was to examine the effects of auditory processing on taste perception, and to this end they would eat a fresh-baked cookie toward the end of the experiment. This was to hide the nature of the cognitive load task, as some participants listened to the tones while they ate the cookie.

Expectation manipulation. At this point, the affective expectations manipulation was introduced. The experimenter showed the tray to the participant and told the participant that this dough had been prepared prior to the experiment for the participant and the dough would be baked into a fresh cookie in a toaster oven purportedly located adjacent to the lab. While holding the tray, the experimenter introduced the expectations manipulation in a casual, off-hand manner. For participants in the neutral expectations condition, the experimenter said:

> You are probably excited about getting to eat a cookie in a psychology experiment, but do not get your hopes up too high, most participants say it is not all that great, it is just an OK cookie.

For participants in the extreme expectations condition, the experimenter said:

> And by the way this should probably be your favorite psychology experiment of the semester because most participants say this is a really good cookie.

The experimenter then explained that he would need to leave the room momentarily in order to place the tray in the purported toaster oven for baking. In actuality the dough was

not fresh and the toaster oven tray was a prop that was returned to the refrigerator for each participant.

Upon returning to the laboratory, the experimenter explained that the taste perception task would take place once the cookie was finished baking, and in the meantime, they would complete a mental imagery task. This task was introduced to resemble as close as possible the procedure for the proposed experimental studies, as at this point participants would imagine eating the cookie. Because expectations in this experiment were manipulated, however, participants did not imagine eating the cookie—rather, they were given the control imagery script and were told to imagine the events of a typical day:

> Something else we have been interested in lately is the way that people form mental images of future events. So we have chosen a simple and familiar event for you to imagine—we want you to imagine the events of a typical day. Say, tomorrow. After you perform the auditory processing task, we will ask you some questions about your mental imagery for your typical day, so be sure to form clear, vivid images.
>
> Imagine, as clearly as possible, that you are beginning the day tomorrow. Imagine that you have just gotten out of bed. Imagine what things look like, imagine what things feel like.
>
> Now, continue to imagine the events of the day, from the time you leave the house to the time you come home at night and the time you go to bed. Imagine how you will feel, imagine what you will be thinking and feeling. Remember to form clear, vivid images as you will be asked questions about your imagery at the end of the experiment.
>
> Once you have clear, vivid, mental images in mind, begin writing about your typical day. Simply put into words the thoughts, feelings, and sensations that your imagination of a typical day brings to mind. Continue to hold clear mental images of this typical day in mind as you write. You will have about five minutes to perform this mental imagery task. Please write about your typical day for the whole time period and try to fill up all of the space. There are additional lines on the back.

The experimenter then left the participant with the worksheet and noted the exact time. After five minutes, the experimenter collected the worksheets and explained that

because the cookie would be ready shortly, the instructions for the auditory processing task would be introduced.

The experimenter again explained that the experiment was an investigation of the effects of auditory processing on perceptions of taste, and that they would listen to a series of tones while they ate the cookie. Participants were asked to put on the computer headphones and to press the spacebar in order to hear the three tones that they would hear during the actual task. After informing the experimenter that they could distinguish all three tones from each other, participants pressed the spacebar again to hear a 10-sec. demonstration of the task. All three tones were presented randomly in 500-ms intervals. Participants were told to count the number of low tones, the critical task in the cognitive load condition. At the conclusion of the demonstration, the experimenter verified that participants could hear the tones clearly and that they understood the task.

Participants in the cognitive load condition were then read the following instructions:

> It is very important that you listen to these tones carefully as you eat the cookie, because we need you to keep track of the number of low-pitch tones that you hear. At the end of the experiment you will be asked how many of the low pitch tones you heard.

Participants in the no-load condition were read the following instructions:

> In your condition, you do not have to pay any attention to the tones while you eat the cookie—in fact, just ignore them. But we are interested in whether or not you enjoy the cookie, so we will ask you some questions about the cookie after you eat it.

After verifying that participants understood the task, the experimenter explained that they would now leave the room and return with the fresh-baked cookie. In actuality, the experimenter took one of the store-bought cookies from the package with a napkin,

placed it on a paper plate and put the cookie in the microwave for approximately 15-sec. This was to make the cookie appear as if it had just been retrieved fresh-baked from the toaster oven. The experimenter allowed approximately 30-sec for the cookie to cool and then returned to the laboratory. The experimenter placed the plate and napkin in front of the participant.

Participants were instructed to press the spacebar before beginning to eat the cookie. This began the tone sequence. They were further instructed to press the "x" key when they were finished with the cookie. This ended the tone sequence. Upon pressing the "x" key participants were prompted by the computer to enter the number of low tones they had counted. Participants in the no-load condition were instructed to simply enter "0" in response to this question. Participants were asked to alert the experimenter after completing this portion of the task.

After being alerted, the experimenter gave the participant the experimental questionnaire. Included in the questionnaire were three measures of cookie-enjoyment modeled after the questions used by Wilson et al. (1989) and Geers and Lassiter (1999): "How much did you enjoy the cookie?" "How pleasant was eating the cookie?" and "How good did the cookie taste?" Questions were answered on a 15-point unipolar scale, from 1 (not at all) to 15 (extremely). Also included as a manipulation check was a retrospective measure of expectations: "How good did you *expect* the cookie to be, *before* you ate it?" Finally, participants completed the 18-item Need for Cognition Scale (Cacioppo & Petty, 1982).

At the end of the experimental session, participants were given a funnel debriefing in order to check for suspicion of the experimental procedures. The debriefing

questions were as follows: "Did anything about the experiment seem suspicious?" "Did anything in particular about the cookie seem suspicious?" "Did you ever have the impression that we may not have been telling you the truth about the cookie?" and "Did you ever have any doubts that you were eating a fresh-baked homemade cookie?"

Results

The three dependent measures of enjoyment (taste, enjoyment, and pleasantness) were averaged together to create a single measure of affective experience (e.g., Geers and Lassiter, 1999; Wilson et al., 1989). A reliability analysis indicated that the three items were highly interrelated (Cronbach's $\alpha = .90$). Visual and statistical screening for outliers on the averaged affective experience measure revealed none. Mean affective experience of the cookie was 8.03 ($SD = 2.65$). In order to control for individual state and trait differences in cookie-appeal, responses on the hunger ($M = 5.66$, $SD = 3.10$) and cookie-liking ($M = 11.24$, $SD = 3.11$) items were included as covariates in the analyses.

In order to determine if cognitive load moderated the effects of affective expectations on affective experience, mean affective experience was subjected to a 2 (expectation condition: neutral, extreme) x 2 (cognitive load condition: no load, load) between-subjects ANCOVA with hunger and cookie-liking as covariates. Only the main effect of hunger was significant, $F(1, 32) = 19.87$, $p < .001$. Not surprisingly, hungrier participants enjoyed the cookie more than less hungry participants. Contrary to predictions, however, the interaction between cognitive load and expectation condition was non-significant, $p = .54$. Thus, cognitive load did not make assimilation to expectations more likely (see Figure 5).

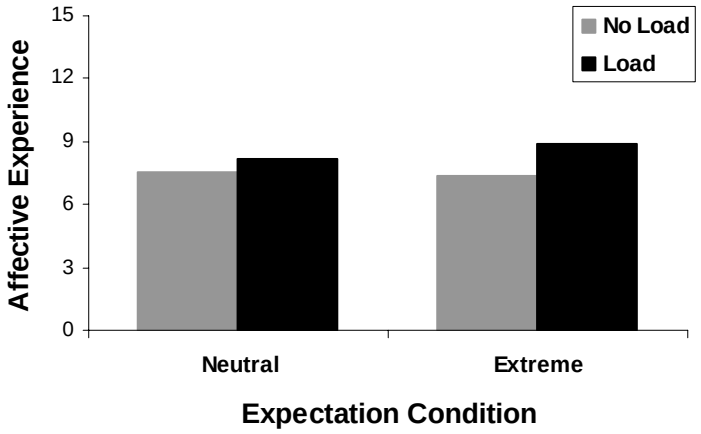

Figure 5. Mean affective experience of the cookie as a function of affective expectations (neutral, extreme) and cognitive load condition (no load, load).

Although the results of the 2-way ANCOVA did not reveal the predicted interaction, the lack of any main effect of expectations makes it difficult to determine if cognitive load had the hypothesized consequence of moderating the effects of expectations on experience. To determine if manipulated expectations at least affected retrospectively reported affective expectations, reported expectations were subjected to a parallel 2 (expectation condition: neutral, extreme) X 2 (cognitive load condition: no load, load) between-subjects ANCOVA with hunger and cookie-liking as covariates. Interestingly, participants provided with extreme affective expectations did at least report that they expected to enjoy the cookie significantly more (M = 10.94, SD = 2.96) than participants provided with neutral affective expectations (M = 7.80, SD = 2.84), F (1, 32) = 11.19, $p < .01$ (see Figure 5), even after controlling for cookie-liking, which was also a significant predictor of expectations, F (1, 32) = 5.64, $p < .05$.[1] The interaction between

[1] All reported means and standard deviations involving ANCOVAs refer to means and corrected for covariates.

expectation condition and cognitive load, however, was non-significant, $p = .24$ (Figure 6).

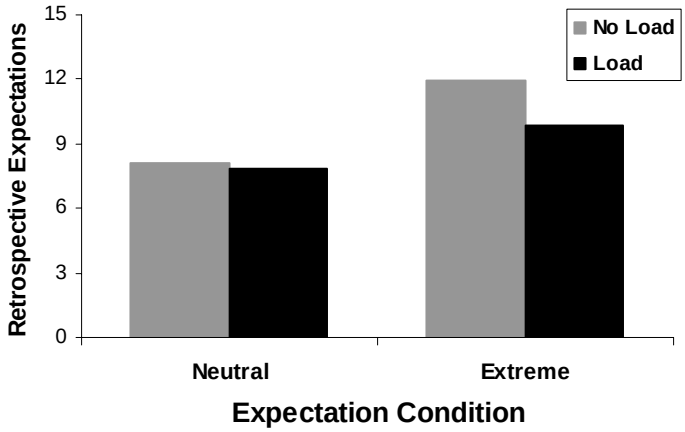

Figure 6. Mean retrospectively reported expectations as a function of expectation condition (neutral, extreme) and cognitive load condition (no load, load).

Although such a retrospective measure should be interpreted with caution, it seems that manipulated expectations influenced participants' retrospectively reported expectations, but not their actual enjoyment of the cookie. This suggests that the expectation manipulation was effective, but calls into question the effectiveness of cognitive load as a moderator of whether a discrepancy is noticed between expectations and experience.

However, because need for cognition moderates the effects of affective expectations on affective experience, such that participants high in need for cognition are more likely to show contrast from and participants low in need for cognition assimilation to their expectations (e.g., Geers & Lassiter, 2003), the effects of need for cognition on affective experience as a function of expectations and cognitive load were examined. A hierarchical regression analysis was conducted with average affective experience as the

criterion variable. All categorical predictors were dummy-coded and continuous variables standardized. Hunger and cookie-liking were entered as predictors in the first step, the main effects of expectations, load, and need for cognition as predictors in the second step, the two-way interactions of load and expectations, need for cognition and expectations, and need for cognition and load as predictors in the third step, and the three-way interaction among cognitive load, expectations, and need for cognition in the fourth and final step. This three-way interaction was significant, $\beta = -.60$, $t\ (28) = -2.49$, $p < .05$ (Figure 7).

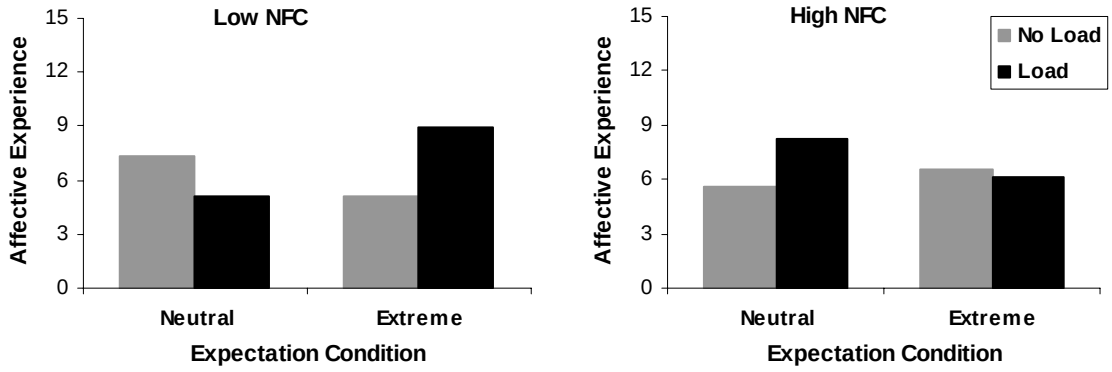

Figure 7. Affective experience as predicted by cognitive load and expectation condition for low need for cognition participants (i.e., 1 *SD* below the mean of NFC; left panel) and high need for cognition participants (i.e., 1 *SD* above the mean of NFC; right panel).

To determine if the predicted two-way interaction between expectations and cognitive load was significant for participants low in need for cognition (NFC), a low-NFC variable was created by adding 1 (i.e., 1 *SD*) to the standardized NFC scores. The four-step regression analysis was then re-conducted with new two-way interaction terms created from the low-NFC variable (low NFC and expectations; low NFC and load)

entered with the expectations and load interaction term in the third step and the new three-way interaction term of low NFC, expectations, and load entered at the fourth step. Results revealed a significant two-way interaction between load and expectations, $\beta = .59$, $t\ (28) = 2.29$, $p < .05$, thus indicating that the predicted interaction between expectations and load was significant for people low in need for cognition (Figure 7, left panel).

In order to examine the nature of the two-way interaction between expectations and cognitive load for participants low in need for cognition, the simple effect of expectations at both levels of cognitive load (low load, high load) was tested. To examine the simple effect of expectations for participants in the cognitive load condition, participants in the cognitive load condition (i.e., high load) were recoded as 0. The regression analysis was re-conducted with the main effect term for high load participants entered in the second step, the new two-way interaction terms (high load and expectations; high load and low NFC) entered in the third step, and the new three-way interaction among expectations, high load, and low NFC entered in the fourth step.

Results of the low NFC, high-load interaction analysis revealed a significant effect of expectations, $\beta = .73$, $t\ (28) = 2.25$, $p < .05$. Participants low in need for cognition who ate the cookie under cognitive load enjoyed the cookie more when provided extreme expectations than when provided neutral expectations, a pattern of affective assimilation. A parallel analysis was conducted in order to examine the simple effect of expectations for participants low in need for cognition who ate the cookie while not under load. For these participants, the simple effect of expectations was non-significant, $\beta = -.44$, $p = .28$.

The two-way interaction between expectations and cognitive load was non-significant for participants high in need for cognition, $\beta = -.29$, $p = .15$. No further analyses were conducted with participants high in need for cognition.

Discussion

Results of Experiment 1 provided mixed evidence for cognitive load as a moderator of whether participants notice a discrepancy between their affective expectations and their affective experience. Expectations only influenced experience for participants low in need for cognition who ate the cookie under cognitive load conditions, such that those with extreme expectations reported greater enjoyment of the cookie—a pattern of assimilation. According to the affective expectation model (e.g., Wilson & Klaaren, 1992) affective assimilation is the typical consequence of expectations. Because more effortful processing tends to result in contrast effects (e.g., Martin et al., 1990), assimilation might simply be more likely to occur because people are "cognitive misers" (e.g., Fiske & Taylor, 1991) and tend to use as little cognitive resources as necessary. Thus, in the absence of an interaction between cognitive load and expectations, at least a main effect of expectations might have been predicted, such that participants provided with extreme expectations enjoy the cookie more than participants provided with only neutral expectations. However, results of Experiment 1 indicate that assimilation only occurs for participants who lack the cognitive resources that they do not like to use anyway. Furthermore, under no conditions was there any evidence for affective contrast, such that participants high in need for cognition or participants with full cognitive resources enjoyed the cookie less when provided with extreme affective expectations than when provided with neutral expectations.

Regardless, results of Experiment 1 do indicate that cognitive load makes assimilation to expectations more likely for some people, and thus provides partial support for the part of the model that suggests the availability of cognitive resources will moderate the effects of affective expectations on affective experience. However, the model maintains that these expectations are generated by mental simulation. Specifically, mental simulation is hypothesized to result in more extreme expectations, and these thought-induced expectations might have different consequences for affective experience than expectations that are explicitly provided. Before testing this possibility, however, Experiment 2 was conducted to determine if mental simulation does in fact result in more extreme affective expectations.

CHAPTER III: EXPERIMENT 2

Method

Overview

Participants imagined eating a chocolate-chip cookie. Participants reported their expectations for the cookie either before or after imagining eating the cookie. It was predicted that participants who reported their expectations after imagining eating the cookie would report more positive expectations for the cookie than those who reported their expectations prior to imagining eating the cookie.

Participants

A total of 21 Introductory Psychology students at Texas Tech University participated and were compensated with course credit. Two participants who were suspicious of the experimental stimulus and one participant with incomplete data due to computer malfunction were excluded from all analyses. Eighteen participants were included in the final sample.

Materials

The experimental stimulus was the store-bought generic chocolate-chip cookie used in Experiment 1. As in Experiment 1, the cookie was warmed in the microwave for 15-sec before being presented to the participant.

Procedure

Upon arrival to the laboratory, participants were greeted by the experimenter and seated at a computer workstation. Participants provided informed consent and filled out a short biographical survey. As in Experiment 1, participants indicated their age, gender, their level of hunger and liking for cookies. Participants were randomly assigned to report

their expectations for the cookie either immediately before or immediately subsequent to imagining eating the cookie.

The experimenter explained to the participant that the experiment was composed of two separate tasks, a taste perception task and a mental imagery task. This cover story was an attempt to hide the connection between the simulation and cookie-eating components of the research design. Furthermore, mental simulation was presented as an imagery task in order to increase the likelihood that participants would remain on task, and they were told to expect to answer questions about their imagery at the end of the experiment.

As in Experiment 1, the experimenter began the session by retrieving a toaster oven tray from a refrigerator located in an office cluster adjacent to the laboratory. The tray contained fresh cookie dough fashioned into a round ball, ready for baking. The experimenter showed the tray to the participant and told the participant that this dough had been prepared prior to the experiment for the participant and the dough would be baked into a fresh cookie in a toaster oven purportedly located adjacent to the lab. The experimenter explained that she would need to leave the room momentarily in order to place the tray in the purported toaster oven for baking. As in Experiment 1, the dough was not fresh and the toaster oven tray was a prop that was returned to the refrigerator for each participant.

Before leaving the room, the experimenter gave participants the expectations questionnaire to participants randomly assigned to report their expectations prior to simulation. Participants randomly assigned to report their expectations after simulation were not given anything at this time. The questionnaire contained the same affective

experience measures adapted from Geers and Lassiter (1999) and Wilson et al. (1989) and used in Experiment 1; however, the questions were changed to future tense for use as measures of affective expectations. The questions were as follows: "How much do you expect to enjoy the cookie?" "How pleasant do you think it will be to eat the cookie?" and "How good do you think the cookie will taste?" Participants also indicated how certain they were of these expectations. All four questions were answered on a 19-point scale ranging from -9 (e.g., "extremely unknowable) to +9 (e.g., extremely enjoyable). A bipolar scale was used in order to allow participants to report the extent to which they had *negative* expectations for the cookie in the event that they did not have positive expectations. The 15-point unipolar scale used in Experiment 1 did not afford this possibility, and thus could have prompted participants to report more favorable experiences than actual.

Upon returning to the laboratory, the experimenter explained that the taste perception task would take place once the cookie was finished baking and, in the meantime, they would complete the mental imagery task. In actuality the mental imagery task was the mental simulation manipulation. The experimenter handed the participant a blank imagery worksheet. Participants randomly assigned to the cookie simulation condition were read the following imagery instructions, which were also written across the top of the worksheet:

> Something else we have been interested in lately is the way that people form mental images of future events. So we have chosen a simple and familiar event for you to imagine—since you are going to eat a cookie at the end of this task, we have decided it makes sense that eating a cookie is the future event that you imagine. After you perform the auditory processing task, we will ask you some questions about your mental imagery of eating the cookie, so be sure to form clear, vivid images.

> Imagine, as clearly as possible, that you are eating the chocolate-chip cookie now. Imagine that the cookie has just been taken out of the toaster oven and brought into the room. Imagine the way the freshly-baked cookie smells. Imagine how it looks, how it feels, and imagine how it tastes.
>
> Now, continue to imagine eating the cookie, from the first bite, all the way to the last bite. Vividly imagine all the aspects of eating the cookie: the sight of the cookie, the smell of the cookie, the feel of the cookie, the taste of the cookie. Imagine how you will feel, imagine what you will be thinking and feeling as you eat the cookie. Remember to form clear, detailed, mental images, as you will be asked questions about your mental imagery at the end of the experiment.
>
> Once you have clear, vivid, mental images in mind, begin writing about eating the cookie. Simply put into words the thoughts, feelings, and sensations that your imagination of eating the cookie brings to mind. Continue to hold clear mental images of the cookie in mind as you write. You will have about five minutes to perform this mental imagery task. Please write about the cookie for the whole time period and try to fill up all of the space. There are additional lines on the back.

After five minutes had passed, the experimenter collected the worksheets and gave the expectations questionnaire to participants randomly assigned to report their expectations subsequent to simulation. While these participants reported their expectations the experimenter left the room to retrieve the cookie. As in Experiment 1, the experimenter took one of the store-bought cookies from the package with a napkin, placed it on a paper plate and put the cookie in the microwave for approximately 15-sec, allowed approximately 30-sec for the cookie to cool and then returned to the laboratory. The experimenter placed the plate and napkin in front of the participant and explained that they would now eat and evaluate the cookie.

When participants were finished the cookie, they completed the same three-item affective experience measure as that was used in Experiment 1 (e.g., “How much did you enjoy the cookie?”). Items were answered on the same 19-point bipolar scale that was

used for the expectation items. Finally, as in Experiment 1, participants were given a funnel debriefing in order to check for suspicion of the experimental procedures.

Results

Visual and statistical screening of data revealed no outliers. As in Experiment 1, a reliability analysis indicated that the three measures of affective experience were highly correlated ($\alpha = .94$) as were the measures of affective expectations ($\alpha = .95$). Accordingly, dependent measures of expectations and experience were derived from the average scores on the three measures of experience and expectations, respectively.

Participants reported an average hunger of 5.11 ($SD = 3.41$) and an average liking for cookies of 12.06 ($SD = 4.07$) on the 15-point unipolar scale. However, independent samples t-tests conducted on hunger and cookie-liking as a function of assignment to expectation condition (e.g., expectations reported before simulation or after simulation) revealed a failure of random assignment. That is, participants who reported their expectations before simulation reported being significantly hungrier ($M = 7.11$, $SD = 3.30$) than participants who reported their expectations after simulation ($M = 3.11$, $SD = 2.21$), $t\ (16) = 3.03$, $p < .01$. Participants who reported their expectations before simulation also reported liking cookies ($M = 13.67$, $SD = 2.18$) more than after simulators ($M = 10.44$, $SD = 4.95$); this difference was marginally significant, $t\ (16) = 1.79$, $p < .10$.

To determine if imagining eating the cookie influenced expectations for the cookie, average expectations were submitted to a one-way ANCOVA with expectation-reporting condition as the independent variable and hunger and cookie-liking entered as covariates. Only the main effect of cookie-liking was significant, $F\ (1, 14) = 19.24$, $p <$

.001. A strong positive correlation ($r = .76$, $p < .001$) indicated, not surprisingly, that participants who liked cookies more had higher expectations for the cookie.

Although the main effect of expectation-reporting condition on expectations was non-significant, F (1, 14) = 1.51, $p < .24$, results were somewhat suggestive. After accounting for baseline differences in hunger and cookie-liking, estimated marginal means were in the hypothesized direction. Participants who reported their expectations after simulation reported higher average expectations ($M = 6.64$, $SD = 2.95$) than participants who reported their expectations before simulation ($M = 5.29$, $SD = 2.95$), $d = .46$. This is considered a medium-sized effect.

In order to determine if expectation reporting condition influenced experience of the cookie, a parallel ANCOVA was conducted with the averaged measure of experience as the dependent variable, expectation condition as the independent variable and hunger and cookie-liking as covariates. This analysis revealed no significant effects of hunger, cookie-liking, or expectation condition, F (1, 14) = 1.68, $p < .22$. However, as with the previous analysis, the marginal means were consistent with a medium-sized effect of expectation condition on experience. After accounting for hunger and cookie-liking, participants who reported their expectations after simulation reported more positive experiences ($M = 5.58$, $SD = 5.81$) of the cookie than participants who reported their expectations before simulation ($M = 2.76$, $SD = 5.81$), $d = .48$.

Discussion

Results of Experiment 2 were somewhat suggestive of a medium-sized effect of simulation on affective expectations and affective experience. That is, participants who reported their expectations after simulation had more positive expectations and more

positive experiences of the cookie than participants who reported their expectations before simulation. Of course, results were not significant, and extreme caution is warranted in speculation about non-significant effects. However, a possible experimental design flaw may have at least weakened the hypothesized effects of simulation on expectations. Participants reported their expectations either immediately before or after imagining eating the cookie. This means that participants who reported their expectations before simulation actually reported their expectations immediately after seeing the fresh dough on the cookie tray and being told that they were going to eat a fresh-baked cookie. This clearly could have provided a strong and vivid image that influenced the expectations of participants who reported their expectations before simulation. Participants in this condition may have spontaneously generated imagery of the cookie baking and all the pleasant aspects that go along with such imagination simply because the sight of the dough on the cookie tray may have prompted such imagination. Thus, these participants may have generated similar mental imagery to participants who reported their expectations after simulation prior to reporting their expectations.

While far from conclusive, results are consistent with a medium-sized effect of simulation on expectations—this in spite of the aforementioned design flaw, the small sample size and the failure of random assignment in such a way as to work against the hypotheses. The small sample size in particular may have been problematic, as there may not have been enough power to detect a significant effect.

On the other hand, the small sample size and non-significant effects warrant equal amounts of caution in interpreting the results. Such noted, it is interesting that participants who reported their expectations after simulation reported more enjoyment of

the cookie than participants who reported their expectations before simulation. After all, both groups did in fact engage in the same simulation task, and thus simulation should have affected the groups equally. Thus, no differences in affective experience were expected. Perhaps reporting expectations immediately prior to eating the cookie provided participants who reported their expectations after simulation with a stronger context with which to guide their evaluation, making it more likely that they would assimilate their experience to their expectations.

With some limited evidence that cognitive load moderates the relationship between affective expectations and experience, such that participants low in need for cognition are more likely to show assimilation to their expectations under cognitive load (i.e., Experiment 1), and suggestive yet inconclusive evidence that simulation results in more extreme affective expectations (i.e., Experiment 2), Experiment 3 was conducted as a test of the full proposed model (i.e., Figure 1). That is, participants simulated eating the cookie, reported their expectations, and ate and evaluated the cookie while under cognitive load or not under load.

Two major methodological changes were made in Experiment 3. Rather than manipulating the time at which participants reported their expectations (e.g., before or after simulation), all participants reported their expectations after simulation. However, some participants simulated eating the cookie, while other participants simulated the events of a typical day. Thus, expectation condition was no longer confounded with time of reporting.

The other important change regarded the method by which the expectation and evaluation measures were delivered. In the preliminary experiments, these questions were

provided in paper and pencil format. In Experiment 3, the questions were presented on the computer. Aside from ease of data collection and minimization of human error, computer presentation provided another important benefit—it increased the anonymity of the expectation and experience-reporting. Most important, the experimenter did not need to be in the room in order to give the questionnaires to the participant, and at no time did the participant have to worry that the experimenter would see their responses. This became a concern after several participants in extended debriefing sessions during Experiments 1 and 2 revealed that they were worried about hurting the experimenter's feelings by evaluating the cookie negatively. In fact, the experimental paradigm did lend itself handily to such demand characteristics, considering that participants were told the dough was homemade and that the experimenter was baking a single fresh cookie just for them. Because these demand characteristics may have resulted in evaluations that were more positive than actual, they may have had something to do with why affective contrast did not occur under any conditions in Experiment 1.

CHAPTER IV: EXPERIMENT 3

Method

Overview

Participants simulated either eating the cookie or the events of a typical day, then reported their expectations for the cookie. Participants then ate the cookie while under cognitive load or not under load and reported their experience of the cookie. It was predicted that participants who simulated eating the cookie would report higher expectations than participants who simulated the events of a typical day. Furthermore, it was predicted that participants who simulated the cookie and ate the cookie under cognitive load conditions would assimilate their experience to their expectations, and thus report greater enjoyment of the cookie than participants who ate the cookie while not under load.

Participants

A total of 94 Introductory Psychology students at Texas Tech University participated and were compensated with course credit. Excluded from analyses were a total of 15 participants for different reasons. Six participants were suspicious of the experimental hypotheses, five participants had missing or incomplete data due to computer malfunction, three participants in the cognitive load condition did not accurately follow instructions and count the number of low tones during the cognitive load task, and one participant was a statistical outlier. The remaining sample consisted of 79 participants.

Stimulus Materials

As in the preliminary experiments, the cookie was a packaged Shur-Shine generic chocolate-chip cookie that was warmed in the microwave for 15-sec. The cognitive load task was the same as that used in Experiment 1. Participants listened to a series of randomly presented low, medium, and high-pitched audio tones and counted the number of low tones.

Procedure

Upon arrival at the laboratory, participants were greeted by the experimenter and seated at a computer workstation. Participants provided informed consent and filled out a short biographical survey. As in the previous experiments, participants indicated their age, gender, their level of hunger and liking for cookies. Participants were randomly assigned to simulate either the cookie or the events of a typical day and to eat the cookie either while under cognitive load or not under cognitive load, resulting in four experimental conditions (cookie simulation, no cognitive load; cookie simulation, cognitive load; day simulation, no cognitive load; day simulation, cognitive load).

Participants were told that there were two purposes to the study and that the first purpose was to examine the effects of auditory processing on taste perception. This was to hide the nature of the cognitive load task, as some participants listened to the tones while they ate the cookie. The second purpose of the study, participants were told, was to examine people's mental imagery for future events. This cover story was an attempt to hide the connection between the simulation and cookie-eating components of the research design. Furthermore, mental simulation was presented as an imagery task in order to

increase the likelihood that participants would remain on task, and they were told to expect to answer questions about their imagery at the end of the experiment.

As in the preliminary experiments, the experimenter began the session by retrieving the toaster-oven tray prop from the refrigerator. The experimenter showed the tray to the participant and told the participant that this dough had been prepared prior the experiment for the participant and the dough would be baked into a fresh cookie in the toaster oven purportedly located adjacent to the lab. The experimenter then left the room briefly and returned the toaster oven tray to the refrigerator.

Upon returning to the laboratory, the experimenter explained that the taste perception task would take place once the cookie was finished baking, and in the meantime, they would complete the mental imagery task. However, because they were told that they would perform the "auditory processing" task (i.e., the cognitive load manipulation) while they ate the cookie, they would first be given instructions on how to complete the auditory processing task. This was done so that the experiment could move immediately from the simulation task to the cookie-evaluation task in order to maximize the hypothesized consequences of mental simulation on cookie enjoyment. Participants were asked to put on the headphones that were plugged into the computer at their workstation, and to press the spacebar in order to hear the three tones that they would hear during the actual task. After participants told the experimenter that they could distinguish all three tones from each other, participants pressed the spacebar again to hear a 10-sec. demonstration of the task. All three tones were presented randomly in 500-ms intervals. Participants were told to count the number of low tones. At the conclusion of

the demonstration, the experimenter verified that participants could hear the tones clearly and that they understood the task.

Simulation Manipulation

After introducing the purported auditory processing task, the experimenter then explained that the mental imagery task would take place while the cookie was baking. In actuality, the mental imagery task was the mental simulation manipulation. The experimenter handed the participant a blank imagery worksheet. Participants randomly assigned to the cookie simulation condition were read the imagery instructions which were the same instructions given to participants in Experiment 2. Participants randomly assigned to the day simulation condition were read slightly different imagery instructions, which were intended to mirror the cookie simulation instructions as closely as possible. These instructions were the same as those given to Experiment 1 participants for their filler task.

The experimenter then left the participant with the worksheet and noted the exact time. After five minutes, the experimenter collected the worksheets, and explained that he would step out of the laboratory and return momentarily. In the meantime, the participant was instructed to press the spacebar on the keyboard and follow the instructions on the computer screen. The computer program then prompted the participant to answer a series of questions regarding their expectations for the cookie. These questions were the same expectation questions used in Experiment 2. Participants also indicated how certain they were of these expectations. All four questions were answered on a 21-point scale ranging from -10 (e.g., “extremely unenjoyable) to +10 (e.g., extremely enjoyable). Participants indicated their response by sliding the mouse cursor up and down a vertical strip on the

computer screen with 1 small box for each of the possible 21 response options. After answering the four questions, the computer program prompted the participant to wait for experimenter instructions.

Meanwhile, the experimenter retrieved the cookie. This timing allowed the participant to answer the expectation questions privately. As in the preliminary experiments, the experimenter took one of the cookies from the package with a napkin, placed it on a paper plate and put the cookie in the microwave for approximately 15-sec. The experimenter allowed approximately 30-sec for the cookie to cool and then returned to the laboratory. The experimenter placed the plate and napkin in front of the participant and asked them to wait for instructions.

Participants in the cognitive load condition were told to put the headphones back on and reminded that they would be listening to the tones and counting the number of low tones while they ate the cookie. Participants in the no-load condition were told that although everyone had been required to learn the task, in their condition they did not actually have to listen to the tones while they ate the cookie.

Participants were instructed to press the spacebar before beginning to eat the cookie. This began the tone sequence. They were further instructed to press the "x" key when they were finished with the cookie. This ended the tone sequence. Upon pressing the "x" key participants were prompted by the computer to enter the number of low tones they had counted. Participants in the no-load condition were instructed to simply enter "0" in response to this question. After verifying that participants understood the instructions, the experimenter explained that they would step out into the hall while the

participant completed the task, and that they were to follow the prompts in the computer program.

After entering "x" when they finished the cookie and entering the number of low tones (or "0" in the no-load condition) the computer program prompted participants to answer a series of questions regarding their actual affective experience. Before answering the questions, however, they were prompted with instructions further intended to reduce potential demand characteristics:

> This experiment is an investigation of the effects of auditory processing on taste perceptions. Because it is a study of taste perceptions, it is important that you give us your honest opinions of the cookie. Some participants have been afraid that if they tell us they do not like the cookie, they will ruin the experiment. Do not worry about ruining the experiment. Just give us your honest evaluation of the cookie.

The questions were the same as those used in Experiments 1 and 2 and were answered on 21-point scales.

After completing the affective experience measures, participants completed the Need for Cognition Scale. They were then given a funnel debriefing in the same manner as the previous studies, thanked for their participation, and dismissed.

Results

As in the previous experiments, the three measures of affective expectations and affective experience were averaged together to create single dependent measures of expectations and experience, respectively. Reliability analyses indicated that the three expectation items and the three experience items were highly interrelated (Cronbach's α = .78 and .88, respectively). Visual and statistical screening for outliers on the averaged affective experience measure revealed none. Mean affective experience of the cookie was

3.98 (*SD* = 3.17). In order to control for individual state and trait differences in cookie-appeal, responses on the hunger (*M* = 5.29, *SD* = 3.79) and cookie-liking (*M* = 10.54, *SD* = 3.28) items were included as covariates in the analyses.

In order to examine whether cognitive load moderated the effects of mental simulation on affective experience, mean affective experience was subjected to a 2 (mental simulation: cookie, day) X 2 (cognitive load: no load, load) between-subjects ANCOVA with hunger and cookie-liking as covariates. Neither of the main effects nor their interaction was significant, all *p*'s > .10. Thus, participants reported equivalent experiences of the cookie regardless of whether they simulated eating the cookie or the events of a typical day or whether or not they ate the cookie under cognitive load (see Figure 8).

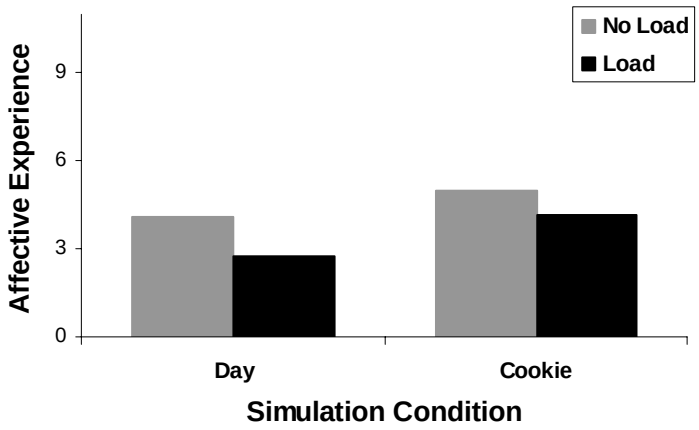

Figure 8. Mean affective experience as a function of simulation condition (day, cookie) and cognitive load condition (no load, load).

No main effect of simulation nor an interaction between simulation and load on affective experience obtained. However, the model predicted that affective expectations

would mediate the relationship between simulation and experience, and thus a mediational analysis was conducted for the sake of thoroughness.

The prescribed method for performing a mediational analysis is provided by Baron and Kenny (1986). The first step is to 1) demonstrate an effect of the IV (i.e., simulation condition) on the mediator (i.e., affective expectations) 2) demonstrate an effect of the independent variable on the DV (i.e., affective experience), and 3) demonstrate an effect of the mediator on the DV, with the IV in the regression equation. As there was no main effect of cognitive load or interaction of cognitive load with simulation condition in the ANCOVA conducted on affective experience reported above, cognitive load was not included in the following mediational analyses.

The first step in the mediational analysis was to test for an effect of the IV on the mediator. To determine if simulating eating the cookie resulted in more positive affective expectations, a hierarchical regression analysis was conducted predicting mean affective expectations from hunger and cookie-liking entered at the first step and simulation condition entered at the second step. Although participants who simulated eating the cookie reported more positive expectations ($M = 6.40$, $SD = 3.11$) for the cookie than participants who simulated the events of a typical day ($M = 5.71$, $SD = 3.20$), the effect of simulation condition on expectations was non-significant, $p = .18$, $d = .31$. Cookie-liking was a significant predictor of expectations, $\beta = .52$, $t\ (75) = 5.37$, $p < .001$, and hunger was marginally significant, $\beta = .18$, $t\ (75) = 1.90$, $p = .06$. Not surprisingly, hungrier participants and participants who liked cookies more reported more positive expectations for the cookie.

The next step in the mediational analysis was to test for an effect of the IV on the DV. In order to determine if simulation influenced affective experience, a hierarchical regression was conducted predicting mean affective experience from hunger and cookie-liking in the first step and simulation condition in the second step. As the main effect of simulation was non-significant ($p = .11$) in the ANCOVA conducted on mean affective experience as a function of simulation and cognitive load, simulation condition was not expected to be a significant predictor of affective experience. In fact, however, the effect of simulation was marginally significant, $\beta = .19$, $t\ (75) = 1.70$, $p = .09$. Cookie simulators reported greater enjoyment of the cookie ($M = 4.57$, $SD = 4.36$) than day simulators ($M = 3.37$, $SD = 4.36$). This discrepancy was presumably due to the fact that neither cognitive load nor the interaction of cognitive load and simulation condition were included in the analysis.

The final step in the mediational analysis was to test for an effect of the independent variable and the mediator on the DV. Although simulation did not influence expectations, affective expectations may still have influenced affective experience. To examine this possibility, a hierarchical regression analysis was conducted predicting mean affective experience from hunger and cookie-liking in the first step, and both simulation condition and reported expectations in the second step. Only the main effect of expectations was significant, $\beta = .45$, $t\ (75) = 3.82$, $p < .001$. Participants who reported higher expectations for the cookie subsequently reported greater enjoyment of the cookie, a pattern of affective assimilation. With reported expectations in the analysis, the marginally significant main effect of simulation condition dropped to non-significant, $\beta = -.13$, $p = .22$.

To summarize, there was a marginally significant effect of simulation condition on affective experience, such that cookie simulators reported greater enjoyment of the cookie than day simulators. Furthermore, affective expectations were a significant predictor of enjoyment, such that participants with higher expectations reported greater enjoyment. However, simulation condition was not a significant predictor of affective expectations. Thus, there was some evidence that simulation influenced enjoyment of the cookie, and strong evidence that expectations influenced enjoyment, but no evidence that simulation resulted in more positive expectations. This presents a bit of a puzzle: to the extent that simulation did influence enjoyment (a tenuous claim given the only marginal significance of this effect), it did not influence enjoyment as a function of conscious expectations.

In Experiment 1, there was a significant three-way interaction among expectation condition, cognitive load, and need for cognition on affective experience, such that the predicted interaction of expectation condition and cognitive load was only significant for participants low in need for cognition. In light of the fact that cookie simulators did not develop significantly more positive expectations for the cookie than day simulators, the need for cognition x simulation condition x cognitive load interaction on affective experience analogous to the need for cognition x expectation condition x cognitive load interaction obtained in Experiment 1 was not expected to be significant. In fact it was not, $\beta = .18$, $p = .14$ (see Figure 9).

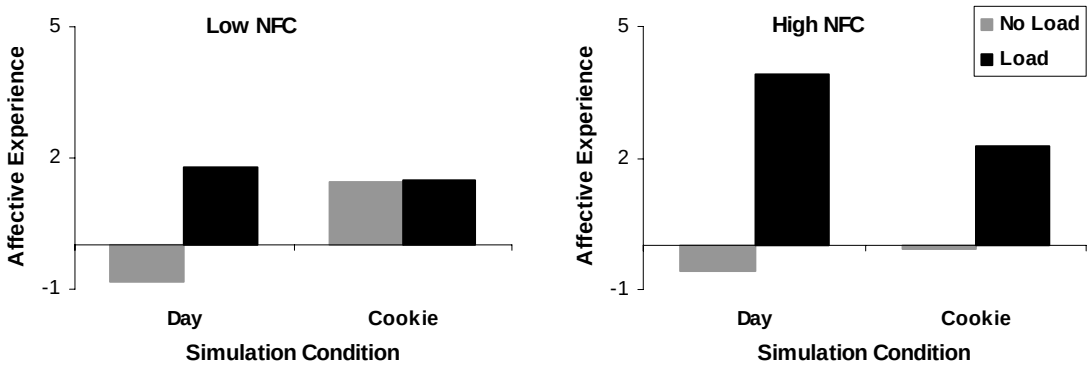

Figure 9. Affective experience as predicted by cognitive load and simulation condition for low need for cognition participants (i.e., 1 *SD* below the mean of NFC; left panel) and high need for cognition participants (i.e., 1 *SD* above the mean of NFC; right panel).

Although the three-way interaction among need for cognition, cognitive load condition, and simulation condition on affective experience was non-significant, reported expectations, regardless of simulation condition, might have interacted with load and need for cognition in a manner analogous to how provided expectations interacted with load and need for cognition in Experiment 1. To examine this possibility, a hierarchical regression analysis was conducted predicting affective experience from hunger and cookie-liking entered in the first step, load condition, reported expectations, and need for cognition in the second step, their two-way interactions in the third step, and the three-way interaction among load, expectations, and need for cognition in the final step. The three-way interaction term was not significant, $\beta = .09$, $p = .41$. However, the two-way interaction between expectations and need for cognition was significant, $\beta = -.24$, $t\ (70) = -2.28$, $p < .05$ (see Figure 10).

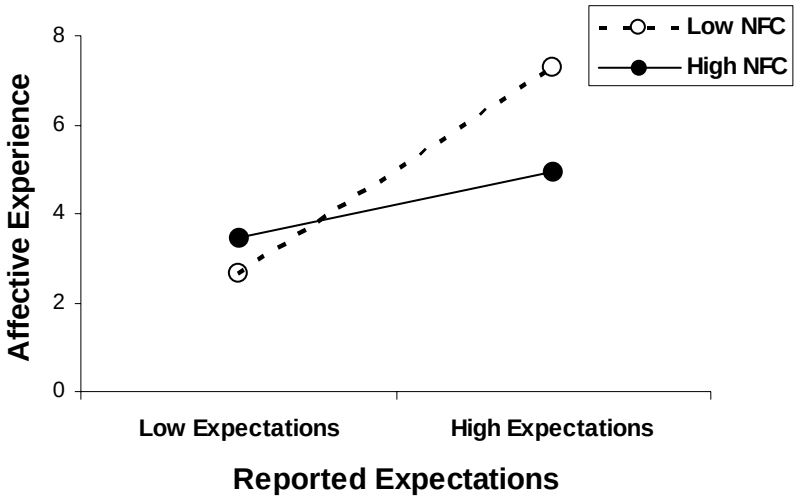

Figure 10. Mean affective experience as predicted by reported expectations and need for cognition.

In order to determine the nature of the reported expectations x need for cognition interaction, the simple effects of expectations on experience for participants low and high in need for cognition were examined. To examine the simple effect of expectations on experience for low NFC participants, a low NFC variable was coded by adding 1 SD to the standardized need for cognition scores. A hierarchical regression analysis was then conducted predicting affective experience from hunger and cookie-liking in the first step, expectations and low NFC in the second step, and the interaction between expectations and low NFC in the third step. The simple effect of expectations was significant, $\beta = .77$, $t\ (70) = 4.40$, $p < .001$. Low need for cognition participants who reported high expectations for the cookie also reported greater enjoyment of the cookie.

To examine the simple effect of expectations on experience for high NFC participants, a high NFC variable was coded by subtracting 1 SD from the standardized need for cognition scores. A hierarchical regression analysis was then conducted

predicting affective experience from hunger and cookie-liking in the first step, expectations and high NFC in the second step, and the interaction between expectations and high NFC in the third step. The simple effect of expectations for high NFC participants was only marginally significant, $\beta = .26$, $t\ (70) = 1.73$, $p < .10$. Participants high in need for cognition who reported high expectations for the cookie also reported greater enjoyment of the cookie. However, the two-way interaction of reported expectations and need for cognition, along with the only marginal significance of the simple effect of expectations on affective experience for high need for cognition participants, indicates that low need for cognition participants showed a strong pattern of assimilation to their expectations relative to high need for cognition participants.

In general affective expectations were the best predictor of affective experience. Although this relationship was moderated by need for cognition, participants in all conditions who reported higher expectations for the cookie also reported greater enjoyment of the cookie. In order to better understand the relationship between expectations and experience, a 2 (time of reporting: expectations, experience; within) X 2 (cognitive load: no load, load; between) X 2 (mental simulation: cookie, day; between) mixed-subjects ANCOVA was conducted with hunger and cookie-liking as covariates. The main effect of simulation condition was marginally significant, $F\ (1, 73) = 3.25$, $p = .075$. On average, cookie simulators reported more positive expectations and enjoyment ($M = 5.49$, $SD = 3.11$) than day simulators ($M = 4.57$, $SD = 3.20$). However, there was also a significant interaction between time with cookie-liking, $F\ (1, 73) = 6.69$, $p < .05$. Because time was a within-subjects variable, a median split was performed on the cookie-liking measure in order to examine the nature of the interaction. A second within-subjects

ANCOVA was conducted with time of reporting (expectations, experience) as the within-subjects variable, dichotomized cookie-liking as the independent variable, and hunger as the covariate. The main effect of cookie-liking was significant, F (1, 76) = 10.01, $p < .01$. Not surprisingly, individuals who liked cookies more reported more positive expectations and more positive experience of the cookie (M = 5.98, SD = 3.02) than participants who liked cookies less (M = 4.33, SD = 3.02). The main effect of time was also significant, F (1, 76) = 14.61, $p < .001$. On average, participants reported more positive expectations for the cookie (M = 6.26, SD = 2.34) than they reported enjoying the cookie (M = 4.05, SD = 3.17). This suggests that expectations and experience were significantly positively correlated—such that individuals with higher expectations reported greater enjoyment of the cookie—but that from expectations to experience, participants across all conditions liked the cookie less than they expected.

As expected, the interaction between time and dichotomized cookie-liking was also significant. To examine the nature of the interaction, separate one-way ANCOVAs were conducted for average expectations and average experience as a function of cookie-liking with hunger as the covariate. Participants high in cookie-liking reported significantly higher expectations for the cookie (M = 7.46, SD = 3.56) than participants low in cookie-liking (M = 5.04, SD = 3.02), F (1, 76) = 21.27, $p < .001$). However, participants high and low in cookie-liking did not differ significantly in their enjoyment of the cookie, p = .23. Thus, the interaction between cookie-liking and time of reporting was driven by the fact that participants who liked cookies more reported more positive expectations for the cookie than participants who liked cookies less. While participants who liked cookies more did not enjoy the cookie any less than participants who liked

cookies less, they did experience greater disappointment. Because they had higher expectations, they experienced a greater change from their expectations.

Discussion

The purpose of Experiment 3 was to test the full model outlined in Figure 1. It was predicted that participants who imagined eating the cookie and ate the cookie while under cognitive load would enjoy the cookie more than participants who imagined eating the cookie but ate the cookie while not under load. Furthermore, it was predicted that cognitive load would moderate the effect of simulation on experience as a function of affective expectations—that is, participants who imagined eating the cookie were hypothesized to develop more extremely positive affective expectations for the cookie.

To summarize, there was a small and only marginally significant main effect of simulation, such that cookie simulators reported more positive expectations and experience of the cookie, Furthermore, participants in all conditions liked the cookie less than they expected to like the cookie, and this was particularly true for participants who liked cookies more. However, there was no evidence that cognitive load made assimilation to expectations more likely, and in particular no evidence that cognitive load made assimilation to expectations more likely for individuals low in need for cognition, as in Experiment 1. In any event, the interaction between reported expectations and need for cognition suggests that low need for cognition participants showed assimilation to their expectations regardless of whether or not they were under cognitive load. Because high need for cognition participants also showed a marginally significant pattern of assimilation, there was no reason to expect that low need for cognition individuals would have to rely on their expectations to an even greater degree when under cognitive load

than when not under load. It seems that all participants tended to rely on their expectations.

Experiment 3's participants reported their expectations immediately prior to eating the cookie. Reporting expectations may have one of two different effects on subsequent enjoyment. Making expectations more explicit could have provided a strong schema with which to guide evaluations, thus discouraging participants from performing a more careful evaluation of the cookie. If all participants invested minimal effort in evaluation of the cookie, all participants would have shown assimilation, regardless of whether or not they ate the cookie under cognitive load. This possibility is supported by the strong positive relationship between expectations and experience. On the other hand, explicit expectations may prompt more careful evaluation of a stimulus (Olson, Roese, & Zanna, 1996), and to the extent that the stimulus is discrepant with the expectation, a more careful comparison of an experience with an expectation will tend to result in affective contrast (Wilson & Klaaren, 1992). Nevertheless, contrast was not observed under any conditions.

In sum, it was unclear whether making expectations explicit influenced the subsequent evaluation of the cookie, and if so, in what way. Experiment 4 was conducted in order to determine how simulation affects affective experience when individuals' attention is not drawn to their expectations for the experience.

CHAPTER V: EXPERIMENT 4

Method

Overview

Participants simulated either eating the cookie or the events of a typical day, but did not report their expectations for the cookie. Participants then ate the cookie while under cognitive load or not under load and reported their experience of the cookie.

An unexpected event complicated data collection and analysis. About halfway through data collection, the manufacturer made the Shur-Shine cookie substantially smaller. Thus, roughly half the participants received the original cookie and the other half received the changed cookie. Because participants in these two samples essentially received different stimuli, data from the two samples are reported as Experiments 4a and 4b.

Participants

A total of 95 Introductory Psychology students at Texas Tech University participated and were compensated with course credit. Fifty participants received the original cookie and were included in Experiment 4a. Forty-six participants received the changed cookie and were included in Experiment 4b.

Excluded from Experiment 4a analyses were a total of 14 participants for different reasons; thus, the attrition rate was quite high (28% of participants overall). Nine participants were suspicious of the experimental hypotheses (18% of participants), four participants in the cognitive load condition did not adequately follow instructions and count the number of low tones during the cognitive load task, one participant had

incomplete data due to a problem with the headphones during the load task. The final sample included the remaining 36 participants.

Excluded from Experiment 4b analyses 11 participants; thus, the overall attrition rate was also quite high in Experiment 4b (20% of participants overall). Seven participants were suspicious of the experimental hypotheses (15% of participants), two participants in the cognitive load condition did not adequately follow instructions and count the number of low tones during the cognitive load task, and two participants had incomplete data due to computer malfunction. The final sample included 35 participants.

Materials

With regard to the complication with the cookie stimulus as noted above, the cookie was the same Shur-Shine generic chocolate-chip cookie used in the previous experiments. The cognitive load task was the same auditory task used in Experiments 1 and 3.

Procedure

The procedure was identical to that of Experiment 3, except that participants did not report their expectations prior to eating the cookie. Rather, after simulating either the cookie or the events of a typical day, participants were simply told to wait a minute while the experimenter retrieved and prepared the stimulus.

Results

A preliminary analysis was conducted with data from both samples with Experiment (i.e., 4a or 4b) included as a between-subjects variable. The 2 (simulation condition: cookie, day) X 2 (cognitive load condition: no load, load) X 2 (Experiment: 4a, 4b) between-subjects ANCOVA with hunger and cookie-liking as the covariates

yielded a significant simulation x experiment interaction, F (1, 61) = 4.47, $p < .05$. Because the interaction included experiment, and because participants were not randomly assigned to Experiment 4a or 4b, all further analyses were conducted separately for Experiments 4a and 4b.

Experiment 4a

As in the previous experiments, a reliability analysis indicated that the three dependent measures (enjoyment, pleasure, taste) were highly related (Cronbach's α = .79), and they were averaged together to create a single measure of affective experience. One outlier on this measure was identified and removed from analyses. Mean affective experience of the cookie was 3.54 (SD = 3.21). In order to control for individual state and trait differences in cookie-liking, responses on the hunger (M = 5.14, SD = 4.40) and cookie-liking (M = 11.51, SD = 2.83) items were included as covariates in the analyses.

To determine if cognitive load moderated the effects of mental simulation on affective experience, affective experience was subjected to a 2 (simulation condition: cookie, day) X 2 (cognitive load condition: no load, load) between-subjects ANCOVA with hunger and cookie-liking as covariates. Neither of the main effects or their interaction was significant, all p's > .14.

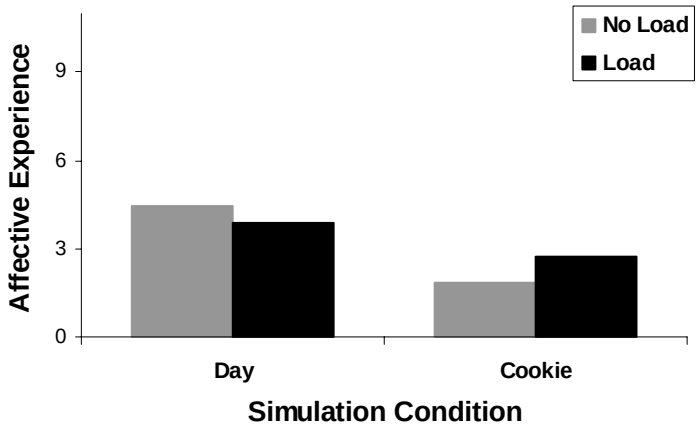

Figure 11. Mean affective experience as a function of simulation condition (day, cookie) and cognitive load condition (no load, load).

In order to determine if need for cognition moderated the effects of cognitive load on the relationship between simulation and experience, a hierarchical regression was conducted predicting mean affective experience from hunger and cookie-liking in the first step, simulation condition, cognitive load condition, and need for cognition in the second step, their two-way interactions in the third step and the three-way interaction term in the first step. As in Experiment 3, the three-way interaction term was non-significant, $p = .82$.

Experiment 4b

A reliability analysis indicated that the three dependent measures (enjoyment, pleasure, taste) were highly related (Cronbach's $\alpha = .87$), and they were averaged together to create a single measure of affective experience. Visual and statistical screening revealed no outliers. Mean affective experience of the cookie was 3.73 (SD = 3.07). In order to control for individual state and trait differences in cookie-appeal,

responses on the hunger (M = 7.57, SD = 3.70) and cookie-liking (M = 10.29, SD = 2.76) items were included as covariates in the analyses.

As in Experiment 4a, the 2 (simulation condition: cookie, day) X 2 (cognitive load condition: no load, load) between-subjects ANCOVA conducted on mean affective experience with hunger and cookie-liking as covariates revealed no significant main effects or interactions, all p's >.31 (Figure 13). Also as in Experiment 4a, the hierarchical regression analysis predicting mean affective experience from the interaction among need for cognition, simulation condition, and cognitive load was non-significant, p = .79.

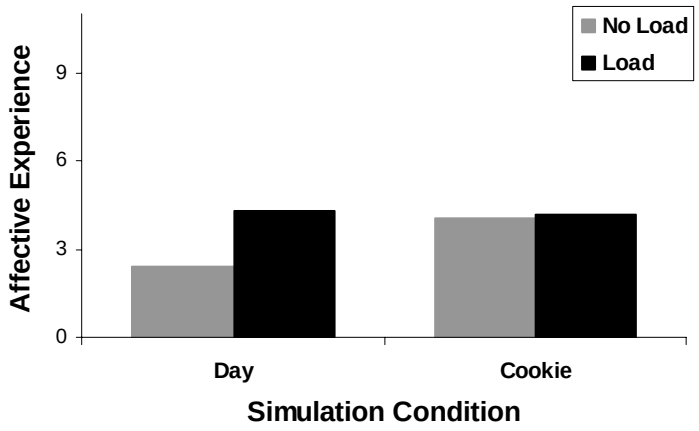

Figure 12. Mean affective experience as a function of simulation condition (day, cookie) and cognitive load condition (no load, load). Neither of the main effects or their interaction was significant.

Discussion

Clearly, Experiment 4 offered no support for the proposed model. Even when the data from Experiments 4a and 4b were analyzed together, the predicted mental simulation x cognitive load interaction did not approach significance.

One problem may simply have been one of sample size and power. Because the change of cookie stimulus necessitated analyzing the groups separately, the sample size in each Experiment 4 was roughly half that of Experiment 3. While more than adequate to detect main effects, the model predicted only an interaction between mental simulation and cognitive load, and the power necessary to detect an interaction may have been lacking. For instance, in Experiment 4a, there were only six participants in each of the cookie simulation cells (no load, load). This in part resulted from the fact that more participants excluded from the analyses due to suspicion and technical difficulties were from the cookie simulation condition than the day simulation condition (nine vs. six, respectively).

Overall, there was a great deal more suspicion in Experiment 4 than in Experiment 3. Given that Experiment 4 took place toward the end of the semester while Experiment 3 took place toward the beginning of the semester, one possibility is that participants were talking to each other about the experiment, and because participants were given a cookie to eat such discussion may have been more likely for this experiment than others. Thus, it might simply have been the case that participants toward the end of the semester were more likely to have known something about the experiment ahead of time. This possibility is introduced with caution, however, as the same pattern of increasing suspicion was not seen during the previous semester of data collection.

A more likely possibility, however, is that Experiment 4 simply does not support the predictions of the model. In order to discuss this possibility, it is necessary to discuss both the ways in which the experiments might have fallen short in testing the model as

well as the ways in which the predictions of the model themselves may have been wrong. I will return to this point below.

CHAPTER VI: GENERAL DISCUSSION

Results Summary and Synthesis

The current research was an examination of how thinking about a pleasant future might influence our experience of the event. Specifically, it was hypothesized that to the extent mental simulation of future events influences the affective experience of those events, it may be because the mental simulation of future events influences our affective expectations for those events. Thus, this research was about affective expectations, including their possible antecedents in mental simulation, their possible consequences for affective experience, as well as possible situational and dispositional factors that might moderate the effects of our affective expectations on our affective experience (i.e., cognitive load and need for cognition, respectively). I introduced a model that outlined the consequences of mental simulation for affective experience. Specifically, I hypothesized that people have generally positive expectations for pleasant future events, and that thinking about a pleasant future event might result in more extremely positive expectations for the event. When the experience falls short of expectations, however, the effects that expectations have on experience might depend on whether or not people notice the discrepancy between their expectations and experience. When the discrepancy is not noticed, the experience is assimilated to the expectation—that is, a pleasant event is experienced as more pleasant. However, if the discrepancy is noticed, the experience is contrasted from the expectation, and a pleasant event is experienced as less pleasant (Roese et al., 1996; Wilson et al., 1989).

Thus, if people have extremely positive expectations for a pleasant future event, the effects of those expectations will depend on 1) whether or not the experience is

discrepant from the expectation, and 2) whether or not the discrepancy is noticed. Because the ability to notice a potential discrepancy between expectations and experience requires sufficient cognitive resources (e.g., Martin et al., 1990) and motivation (e.g., Geers & Lassiter, 2003), I hypothesized that cognitive load and low motivation, as indexed by need for cognition, would make assimilation to expectations particularly likely. Thus, the full model predicted that thinking about a pleasant future experience may lead to more extremely positive expectations for the experience, but the effect that expectations have on the experience may depend on whether or not participants notice a discrepancy between their expectations and experience.

Four experiments were conducted in order to examine various predictions of the model. Experiment 1 examined whether cognitive load moderated the relationship between affective expectations and experience (see Figure 3). Because Experiment 1 did not investigate the hypothesis that mental simulation would influence expectations, participants were provided expectations. Participants with either neutral or extremely positive expectations ate the cookie while under cognitive load or not under load. It was predicted that participants who ate the cookie under load would be more likely to assimilate their experiences to their expectations, such that participants under load with extremely positive expectations would like the cookie more than participants under load with neutral expectations. In fact, this predicted pattern was significant for participants low in need for cognition, but not for participants high in need for cognition (see Figure 6). Results indicate that assimilation to expectations only occurs when participants lack both the motivation (i.e., need for cognition) and the cognitive resources to evaluate the cookie.

Experiment 2 examined the part of the model not investigated in Experiment 1: that mental simulation would influence expectations, such that thinking about a pleasant event results in more extremely positive expectations for the event (see Figure 7). Participants imagined eating the cookie and then ate and evaluated the cookie. Some participants reported their expectations for the cookie before imagining eating the cookie, while others reported their expectations after imagining eating the cookie. It was predicted that participants who reported their expectations after imagining eating the cookie would report more extremely positive expectations for the cookie than participants who reported their expectations before imagining eating the cookie. Although this predicted difference was not significant, the means were in the predicted direction, yielding a medium-sized effect of simulation on expectations.

Experiment 3 examined the full model (see Figure 1). Participants simulated either eating the cookie or the events of a typical day and reported their expectations for the cookie. Participants then ate the cookie while under cognitive load or not and reported their experience of the cookie. It was predicted that cognitive load would moderate the effects of simulation on affective experience, such that participants who imagined eating the cookie and who ate the cookie under cognitive load would enjoy the cookie more than participants who imagined the cookie but ate the cookie under no load. No effect of cognitive load was predicted for participants in the day simulation condition. Although this predicted interaction did not obtain, there was a marginally significant effect of simulation on experience, such that regardless of whether or not participants ate the cookie under load, they showed a general pattern of assimilation. That is, participants who imagined eating the cookie enjoyed the cookie more than participants who imagined

the events of a typical day. Because all participants showed this pattern, the interaction among cognitive load, simulation condition and need for cognition analogous to that in Experiment 1 was not expected to obtain, and in fact it did not.

Affective expectations were predicted to mediate the effects of simulation on experience. Presumably, cookie simulators enjoyed the cookie more than day simulators because they developed more extremely positive expectations for the cookie. Surprisingly, however, this was not the case. The effect of simulation condition on expectations was non-significant. Apparently, simulation affected enjoyment of the cookie without actually affecting their expectations for the cookie. Not surprisingly, however, although simulation did not influence expectations, expectations did significantly predict enjoyment: participants with higher expectations reported greater enjoyment of the cookie. Furthermore, this was particularly true for participants low in need for cognition.

One more finding of note in Experiment 3 was that participants in all conditions enjoyed the cookie less than they expected to enjoy the cookie. That is, even though participants who simulated the cookie enjoyed the cookie more than participants who simulated the events of a typical day, and even though participants with generally higher expectations enjoyed the cookie more than participants with lower expectations, all participants enjoyed the cookie less than they thought they would.

Experiment 4 was a replication of Experiment 3 with the exception that participants did not report their expectations prior to eating and evaluating the cookie. None of the analyses conducted on Experiment 4a, with the original stimulus, or on Experiment 4b, with the changed stimulus, supported the predictions of the model.

Across the four experiments results provided little support for the model, and there were often inconsistencies in the pattern of results between experiments. In attempting to provide a summary of the results across the four studies I do so with respect to these inconsistencies, and with the caveat that the implications may be of limited generalizability. This is a particularly important caveat when references are made to Experiment 4, as null results necessitate very careful inferences. That is, the following analysis is presented as if there were no theoretical or methodological concerns to be addressed with regard to the experiments. These considerations will be addressed in the next section.

With respect to the concerns outlined above, a few tentative inferences can be drawn from a comparison of the pattern of results across the four experiments. First of all, there was little evidence that simulating the cookie resulted in more extreme affective expectations. Experiment 3, however, provided evidence that simulation influenced enjoyment of the cookie, even though it did not influence expectations. However, this effect was not replicated in Experiment 4. This leads to a rather strange conclusion: imagining a pleasant experience results in a more pleasant experience, but only if expectations are made explicit. Furthermore, this is true even though imagining the experience has no effect on expectations for the experience.

As mentioned above, imagining the cookie results in greater enjoyment of the cookie, but only if expectations are made explicit (Experiment 3). Furthermore, to the extent that imagining the cookie results in greater enjoyment of the cookie, cognitive load does not moderate the effects of simulation (Experiments 3 & 4) or reported expectations (Experiment 3) on affective experience. Cognitive load only moderated the effects of

affective expectations on experience for specific people in specific circumstances—that is, for participants low in need for cognition who were provided expectations by the experimenter (i.e., Experiment 1). This suggests that when participants are provided expectations, they only rely on those expectations to guide their experience when they are robbed of the cognitive resources they do not like to use anyway.

In sum, thinking about a pleasant future experience has little, if any, effect on expectations for the experience, but might result in greater enjoyment of the experience, particularly if one has low motivation to evaluate the experience. When mentally busy, being provided positive expectations might also result in greater enjoyment of an experience, but once again, only when one is low in motivation to think about the experience.

As previously noted, it is difficult to interpret results that were often inconsistent, both across studies and with the predictions of the model. However, because each component of the model was built on a solid empirical foundation, it is perhaps more difficult to address why results were inconsistent with the model from a theoretical perspective than a methodological perspective. Thus, in the next section, I address theoretical issues largely in terms of methodology in order to examine the various inconsistencies among the results of the four experiments.

Theoretical and Methodological Issues

A useful way to conceptualize the model outlined in this dissertation is as a conjunction of two theoretical frameworks, the first concerning the consequences of affective expectations for experience, and the second concerning the source of these expectations. In order to discuss why the results did not support the predictions of the

model, I will address theoretical, operational, and methodological concerns separately with regard to each of these frameworks.

Affective Expectations and Experience

The model predicted that to the extent that a discrepancy existed between expectations and experience, assimilation would be more likely to occur if a discrepancy between expectations and experience was not noticed, but contrast would be more likely to occur if the discrepancy between expectations and experience was noticed (e.g., Wilson et al., 1989, Geers & Lassiter, 1999). Because people under cognitive load tend to evaluate stimuli in terms of previously activated information (Dijksterhuis et al., 2001; Martin et al., 1990), cognitive load was predicted to make assimilation to expectations more likely. Accordingly, as cookie simulators were predicted to develop more extremely positive affective expectations for the cookie than day simulators, it was predicted that participants who simulated the cookie and ate the cookie while under load would be more likely to assimilate their experience to their expectations, enjoying the cookie more, while participants who simulated the cookie and ate the cookie not under load would be more likely to contrast their experiences from their expectations, enjoying the cookie less.

While there was some evidence for affective assimilation, under no conditions was there evidence for affective contrast. In retrospect, however, this is not particularly surprising. Typically our experiences conform to our expectations. Indeed, this why we have them (e.g., Olson et al., 1996). Furthermore, when they do not, we often do not notice, and assimilation occurs anyway (e.g, Wilson & Klaaren, 1992). Because assimilation is the rule and contrast the exception, it was perhaps not reasonable to expect contrast in the absence of a manipulation that would have made contrast, rather than

assimilation, more likely, such as the unitization procedure employed by Geers and Lassiter (1999). In any event, in order for contrast or assimilation to occur, there must be a discrepancy between expectations and experience. Therefore, one possible reason contrast did not occur is that there was not a sufficient discrepancy between expectations and experience.

Discrepancy between expectations and experience. The notion of discrepancy is central to several models of assimilation and contrast in judgment. For instance, Schwarz and Bless's (1992) inclusion/exclusion model holds that when a stimulus is included a judgmental category, assimilation occurs, but if it is extreme or discrepant enough to be excluded from the category, contrast occurs. Martin's (1986) set/reset model holds that to the extent a stimulus matches a previously activated category, assimilation occurs, but if it does not match, contrast occurs. A mismatch, or discrepancy, is necessary but not sufficient for contrast. The discrepancy must also be noticed in order for contrast to occur (Wilson et al., 1989).

In the absence of a sufficient discrepancy, cognitive load would not have been a particularly effective moderator of the relationship between expectations and experience. That is, participants who ate the cookie while not under load would have had no more of a discrepancy to detect than participants who ate the cookie under load, and thus no pattern of assimilation would have emerged. In fact, there was perhaps some evidence that the stimulus was discrepant. In Experiment 3, the main effect of time of reporting was significant, such that participants across conditions reported significantly higher expectations for the cookie than enjoyment of the cookie. However, the relationship between expectations and experience clearly indicated assimilation: there was a strong

positive relationship between expectations and experience, such that participants with higher expectations enjoyed the cookie more and participants with lower expectations enjoyed the cookie less, regardless of the fact that all participants enjoyed the cookie less than they expected to. This suggests that there was in fact a discrepancy between expectations and experience, but that the discrepancy was either insufficient or simply not noticed. This is a rather tenuous claim, however, considering that participants explicitly provided their expectations just three minutes or so before evaluating the cookie.

There is another possible and more mundane explanation for this finding, however. In order to correct for possible demand characteristics elicited by reporting their enjoyment of the cookie, participants were prompted immediately after eating and immediately prior to evaluating the cookie with a brief set of instructions that might have artificially dampened enjoyment ratings. Because some pilot participants in debriefing indicated that they had reported enjoying the cookie more than they actually had in order to avoid offending the experimenter, the instructions encouraged participants to report their honest evaluation of the cookie, and not to worry about hurting the experimenter's feelings or ruining the experiment. Such instructions could have led participants to believe that their cookie enjoyment evaluations were artificially inflated, and in turn led them to overcorrect for such a perceived bias. As such a bias may or may not have existed, overcorrection may have resulted in the significantly lower enjoyment than expectation ratings, as participants were prompted with no such instructions prior to reporting their expectations. Nevertheless, such influence would only have been expected to have had a main effect on time of reporting (i.e., from expectations to experience) and

thus should not have obscured any moderating effects of cognitive load on whether participants noticed a discrepancy between expectations and experience.

On the other hand, if enjoyment ratings were artificially deflated, there may not have *been* a discrepancy between expectations and experience, at least, not a particularly strong one. This would explain why there were no interactions with cognitive load in Experiment 3, either as a function of simulation condition or reported expectations. The interaction between need for cognition and expectations does not support this possibility, however. Low need for cognition participants showed stronger assimilation effects of reported expectations on enjoyment than high need for cognition participants. The fact that need for cognition moderated the relationship between expectations and experience suggests that there was in fact some discrepancy between expectations and experience, as discrepancy is a necessary condition for assimilation (Wilson et al., 1989).

Noticing discrepancy: need for cognition and cognitive load. In Experiment 3, participants low in motivation to think relied more heavily on their expectations to guide evaluation relative to participants high in motivation. In Experiment 1, however, only participants low in motivation and ability to think relied on their expectations to guide their evaluation of the cookie. Participants low in need for cognition who ate the cookie under cognitive load showed assimilation to their expectations, such that those provided with positive expectations enjoyed the cookie more than those provided with only neutral expectations. That is, at least for some participants, the cognitive load manipulation effectively moderated the relationship between expectations and experience in Experiment 1, while in Experiment 3 cognitive load moderated neither the relationship

between simulation and affective experience nor the relationship between reported expectations and experience.

Cognitive load was predicted to moderate the relationship between expectations and experience. Furthermore, a discrepancy between expectations and experience is necessary in order for cognitive load to moderate this relationship. One possible reason, then, why cognitive load had some moderating effect in Experiment 1 but no moderating effect in Experiment 3 is that there existed a greater discrepancy between expectations and experience among Experiment 1's participants provided with positive vs. neutral expectations than among Experiment 3's participants who simulated eating the cookie vs. a typical day. On the assumption that the cookie was a relatively neutral stimulus, greater expectations imply greater discrepancies. Along these lines, Experiment 1 participants provided with extremely positive expectations reported having held significantly more positive expectations for the cookie than participants provided with only neutral expectations (see Figure 5). Conversely, Experiment 3 participants who simulated eating the cookie did not report significantly higher expectations for the cookie than participants who simulated the events of a typical day.

One way to explain Experiment 3's null effect of simulation is that cookie simulation did not result in more extremely positive expectations for the cookie. Another explanation, however, is that cookie simulators did develop more positive expectations for the cookie, but that day simulators developed more positive expectations for the cookie as well. After all, both groups were shown the raw cookie dough on the cookie tray and told that the cookie would be baked fresh. Although cookie simulators were explicitly instructed to imagine eating the cookie, it is possible that day simulators

spontaneously imagined eating the cookie, thus providing them with relatively high expectations for the cookie as well. To the extent that the difference in expectations between groups was small in Experiment 3, cognitive load would likely have had relatively equivalent effects across simulation conditions. Accordingly, this analysis suggests a methodological problem similar to the design flaw in Experiment 2. The problem in Experiment 2 was that participants who reported their expectations prior to simulation may have held vivid images of the cookie in mind as they reported their expectations. This flaw may not have been completely eliminated in Experiments 3 and 4, a point to which I return in the next section.

Another possible reason why day-simulators in Experiment 3 may have held higher expectations for the cookie than neutral expectation participants in Experiment 1 is that participants in Experiment 1 provided with neutral expectations had diminished expectations for the cookie. Experiment 1 participants were shown the cookie dough and told that they would eat a fresh-baked cookie in both expectation conditions. To the extent that people generally expect fresh-baked cookies to be quite tasty, providing participants with neutral expectations may have diminished their expectations for the cookie. Thus, participants provided with neutral expectations in Experiment 1 could have held lower expectations for the cookie than day simulators in Experiment 3.

In sum, evidence for the predictions of the model regarding the effects of affective expectations on affective experience was mixed. In Experiment 1, when expectations were provided, only individuals low in motivation and ability to think showed assimilation to their expectations. In Experiment 3, participants in all conditions showed assimilation to their expectations, perhaps because expectations between groups differed

only slightly as a function of simulation condition. This latter concern relates to the second theoretical framework on which the model was based—that is, the source of affective expectations as generated by thought-induced polarization.

Mental Simulation and Affective Expectations

Perhaps the most tenuous claim of the model was that mentally simulating a pleasant future event would result in more extreme affective expectations for the event. This prediction was based largely on the work of Tesser (e.g., Tesser, 1978; Tesser et al., 1995), who has shown across a variety of different attitude objects that thought tends to make positive attitudes more positive and negative attitudes more negative. The model maintained that one's attitude toward a future event is synonymous with one's expectation for the event, so that if thinking about chocolate-chip cookies tends to make one's attitude toward chocolate-chip cookies more positive, then thinking about eating a chocolate-chip cookie would tend to make one's expectations for the cookie more positive.

In general, evidence for this prediction of the model was weak. While there was a marginally significant effect of simulation condition on affective experience in Experiment 3, there was little evidence that simulation had anything more than a minimal effect on expectations in Experiments 2 and 3, and the effects of simulation on affective experience were not replicated in Experiments 4a and 4b. Of course, there was an important difference between Experiments 2 and 3 and Experiment 4. In both Experiments 2 and 3, expectations were made explicit, whereas in Experiment 4, they were not. This suggests that if thinking about a pleasant future event does influence

affective experience, it only does so when expectations are explicitly reported, even though there is little evidence that simulation affected expectations.

There are two primary possibilities as to why simulation had little effect on expectations for the cookie: 1) The theoretical foundation of this part of the model was wrong, such that simulation does not tend to result in more extreme affective expectations; 2) The theoretical foundation of this part of the model was not wrong, but the particular stimulus was not subject to the predicted effect. Regarding the first possibility, it is plausible that thinking about the cookie could have made people want the cookie more or increased their desire for cookies in general without necessarily changing their expectations for the cookie. An increase in wanting for the cookie may have been more likely to affect the experience of the cookie than expectations for the cookie—an idea consistent with the finding that in Experiment 3 simulation did have a marginally significant on experience without having a significant effect on expectations. In fact, Berridge (1999) has distinguished between the conscious, subjective experience of pleasure and the core processes underlying pleasure, including "liking" and "wanting." According to Berridge (1999), the subjective and core processes are dissociable from one another, such that an observable change in wanting or liking can occur in the absence of an experienced change in pleasure. For instance, drug addicts unwittingly administer larger amounts of saline solution containing trace amounts of cocaine than solutions containing no cocaine, even though they report no awareness of their preference and no difference in experienced pleasure between the two solutions (Fischman & Foltin, 1992). Furthermore, not only are the experience of pleasure and core components of liking and wanting dissociable, but liking and wanting themselves may also be dissociable from one

another. It could be argued, for instance, that the addicts' behavioral preference for the solution containing cocaine represented an increased wanting for the solution without an accompanying increase in liking for the solution. This possibility is supported by the fact that liking and wanting may be represented in different brain systems (see Berridge, 1999, for a review).

Although for most people at least chocolate-chip cookies and cocaine are very different stimuli, the possible dissociation of liking and wanting suggests that thinking about cookies may have increased people's wanting for the cookie without influencing their expected liking for the cookie. Future research could examine this possibility in a variety of ways. For instance, after imagining eating the cookie, some participants could be asked to report how much they want or desire the cookie, while other participants could be asked to report their expectations for the cookie (so that reporting desires does not contaminate expectations and vice versa). This would allow for an examination of whether simulation affects desires and expectations differently, and also whether desires and expectations have different consequences for affective experience. It is plausible, for instance, that thinking about the cookie could have made it more appealing without necessarily influencing expectations. Cookie simulators may have only expected a moderately good cookie, but nevertheless developed a stronger desire for the cookie. Likewise, simulators could have been given an opportunity to eat additional cookies or take some of the cookies home with them. Just as the addicts unwittingly administered larger amounts of the solution containing cocaine, cookie simulators may eat more cookies or take more cookies with them, even if their expectations do not differ from those of day simulators.

The second possibility is that thinking about cookies simply did not result in attitude polarization in general. In fact, thought does not always result in attitude polarization. Linville (1982) has shown that for more complex attitudes, thought actually results in less extreme evaluations. For instance, people make more extreme judgments of outgroup members (e.g., foreigners) than ingroup members (e.g., Americans). The explanation for this finding is that people have many dimensions by which to evaluate ingroup members, and evaluations will be less favorable along some of those dimensions while more favorable along others. The result is a tempering of the overall evaluation. Conversely, people may have few dimensions along which to evaluate outgroup members, and the result is a more polarized evaluation.

Interestingly, Linville (1982, Experiment 3) tested this hypothesis with chocolate-chip cookies. Participants in a complex schema condition ate and evaluated five chocolate-chip cookies along six dimensions (e.g., sweetness, freshness, buttery taste, softness, chewiness, chocolate-chips) while participants in a simple schema condition ate and evaluated the cookies along only two of the six dimensions. All participants then provided one global evaluation of each cookie. As expected, participants who evaluated each of the cookies along only two dimensions showed greater extremity in their evaluations than participants who evaluated the cookies along six dimensions, as measured by the standard deviation among each participant's five ratings. With fewer dimensions, evaluations were more likely to be consistent on each dimension, resulting in greater extremity. With more dimensions, evaluations were less likely to be consistent on each dimension, resulting in less extremity.

As previously discussed, however, Tesser and Leone (1977) have shown that more complex schemas can result in greater attitude polarization. Men show attitude polarization when thinking about football, but not fashion, while women show the opposite pattern (or so they did in 1977). Tesser and Leone (1977) explain that men have better-developed schemas for football than fashion, and thus bring more evaluatively-consistent cognitions to mind when thinking about football than when thinking about fashion. This apparent contradiction has been resolved by Judd and Lusk (1984), however, who showed that more complex schemas will result in polarization when the dimensions are correlated, but not when they are uncorrelated. Thus, Linville's (1982) results suggest that to the extent participants brought uncorrelated dimensions to mind as they imagined eating the cookie, they might have actually developed less extremely positive expectations for the cookie.

A careful analysis suggests that this possibility is unlikely. The cookie stimulus was chosen because it was believed to be a relatively unambiguous stimulus. That is, people have well developed schemas for chocolate-chip cookies, and those schemas tend to be generally positive. Furthermore, a wealth of research indicates that people tend to hold idealized representations for future events (see Mitchell & Thompson, 1994, for a review). Extended debriefing during pilot testing as well as content analysis of the simulations themselves indicated that participants who imagined eating the cookie had absolutely no negative thoughts or feelings about the cookie during simulation. To the extent that people hold idealized representations for future events, and that the thoughts that participants brought to find were generally positive, their expectations for the cookie would have been predicted to become more positive with thought (e.g., Tesser, 1978).

Operationalization of the Model

Cookie stimulus. As previously mentioned, the cookie was chosen because it was believed to be relatively unambiguous. Furthermore, people likely have well-developed schemas for chocolate-chip cookies, and well-developed schemas are necessary for thought-induced attitude polarization to occur. Although satisfying this requirement, the cookie may have been *too* unambiguous. Perhaps people's schemas for chocolate-chip cookies are so well-developed that the mental simulation manipulation was undermined. If people generally expect chocolate-chip cookies to be quite good, mental simulation may have had limited ability to polarize expectations for the cookie. Perhaps a more complex, more ambiguous stimulus would have been more likely to result in polarized expectations, such as the events of the upcoming Friday night. I return to this possibility below.

Mental simulation manipulation. The introduction of the mental simulation manipulation itself may have contributed to the potential problems with the cookie stimulus noted above. As previously noted, all participants were shown the fresh cookie dough on the toaster oven tray before being instructed to simulate the cookie or the events of a typical day. This could have constrained the range of expectation responses, as the sight of the cookie dough might have generated strong positive expectations among all participants. Unfortunately, this suggests that the design flaw noted in Experiment 2 may have also been a problem in Experiments 3 and 4. Although participants in the cookie simulation comparison groups did not report their expectations immediately after seeing the cookie dough and being told that they would eat a fresh-baked cookie, as they did in Experiment 2, this still could have prompted mental simulation similar to the

simulation performed by cookie simulators. After all, these participants simply wrote down the events of their typical day. It is plausible that they also were thinking about the cookie while performing this presumably mundane and mentally unchallenging task. Thus, there may have been a problem with operationalizing the cookie simulation comparison group: perhaps these participants should have engaged in an activity that would have specifically prevented them from thinking about the cookie.

Cognitive load manipulation. In general, the cognitive load manipulation was not particularly effective. Perhaps low-level processes like taste perception are not particularly prone to interference from higher-level cognitive tasks, particularly when the tasks take place in different sensory modalities. That is, the taste perception task was a gustatory task, and the cognitive load task was an auditory task. This would explain why cognitive load only made assimilation more likely for participants already low in motivation to think in Experiment 1. Participants high in need for cognition may have been highly motivated to pay attention to the cookie while counting the low tones, while participants low in need for cognition lacked the motivation to pay attention to the cookie while counting the low tones. In fact, need for cognition interacted with cognitive load in Experiment 1 as well as with reported expectations in Experiment 3. This suggests that the trait measure was a more effective moderator of the relationship between expectations and experience than the state manipulation (i.e., cognitive load). Future research, then, might investigate other trait variables that would be predicted to moderate the relationship between affective expectations and experience. For instance, drawing on a wealth of literature suggesting that optimists are more likely to overlook contradictions and discrepancies while pessimists show increased sensitivity to contradictions and

discrepancies, Geers and Lassiter (2002) have found that optimists are more likely to show assimilation to positive expectations, but pessimists are more likely to show contrast from positive expectations. Thus, when provided positive expectations for a relatively unfunny film, optimists enjoy the film more than those with no expectations, and pessimists enjoy the film less than those with no expectations.

Great Expectations: A New Look

The new look theory in perception was based on the notion that perception is a process of stimulus classification, and as such, the meaning and value placed on a stimulus is directly a function of the category in which it is classified: "All perception is generic in the sense that whatever is perceived is placed in and achieves its meaning from a class of percepts with which it is grouped" (Bruner, 1957, p. 124). Bruner proposed a state of "readiness" to characterize the organism's interaction in the environment. Though what Bruner had in mind were more passive perceptual processes, the new look in perception opened the door to an understanding of organisms as actively engaged in constructing their experiences. It is rare that we bring nothing to bear on our experiences; rather, our experiences are shaped by our previous experiences, which provide schemas for organizing our current experiences, and these schemas provide expectations for our future experiences. Most important, our experiences tend to conform to our expectations (e.g., Olson, Roese, & Zanna, 1996). Indeed, they tend to be a product of our experiences.

This current research was concerned with affective expectations, including both the processes by which they are influenced (i.e., thought-induced attitude polarization) and the processes they in turn influence (i.e., assimilation and contrast in affective experience). In the final analysis, however, the experiments reported herein neither

provided strong support for the model nor may they have represented the best potential tests of the model. As noted at the beginning of the discussion, however, the various components of the model are built on solid empirical ground. Although the current research suggests that the model does not hold for the kind of unambiguously pleasant experience such as eating a chocolate-chip cookie investigated here, it might be the case that the model holds for the kind of more complex, more ambiguous experience that motivated the research in the first place: Monday comes, and already, we cannot wait for Friday. Each day brings us closer to the weekend, and the contents of consciousness fill with thoughts, feelings, and plans for Friday night. The imagination of those events may bring with it the good feelings associated with them. But what effects might the imagination of Friday night have on our actual experience of Friday night?

Examining participants' expectations and experiences of Friday night provides a more ecologically valid test of the model perhaps than examining expectations for and experience of chocolate chip cookies. Along the same lines, a trait moderator of the relationship between expectations and experience could be implemented, as the laboratory manipulation of cognitive load was not particularly effective.

Participants would come into the laboratory for two sessions. They would further be assigned to either simulation or recall conditions. In the first session, simulation participants would be instructed to think about the coming Friday night and write a simulation of how they expect the events of the coming Friday night to unfold. Recall participants would be instructed to write a story about how the events of the past Friday unfolded. All participants would then report how much they expect to enjoy the coming

Friday night. In the second session, all participants would come into the laboratory and report how much they actually enjoyed the previous Friday.

One final possibility concerns the extension of the model to the realm of unpleasant events. Some research has demonstrated positive benefits of mentally simulating unpleasant events (e.g., Rivkin & Taylor, 1999), and imagining negative outcomes for future events (e.g., defensive pessimism, Norem & Cantor, 1986). According to the proposed model, however, there may be times when imagining a negative outcome is detrimental, such as when a discrepancy between expectations and experience is not noticed. In this case, affective assimilation would occur, and the experience would be experienced as more unpleasant. For instance, thinking about going to the dentist might make one's expectations for the dental procedure more negative, even if the dental procedure is less unpleasant than anticipated. On the other hand, if a discrepancy between negative expectations and experience is noticed, affective contrast would be predicted, resulting in decreased unpleasantness of the experience.

These predictions are based on the hypothesis that mental simulation of a negative event will polarize the representation of the event, leading to extreme negative expectations. Indeed, this follows from Tesser and Conlee (1973), who found that thinking about an unfriendly interaction partner polarized negative feelings toward the partner, just as thinking about a friendly interaction partner polarized positive feelings toward the partner. Furthermore, Buehler and McFarland (2001) demonstrated the intensity bias for predictions of negative affect, in that students expect to feel worse about getting a low grade than they actually report feeling. However, it is also plausible that representations of negative events are not more negative than the corresponding actual

experience (e.g., Mitchell & Thompson, 1994). As previously noted, our expectations for future events tend be colored by self-enhancement biases (Mitchell & Thompson, 1994) and "positive illusions" (e.g., Taylor & Brown, 1988) that may brighten our representations of negative events just as well as positive events. If representations of future negative events are not as bad as actual events, then it could instead be the case that thought tends to make expectations for negative events less extreme.

The potential extension of the current model to the domain of unpleasant affect leads to some interesting predictions. However, as the current research does not provide strong support for the model within the domain of pleasant affect, such predictions are at best speculation. Before extending the model to new domains, it will first be necessary to demonstrate that it holds within the framework for which it was constructed.

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APPENDIX A: EXTENDED LITERATURE REVIEW

Monday comes, and already, we can't wait for Friday. Each day brings us closer to the weekend, and the contents of consciousness fill with thoughts, feelings, and plans for Friday night. And the imagination of those events may bring with it the good feelings associated with them. But what effects might the imagination of Friday night have on our actual experience of Friday night?

The above illustration is composed of many psychological elements. First, there is the pervasive tendency for humans to engage in "mental time travel" (Sheldon & Vansteenkiste, 2005), or mental simulation of the future (Sanna, Carter, & Burkley, 2005). Some, such as philosopher Daniel Dennett, have even proposed mental simulation as the basis for the evolution of consciousness: "…the fundamental purpose of brains is to produce future" (Dennett, 1991, p. 177).

Second, the simulation of a future event requires some initial representation of the event (e.g., Wilson & Gilbert, 2003). Each person's representation of Friday night will include a variety of elements and the feelings associated with those elements, and this mental schema will guide the mental simulation of Friday night. These schemas are the foundation of our expectations for future events (e.g., Lowenstein & Schkade, 1999). To the extent that our schema for Friday night is composed of positive elements, we will likely expect to enjoy Friday night.

Finally, simulations involve the active elaboration of these schemas in consciousness. A person whose schema for Friday night includes a few beers at the pool hall with friends may actually imagine the event unfolding in time: "Mental simulation refers to the imitative representation of the process of an event…it includes the cognitive

construction of hypothetical scenarios (and) rehearsals of likely future events" (Taylor & Pham, 1996).

The question for the current research is this: How does the mental simulation of a future event influence our affective experience of the event? Several theoretical perspectives bear on this question. Counterfactual thinking—or the imagination of alternative realities—can have an impact on emotional experience (e.g., Roese & Olson, 1997; Sanna, et al., 2005). The intensity bias (e.g., Buehler & McFarland, 2001), or the overestimation of our affective reactions to future events, suggests a tendency to represent idealized versions of future events. The attitude polarization literature (see Tesser, Martin, & Mendolia, 1995, for a review) demonstrates some possible affective consequences of elaborating those representations via mental simulation. Finally, the affective expectation model (e.g., Wilson & Klaaren, 1992) and decision-affect theory (e.g., Mellers & McGraw, 2001) highlight the affective consequences of our expectations for future events. Each of these literatures will be considered with regard to the current research question: How does the mental simulation of a future event influence our affective experience of the event?

Mental Simulation and Counterfactual Thinking

Counterfactuals are simulations of past events that did not happen, but can be imagined to have happened (Sanna, 2000). The relationship of counterfactual thinking to affect can trace its roots to two influential theories in psychology: *norm theory* and *social comparison theory.*

According to norm theory (Kahneman & Miller, 1986), the comparison of experienced outcomes with easily imagined alternative outcomes can have affective

consequences. Thus, the impact an alternative outcome has on emotion is in part determined by how easily the alternative outcome is brought to mind. Consider this classic example from Kahneman and Tversky (1982): Given two airport-bound individuals who miss their respective flights—one by 5 minutes, the other by 30—who is likely to feel worse? According to norm theory, the former will feel worse, because it is easier to imagine having actually made the flight when one is only 5 minutes late.

The central notion of social comparison theory (Festinger, 1954) is that one important way we gain information about ourselves is by comparing ourselves to others on relevant dimensions. According to Festinger, how one evaluates themselves depends entirely on this context of evaluation, and these evaluations will have affective consequences. For instance, a professional violinist may choose to compare herself to her peers, but to the extent that she plays at a skill level roughly equivalent to that of her peers, this comparison may not be very informative. However, she will quickly realize how talented she is if she compares her skills to those of a junior high orchestra student, and by the same token will realize how woefully inadequate her skills are if she compares herself to Itzhak Perlman. In the latter case, she makes a *downward* social comparison: She compares herself to someone who is clearly inferior to her on the relevant dimension. In the former case, she makes an *upward* social comparison: She compares herself to someone who is clearly superior to her on the relevant dimension. Importantly, these comparisons will have affective consequences: downward social comparisons tend to result in increased levels of positive affect: the violinist will feel pretty good about how well she plays the violin after comparing her playing to that of a junior high student. On the other hand, upward social comparisons tend to result in decreased levels of positive

affect: she may actually feel worse about how well she plays the violin after comparing her playing to that of Itzhak Perlman. These types of affective context effects are examples of affective contrast—one feels better when comparing themselves to someone worse and worse when comparing themselves to someone better on a relevant dimension. That is, the change in affective experience is away from that of the standard of comparison.

In the social comparison literature, the standard of comparison is a relevant other. That is, the comparison is *interpersonal.* However, in the counterfactual thinking literature, the standard is *temporal.* That is, counterfactuals are produced when one imagines an alternative outcome to an event that has already taken place. Like social comparisons, counterfactuals can be downward or upward. Downward counterfactuals are produced when one imagines an alternative outcome that is worse than actual. For instance, if a student receives a "C" on a paper, he produces a downward counterfactual by imagining having received an "F," and an upward counterfactual by imagining having received an "A." Like social comparisons, counterfactuals also tend to result in affective contrast: the student feels better when producing a downward counterfactual—that is, imagining having done worse, but feels worse when producing an upward counterfactual—that is, imaging having done better (see Roese & Olson, 1997, for a review of the relationship between counterfactual thinking and affect).

A well-known example of the effects of counterfactual thinking is provided by Medvec, Madley, & Gilovich (1995). Independent raters combed through footage from the 1992 Olympic Games and judged how happy the gold, silver, and bronze medal winners appeared after learning of their position. While gold medal winners

unambiguously appeared to be the happiest of the three, silver medal winners counterintuitively appeared less happy than bronze medal winners. According to Medvec et al. (1995; c.f. McGraw, Mellers, & Tetlock, 2005), the explanation of these findings lies in the type of counterfactuals that each medal winner is likely to produce. Silver medal winners may more easily produce upward counterfactuals, by imaging having won the gold instead of the silver, and thus experience disappointment. On the other hand, bronze medal winners may more easily produce downward counterfactuals, by imagining not having won a medal at all, and thus experience elation.

Counterfactual thinking does not always result in affective contrast. It can also result in affective assimilation. Assimilation occurs when imagining a better outcome leads to increased positive affect and imagining a worse outcome leads to increased negative affect. That is, the change in affective state is in the same direction as the standard of comparison. According to the reflection and evaluation model of comparative thinking (Markman & McMullen, 2003), affective contrast is a result of what the model terms evaluation, which occurs when that which is imagined to have happened is compared with what did actually happen. Assimilation is a result of what the model terms reflection, which occurs when that which is imagined to have happened is not compared with what did actually happen. Rather, people simply reflect on the imagined alternative. McMullen (1997) asked to participants to "vividly imagine what might have happened" in regard to a negative life event. That is, there was no comparison of the imagined event with the actual event. With these instructions, the result was affective assimilation: participants who imagined better outcomes actually felt better and participants who imagined worse outcomes actually felt worse. In another condition, participants were

instructed to think about the imagined alternative in comparison to the actual event. In this case, the result was affective contrast: those who imagined better outcomes felt worse and those who imagined worse outcomes felt better.

Counterfactual thinking typically refers to the imagination of events that could have happened, but did not. Conversely, prefactual thinking is another type of mental simulation that involves the imagination of events that could happen in the future (e.g., Sanna, 2000).

Sanna et al. (2005) have proposed the imagination, goals, and affect (IGoA) model of mental simulation, which identifies four possible motives that drive prefactual thinking. *Catastrophizing* and *self-protective* motives involve imagining "worse possible worlds" (e.g., Markman, Gavanski, Sherman, & McMullen, 1993), and thus tend to result in the production of downward counterfactuals. Catastrophizing occurs when one imagines events transpiring in the worst possible of ways and is generally considered maladaptive (Sanna et al., 2005). However, downward prefactuals can also be adaptive: For instance, *defensive pessimism* (e.g., Norem & Cantor, 1986) is a self-protective prefactual that involves imaging negative outcomes, but for the purpose of better preparing oneself for the future.

Indulging and *self-improvement* motives, on the other hand, involve imagining "better possible worlds" (Markman et al., 1993), and thus tend to result in the production of upward prefactuals. Indulging (e.g., Oettingen, Pak, & Schnetter, 2001) occurs when one engages in free fantasy thought or imagines the best of possible outcomes. *Self-improvement* also involves the imagination of positive outcomes, but typically for the purposes of improving upon a current state of affairs.

Importantly, the model (e.g., Sanna et al., 2005) explains the expected affective consequences of imagining the future. Both self-improvement and self-protection will typically result in affective contrast, because they involve a comparison of the imagined future with the present (e.g., Markman & McMullen, 2003). Self-improvement simulation might cause one who feels bad to feel better by imaging how things could be better in the future. Conversely, self-protection might cause someone who feels good to feel bad by imaging how things in the future could be worse. Indulging and catastrophizing, however, tend to result in affective assimilation, because they involve reflection as opposed to evaluation (e.g., Markman & McMullen, 2003). For instance, participants who imagine positive outcomes to various problems experience increased positive affect (Oettingen et al., 2001); likewise, participants who list possible negative outcomes to topics of worry experience increased anxiety and discomfort (Vasey & Borkovec, 1992).

To sum, research has demonstrated that counterfactual thoughts have consequences one's current affective state. More relevant, prefactual thoughts can also have consequences for one's current affective state—that is, thinking about the future can change the way that you feel in the present. Little research, however, has examined the consequences of thinking about the future for one's future affective experience. A notable exception is Rivkin and Taylor (1999). Participants were asked to imagine a stressful interpersonal or academic problem that was taking place in their lives. Some participants were instructed to mentally simulate the event taking place and others were instructed to simulate the event being resolved. Interestingly, compared to participants who simulated the event being resolved and control participants, those who simulated the event taking

place experienced greater positive affect. More important, these participants still reported higher levels of positive affect after 1 week of daily 5-minute simulation exercises.

While Rivkin and Taylor (1999) showed that simulation can have consequences not just for one's current affective state (see Roese & Olson, 1997; Sanna, 2000, for reviews) but for one's future affective state as well, important questions remain as to the relationship between mentally simulating the future and affective experience. For instance, participants in Rivkin and Taylor (1999) did not simulate a future event, but a past or ongoing event. Furthermore, they measured affect generally, not affect as it related to the stressful event specifically. The effects of mentally simulating a future event on the affective experience of that event have not been investigated.

While it is not well-documented how thinking about the future makes us feel, there is no shortage of research on how we think the future will make us feel. And while for the most part, people are rather accurate in determining whether something will be pleasant or unpleasant (e.g., Robinson & Clore, 2001), they are not necessarily accurate in determining how pleasant or unpleasant something will be. Rather, people show a general tendency to overestimate how much they will enjoy pleasant future experiences (see Wilson & Gilbert, 2003, for a review). In the affective forecasting literature, this is known as the intensity bias (Buehler & McFarland, 2001); it has also been termed rosy prospection (Miller & Thompson, 1994). Importantly, research on the intensity bias highlights a fundamental source of error in the way that people represent future affective experiences.

Error and Bias in the Representation of Future Affective Experience

Research has well documented a pervasive tendency to overestimate both the duration (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000) and intensity (Buehler & McFarland, 2001) of affective experiences. The intensity and durability biases are collectively known as the impact bias, or the tendency for people to "overestimate the impact of future events on their emotional reactions" (Wilson & Gilbert, 2003).

The impact bias has been investigated primarily in the affective forecasting paradigm, which involves asking people to predict how they will feel after a specific future event takes place (see Wilson & Gilbert, 2003, 2005, for reviews). Wilson and Gilbert (2003) have highlighted a number of possible contributors to the impact bias. First of all, impact biases in affective forecasting may operate at the forecasting stage—that is, when people predict a future event will make them feel, or at the experiencing stage—that is, when people report how they do feel after experiencing the event.

With regard to the experiencing stage, Wilson et al. (2000) have identified *focalism* as one cause of the impact bias. Focalism refers to the tendency that people have to focus only on the forecasted event when predicting their future emotional state, to the neglect of anything else that might be occurring in their lives. In a sense, they overestimate the extent to which the forecasted event will dominate their thoughts. In Wilson et al. (2000), participants were college football fans who were asked to predict how happy they would be if their team won a game that was 2 months in the future. Participants expected to experience above average happiness for 3 successive days after the win. In fact, when participants did report their happiness 2 months later after their team had won the game, they were no happier than usual by day after the game. More

interestingly, some participants completed a thought diary before making their forecasts. Specifically, they estimated the amount of time they would spend thinking about a variety of topics on a day following the football game. In this condition, forecasting errors were attenuated. Wilson et al. (2000) conclude that participants in the diary condition were able to realize that the win, if it happened, would not be the only thing dominating their thoughts at that time, and thus, not the only thing contributing to their happiness.

While focalism contributes to the impact bias at the experiencing stage, other sources of error in affective forecasting contribute to the impact bias at the forecasting stage. The first that Wilson and Gilbert (2003) highlight is that of construal. Simply put, forecasting how you will feel about something in the future requires you to first imagine the event itself, so your forecast will certainly depend at least in part on *how* you imagine the event. For instance, your imagination of your upcoming trip to Paris may include images of beautiful architecture along the banks of the Seine, romance atop the Eiffel Tower and stunning classical art at the Louvre. It will likely not include the weariness of jet lag, the uncomfortable moist and chilly afternoon mist and the frustrations of trying to communicate in a foreign language. Yet in reality these frustrations will affect your actual enjoyment of the experience as much as the delights that you *can* well imagine.

Support for construal as a source of affective forecasting error is provided by Woodzicka and LaFrance (2001). The authors asked women to imagine how they would feel in an uncomfortable job interview situation—specifically, a situation in which inappropriate sexual questions were asked. Many women reported that they would not answer the questions; some even said they would confront the interviewer. However, none of the women who did participate in such an interview did actually confront the

experimenter. Wilson and Gilbert (2003) suggest that the women's forecasting errors in this case are due to construal: they imagine the interview situation as being less hostile and oppressive than it actually is, and thus imagine being more assertive than they actually are.

Many affective forecasting studies require that people make forecasts far into the future, making sources of forecasting error such as focalism more likely. Importantly, however, Buehler and McFarland (2001, Study 2) have provided evidence for the intensity bias over a very short period of time. At the beginning of a class period, participants were asked to predict their affective reactions to receiving their midterm grade, which was revealed later in the class period. Specifically, participants judged how intensely they would feel a series of positive and negative emotions after learning they had received the grade they expected to receive, one grade lower and one grade higher than they expected to receive, and two grades lower and higher than they expected to receive. Participants made these same affect judgments immediately after learning the actual midterm grade. Results provided evidence for the intensity bias: Participants predicted more extreme affective reactions than they reported experiencing for both positive (better grades than expected) and negative (worse grades than expected) outcomes. In other words, participants who did better than expected did not feel as good about it as they had anticipated, and participants who did worse than they expected did not feel as bad about it as they had anticipated.

Buehler and McFarland (2001) suggest that the intensity bias is due to a tendency for people to misrepresent future events when making affective forecasts. Just as Wilson and Gilbert (2003) suggest that forecasting errors are subject to misconstrual at the

forecasting stage, Buehler and McFarland (2001) suggest that mental representations of future events tend to be idealized—that is, they tend to be better than actual. Buehler and McFarland (2001, Study 3) provided support for this hypothesis by measuring temporal focus in affective forecasts. Participants completed an open-ended thought listing measure in which they were asked to list all of their thoughts about how they would feel on the upcoming Christmas day. They then completed an affect measure to assess their predicted feelings on Christmas day. Thoughts were coded as to whether they focused more on the upcoming Christmas holiday or previous Christmas holidays. Finally, participants completed a take-home questionnaire shortly after Christmas which consisted of a retrospective affect measure. Results indicated an intensity bias, such that participants made more extreme forecasts of positive affect than they reported experiencing. Furthermore, this intensity bias was significantly greater for those who focused on the upcoming Christmas than those who focused on past Christmas vacations, as assessed by the open-ended thought listing measure. These results suggest that participants generated more idealized representations of the upcoming Christmas when they did not consider the events of past Christmas days.

These results are also consistent with those of Van Boven and Ashworth (in press), who demonstrated that participants experience more positive affect when imagining future experiences than when recalling those same experiences, such as the Thanksgiving holiday. Because in Buehler and McFarland (2001, Study 3) affect measures were taken sometime after Christmas day, the results of Van Boven and Ashworth (2005) suggest that the results of Buehler and McFarland (2001, Study 3) may in part be due to a retrospective bias. That is, participants may have simply remembered

less positive affect than they actually experienced. However, a retrospective bias does not easily account for the greater intensity bias among those who listed more future-oriented Christmas thoughts.

In fact, people both predict and remember more intense emotions than they actually report experiencing (Wirtz, Kruger, Scollon, & Diener, 2003). And the intensity bias, or the tendency to overestimate affective reactions to future events, has been obtained with on-line measures of affect—that is, as events unfold. Participants in Wirtz et al. (2003) predicted how intensely they would experience 5 negative and 5 positive emotions over spring break 2 weeks prior to the vacation. They also responded to 3 prospective questions regarding their expected enjoyment of their spring break vacation—for example, "I expect to enjoy spring break." Participants were given personal data assistants (PDA) that were scheduled to beep at random times throughout the day on each day on each day of the participants' spring break vacation. At that time, participants responded to the 10 emotion terms and answered the prospective questions in present tense, such that, for example, "I expect to enjoy spring break" was rephrased "I am enjoying spring break." Finally, upon returning from vacation, participants again responded to the emotion terms and answered the enjoyment questions in retrospective form.

Consistent with the results of Buehler and McFarland (2001), participants both expected and remembered more intense emotion then they actually reported experiencing on-line, during spring break. Importantly, the retrospective bias cannot account for the more intense expected than remembered emotion, because participants expected to experience more intense emotion than they actually did experience. These results are also

consistent with the results of Mitchell, Thompson, Peterson, & Cronk (1997), who have shown under a variety of circumstances that people expect to enjoy their vacations more than they actually report experiencing them while on vacation.

Drawing on research that highlights the biases that shape and color our representations of the past (see Johnson & Sherman, 1990, and Ross & Buehler, 2001, for reviews), Mitchell and Thompson (1994) have identified several common principles that may tend to bias our representations of the future. For instance, self-enhancement biases may play a role in the intensity bias, or what Mitchell and Thompson (1994) call rosy prospection. Self-enhancement biases occur when the idealized representation of an event makes one feel or look better. The idealization of positive events may serve a "positive illusion" function (e.g., Taylor & Brown, 1988) that allows us to believe good things will happen for us. For instance, when it comes to vacation, expecting a good vacation makes us feel like good people. Vacations take a great deal of thought, planning, and careful consideration. Imagining the vacation unfolding in less-than-optimal ways or imagining unpleasant events taking place while on vacation might be inconsistent with people's notions about themselves as thoughtful and effective vacation planners. In terms of cognitive dissonance theory, people may choose to imagine flawless vacations over imagining more realistic vacations and then updating their self-views appropriately.

It may also be the case that idealized versions of positive events are more easily brought to mind than more realistic versions (e.g., Mitchell & Thompson, 1994). According to the availability heuristic (Kahneman & Tversky, 1984), evaluations are guided by information that is easily brought to mind. In the case of Christmas, for instance, to the extent that participants focused on the future Christmas to the neglect of

past Christmases (e.g., Buehler & McFarland, 2001), affective forecasts may have been guided by a highly-idealized Western-prototypical Christmas schema. A schema-typical Christmas may consist of the type of Christmas celebrated in popular Christmas tunes and movies, and will likely include the beauty of sparkling snow, the comfort of family and the joy of giving. Reflecting on past Christmases, however, may bring to mind elements a bit closer to reality: airport delays, old family spats, and devilish inclinations of re-gifting yet another breadmaker.

To sum, there is reason to believe that people's representations of future experiences tend to be idealized. Such idealized representation may be at least one mechanism that underlies the intensity bias in affective forecasting errors, and these errors may represent unrealistic expectations for future events. But what effects might the mental simulation of the future experience have on the actual experience of the event? The foregoing analysis suggests that the representation of Friday night is already idealized to some degree. In reality, though, we do not simply imagine how we are going to feel about an upcoming event and then forget about it. As the anecdote at the beginning illustrates, we may actually imagine the event taking place in a particular way (see also Lowenstein & Schkade, 1999). What happens to that representation of Friday night when it is actively elaborated via mental simulation?

Thought-generated attitude change

Thought tends to polarize feelings – that is, to make them more extreme, such that positive feelings become more positive, and negative feelings become more negative (see Tesser, 1978, and Tesser, Martin, & Mendolia, 1995, for reviews). In an early demonstration of this effect, Sadler and Tesser (1973) paired participants with a

simulated interaction partner who was purportedly located in a nearby room. The participant was instructed to describe themselves to the interaction partner. The experimenters then played an audiotape of the simulated interaction partner either criticizing or complimenting the participant. Participants then reported how much they liked their partner. However, some participants were given time to think about their feelings toward their partner before evaluating them while other participants completed a secondary task in order to distract them from thinking about their feelings toward their partner. Not surprisingly, participants who were complimented liked their partners while participants who were criticized disliked their partners. Importantly, thought exacerbated this tendency. That is, participants who spent time thinking about a critical interaction partner liked them less than participants who were distracted, and participants who spent time thinking about a complimentary interaction partner liked them more than participants who were distracted.

In order to effectively demonstrate that thought itself results in attitude polarization, Tesser and Conlee (1975) manipulated the amount of time that participants spent thinking about a variety of different attitude objects, such as the legalization of prostitution. Participants were randomly assigned to think about the attitude objects for amounts of time varying from 30 to 180 seconds. As expected, attitudes polarized in a linear proportion to the amount of time spent thinking, such that the more time participants spent about their attitudes, the more polarized their attitudes became.

To explain these findings, Tesser and Cowan (1975) suggested that given more time, participants may bring to mind more attitude-consistent thoughts, and this increase in the number of accessible thoughts may be responsible for the more greatly-polarized

attitude. Indeed, Tesser and Conlee (1973) recorded the number of thoughts provided by participants, and thought-condition participants did record more thoughts than distracted participants. However, it could be the case either that the number of thoughts or the process of thought-generation itself is responsible for attitude polarization. In order to test between these two hypotheses, Tesser and Cowan (1975) provided participants with either four or eight adjectives describing a target person in a person perception task. The rationale for this manipulation was that participants should have a more difficult time generating new adjectives to describe the person when provided with eight as opposed to four, so to the extent that the process of thought-generation is responsible for attitude polarization, participants provided with four adjectives should report more favorable attitudes to the target person. Half the participants were assigned to a thought condition and half the participants to a distraction condition. Results were consistent with the thought generation explanation: Participants provided with only four cognitions who were given time to think about their attitudes showed the greatest amount of polarization. Furthermore, if the number of thoughts themselves were responsible for increased polarization under any circumstances, it would be expected to matter under distraction conditions. In other words, when participants are not given the ability to generate their own thoughts, they should rely on the thoughts provided, and thus participants provided with eight adjectives should show greater polarization. Interestingly, however, this difference was not significant, providing convergent evidence that it is the process of thought generation itself, not the number of cognitions that are produced, which is responsible for thought induced attitude polarization.

If the process of thought generation is responsible for thought-induced attitude polarization, people should show greater polarization when they have a greater ability to think about the attitude object. Thus, attitudes for which people have strong schemas should polarize more than those for which people have weaker schemas, because strong schemas are associated with rich, detailed, and interconnected networks of thoughts and cognition. To test this hypothesis, Tesser and Leone (1977) asked men and women to report their attitudes toward both football and fashion in either thought or distraction conditions. In that men have better-developed schemas for football and women for fashion, men should show greater attitude polarization for football than fashion and women should show greater attitude polarization for fashion than football. This is what the authors found for participants who were given time to think about their attitudes. Participants who were distracted did not show this gender difference in polarization.

Interestingly, not all research has demonstrated that stronger schemas lead to greater attitude polarization. In fact, Linville (1982; Linville & Jones, 1980) has argued that more complex schemas may actually result in less extreme attitudes. In an examination of this hypothesis, Linville and Jones (1980) gave white participants information about law school candidates that were randomly designated black or white. When the information about the candidate was negative, candidates designated as black were evaluated less favorably than the same candidates designated as white. This result is certainly not surprising given the previous research on prejudice and stereotyping. However, when the information about the candidate was positive, candidates designated as black were evaluated more favorably than the same candidates designated as white. To explain these findings, Linville and Jones (1980) suggested that people have more

complex schemas for in-group than out-group members. When schemas are complex, there are more dimensions by which an attitude can be evaluated, and the more dimensions, the less likely evaluations are to be congruent on each dimension. For instance, people have a lot of knowledge about their own race, and thus many dimensions by which they might evaluate members of their own race. Furthermore, some of these dimensions might be associated with favorable evaluations, but others might be associated with unfavorable evaluations. This variance across dimensions thus results in a tempered evaluation. On the other hand, people have less well-developed schemas for other races, and thus few dimensions on which to base their evaluations. Furthermore, evaluations are more likely to be consistent across fewer dimensions, and thus, the overall evaluation is more extreme. Indeed, Linville (1982) has demonstrated that young males do in fact have more complex schemas for young males than old males (Experiment 1) and that young males evaluate a favorable target in a person perception task more favorably when the target is older and an unfavorable target less favorably when the target is older (Experiment 2).

Linville has also shown that evaluative complexity can be experimental induced (Linville, 1982; Experiment 3). Participants were instructed to eat and evaluate several chocolate chip cookies. However, some participants were given six dimensions on which to base their evaluations (e.g., sweetness/richness, chocolate chips, buttery taste, freshness, softness, and chewiness), whereas other participants were instructed to use only two of these dimensions (randomly determined). As expected, participants in the 2-dimension condition showed greater extremity in their ratings, as measured by the standard deviation and range of their ratings across all cookies.

How can the results of Tesser and Leone (1977) be reconciled with those of Linville (1982)? First of all, it is clear that at least when it comes to cookies, the authors do not mean the same by polarization. Polarization, according to Tesser and Leone (1977), refers to the tendency of an evaluation to become more extreme as a function of time spent thinking about the attitude object. The comparison is to the same attitude object, with people who have thought about the attitude object less or not at all. Linville (1982) initially discusses polarization with reference to a different attitude object: for instance, in-group vs. out-group members. And in experiment 3, polarization is discussed as variance in rating among several different types of cookies, not evaluation per se. In fact, there was no significant difference in mean ratings across the five cookies between simple and complex-schema cookie evaluators. Finally, there was no thought condition or control condition in the cookie study, so no inferences about polarization of the Tesser and Leone (1977) variety can be made. There is, therefore, no reason to expect that if asked to report their attitudes toward cookies in general, that simple-schema participants would report more polarized attitudes than complex-schema participants in comparison to a no-thought control. Rather, the results of Tesser and Leone (1977) suggest that if anything the complex-schema participants would report more polarized attitudes toward cookies.

Judd and Lusk (1984) have further reconciled the seeming inconsistencies between the two approaches by showing that the relationship between extremity and dimensionality depends on how related the judgmental dimensions are to one another. When dimensions are unrelated to one another, judgments will tend to be less extreme, because with unrelated dimensions there is no systematic relationship between

evaluations along those dimensions. However, when dimensions are highly interrelated, their evaluations will also tend to be highly related. Thus, judgments along highly related dimensions should be more extreme than judgments along unrelated dimensions. Judd and Lusk (1984, Experiment 2) had participants generate evaluative dimensions for both sororities and rock bands. Overall, the dimensions that were generated by which to evaluate sororities were more highly correlated than the dimensions generated for rock bands, and as expected, evaluations of sororities were more extreme than evaluations of rock bands.

Lastly, a more recent demonstration of the tendency for thought to polarize evaluations comes from research on the unpacking effect (Savistky, Van Boven, Epley, & Wright, 2005; Van Boven & Epley, 2003), or the tendency for more detailed descriptions to increase frequency and likelihood judgments. Of most relevance, Van Boven and Epley (2003, Study 2) provide evidence for an analogous unpacking effect in affective forecasts. Participants who "unpacked" a water sports vacation in the Bahamas, by listing as many water sports as they could think of, subsequently evaluated the vacation more favorably than those who completed the unpacking task after evaluating the vacation. That is, thinking about the vacation led to more positive feelings about the vacation.

To sum, mental representations of future events may already be idealized (e.g., Buehler & McFarland, 2001). These idealized representations may underlie intensity biases in affective forecasts. Furthermore, thinking tends to polarize feelings (Tesser, 1978; Tesser, Martin, & Mendolia, 1995). Accordingly, mental simulation of a future event may polarize the already-idealized representation of that event. To the extent that intensity biases reflect extreme affective expectations for future events, mental simulation

may result in even more extreme affective expectations for future events. Furthermore, these affective expectations may have consequences for people's affective experiences. Decision affect theory (e.g., Mellers & McGraw, 2001) and the affective expectation model (Wilson & Klaaren, 1992) illuminate the processes by which affective expectations influence affective experience.

Affective Expectations

How pleasant is winning $8? Intuition dictates that winning $8 is an unambiguously pleasant event. What if, however, you won $8 when you could have won $32? Perhaps in this case, winning $8 is not quite as pleasant. This is exactly what was found by Mellers, Schwartz, Ho, and Ritov (1997). Participants who won a given amount of money on a gamble experienced less pleasure when the alternative outcome was a win of an even greater amount of money, relative to a loss of money. Likewise, participants who lost money experienced less displeasure when the alternative outcome was a loss of an even greater amount of money, relative to a win. According to decision affect theory (Mellers & McGraw, 2001; Mellers et al., 1997; McGraw, Mellers, & Tetlock, 2005; Mellers, Schwartz, & Ritov, 1999), affective reactions are determined by both obtained and unobtained outcomes. As such, the more pleasant the unobtained outcome is, the less pleasure a person will experience, even if the obtained outcome is pleasant (e.g., winning $8); conversely, the less pleasant the unobtained outcome is, the less displeasure a person will experience, even if the obtained outcome is unpleasant (e.g., losing $8).

Decision affect theory explains how affective reactions are a function of both obtained and unobtained outcomes, or chosen and unchosen alternatives. Typically, unobtained outcomes and unchosen alternatives are unknown until the outcome or chosen

alternative is known as well. However, as noted by Wilson and Gilbert (2003), it is rare that we approach an experience with no prior expectations. As such, it is reasonable to expect that prior expectations might play a similar role in determining affective reactions. When one falls short of their expectations, the expectation is analogous to the unobtained outcome. To test this hypothesis, McGraw et al. (2005) reexamined the findings of Medvec et al. (1995), that bronze medal winners always appeared happier than silver medal winners. McGraw et al. (2005) had independent raters review the affective reactions of medal winners from newer Olympic Games footage. Results indicated that overall, gold medalists were happier than silver medalists, who were in turn happier than bronze medalists. However, silver medalists who expected to win the gold were less happy than silver medalists who expected to win the silver or less, and bronze medalists who expected to win the silver or gold were less happy than bronze medalists who expected to win the bronze or less. Overall, medalists were happier when expecting to do finish worse than they did, and less happy when expecting to finish better than they did.

To sum, decision affect theory explains how a comparison of obtained with unobtained, or expected outcomes, to result in affect contrast. In brief, people are happier when they could have done worse and less happy when they could have done better. As previously noted, however, comparative thinking does not always lead to affective contrast (e.g., Markman & McMullen, 2003). If the unobtained outcome is not evaluated in reference to the obtained outcome, affective assimilation may occur. And according to the affective expectation model (e.g., Wilson & Klaaren, 1992), even if our experiences are discrepant from our expectations, affective contrast will only occur if the discrepancy is noticed. Otherwise, affective assimilation occurs. That is, someone who holds a

positive expectation for a future experience may enjoy the experience more than someone who does not hold a positive expectation, even if the experience is not as positive as expected.

In an investigation of this prediction of the affective expectation model, Wilson, Lisle, Kraft, & Wetzel (1989, Study 1), showed participants a panel of six cartoons selected from the *New Yorker* magazine. Pretesting had revealed that the first three of the cartoons in the panel were moderately funny, but the second three cartoons were not particularly funny. Some participants rated how funny they felt each of the cartoons were with no prior expectations. In this condition, as expected, participants rated the first three cartoons moderately funny and the second three cartoons unfunny. Other participants, however, rated how funny they felt each of the cartoons were after being given expectations. Specifically, the experimenter mentioned that previous participants in the study had found all of the cartoons to be funny. In this condition, participants rated the second three cartoons—that is, those that pretesting had revealed to be relatively unfunny—to be just as funny as the first three. Furthermore, people in this condition spent less time evaluating the second three cartoons than participants in the no-expectancy condition. Wilson et al. (1989, Study 1) interpreted this finding to mean that because participants were given expectations, they did not perform a careful evaluation of the stimuli, and thus did not notice any discrepancy between their affective expectations and their affective experience of the cartoons. Instead, they simply evaluated the second three cartoons consistent with their expectations.

Accordingly, the affective expectation model predicts that if the discrepancy between an affective expectation and the affective experience is noticed, affective

contrast will occur. That is, if participants who were given expectations in Wilson et al. (1989, Study 1) performed a more careful examination of the cartoons, they may have noticed the discrepancy that existed between their expectations and their experience of the second three cartoons. In this case, they may have rated those cartoons as less funny than participants who were given no expectations. This prediction of the model was investigated by Geers and Lassiter (1999). Participants viewed a six-minute film clip that pre-testing had revealed to be relatively unfunny. Some participants were asked to evaluate how funny the film was without any prior expectations. Other participants, however, were asked to evaluate how funny the film was after being told that the video was very popular and widely considered to be funny. Furthermore, Geers and Lassiter (1999) manipulated how carefully participants evaluated the film stimulus by employing the unitization of perception/behavior procedure developed by Newtson (1973). In this procedure, participants are asked to evaluate some sequence of action by analyzing the sequence into the smallest segments of meaning (e.g., fine-unitization) or largest segments of meaning (gross-unitization). For participants who were given no expectations, unitization strategy was not expected to make a difference in the way participants evaluated the film. However, for participants with expectations, it was expected that fine-unitization of the film would make noticing the discrepancy between their positive expectations and the relatively unfunny film more likely, resulting in affective contrast. Conversely, it was expected that gross-unitization of the film would make noticing the discrepancy between their positive expectations and the relatively unfunny film less likely, resulting in affective assimilation. These hypotheses were supported. Participants who used a fine-unitization strategy and had positive expectations

enjoyed the film less than those who used this strategy but did not have expectations. And participants who utilized a gross-unitization strategy and were given positive expectations enjoyed the film more than those who utilized this strategy but were not given expectations.

More recent research has replicated and extended these findings (Geers & Lassiter, 2002, 2003, 2005). For instance, prior stimulus exposure has been shown to moderate the effects of affective expectations on affective experience (Geers & Lassiter, 2005). When participants viewed a target film clip two weeks before they were given positive expectations for the film, their affective experience upon a subsequent viewing of the same clip was contrasted away from their expectations. That is, they enjoyed the film less than those given no expectations. Conversely, those who had not previously viewed the target film clip assimilated their affective reactions to their expectations. That is, they enjoyed the film more than those given no expectations.

Another factor that may determine whether contrast or assimilation effects occur is the degree of discrepancy between expectations and experience (e.g., Wilson & Klaaren, 1992). The greater the discrepancy between the stimulus and the context in which it is presented, the more likely it is that judgments of the stimulus will be contrasted away from the context. Conversely, the less of a discrepancy between the stimulus and the context in which it is presented, the more likely it is that judgments of the stimulus will be assimilated to the context. In the social judgment literature, for instance, contrast effects in person perception are more likely when extreme examples are primed, and assimilation effects are more likely when only moderate examples are primed (Herr, Sherman, & Fazio, 1983; see also Herr, 1986). For instance, people judge

ambiguous animals as less ferocious when they are presented in a context of extremely ferocious animals, such as the grizzly bear, but more ferocious when presented in a context of only moderately ferocious animals, such as the wolf (Herr, Sherman, & Fazio, 1983; see also Herr, 1986).

Finally, individual differences have also been shown to moderate the effects of affective expectations on affective experience. Need for cognition (Cacioppo & Petty, 1982) is a general measure of the tendency to enjoy thought and thought-related problem solving. Geers and Lassiter (2003) have found that individuals high in need for cognition are more likely to notice a discrepancy and individuals low in need for cognition are less likely to notice a discrepancy between expectations and experience. That is, high need for cognition individuals are more likely to show affective contrast from and low need for cognition individuals affective assimilation to their affective expectations. This is consistent with work showing that individuals high in need for cognition are more likely to show contrast in their impressions of a target person (Martin, Seta, & Crelia, 1990, Experiment 3).

Need for cognition also moderates the tendency for thought to polarize attitudes (Leone & Ensley, 1986). Interestingly, it is low need for cognition individuals who show greater effects of thought-induced attitude polarization. Leone and Ensley (1986) suggest that individuals high in need for cognition possess multidimensional schemas by which the evaluate attitude objects. In light of Linville's (1982) work, multidimensional attitudes might be less evaluatively consistent. Thus, when individuals high in need for cognition think about their attitudes, they may bring to mind more evaluatively inconsistent dimensions than low need for cognition individuals.

To sum, research on counterfactual thinking demonstrates that mental simulation can lead to affective contrast or assimilation in a current emotional state (see Markman & McMullen, 2003, for a review). However, this work has not investigated the effects of mentally simulating a future event on the actual affective experience of that event. Some insight into what effects this might have is provided by research on the intensity bias in affective forecasting (Buehler & McFarland, 2001). The intensity bias may be the result of a tendency to hold idealized representations of future events. And the tendency of thought to polarize feelings (Tesser, 1978, Tesser, Martin, & Mendolia, 1995) suggests that mental simulation of a future event may further polarize these representations, resulting in extreme expectations for future events.

According to the affective expectation model (Wilson et al., 1989), affective experience is almost always a function of affective expectations, and expectations can result in either assimilation or contrast in affective experience (Geers & Lassiter, 1999; Wilson et al., 1989). Thus, mental simulation may also have affective consequences, such that mental simulation of a future event may lead to assimilation or contrast in the actual affective experience of the event.

Specifically, mental simulation of a future event may lead to affective assimilation in the actual affective experience of the event, to the extent that any discrepancy that may exist between simulation-generated extreme affective expectations and actual affective experience is not noticed. On the other hand, mental simulation of a future event may lead to affective contrast in the actual affective experience of the event, to the extent that any discrepancy between simulation-generated extreme affective expectations and actual affective experience is noticed.

Whereas Geers and Lassiter (1999, 2003, 2005) used Newtson's (1973) unitization procedure to manipulate how likely participants would be to notice a discrepancy between their expectations and experience, a more ecologically valid manipulation might be cognitive load. Dual-process models of information processing maintain that cognitive load increases schema-based processing and reliance on heuristics (e.g., Chaiken & Trope, 1999). In the person perception literature, a wealth of research has demonstrated that cognitive load increases the tendency to use stereotypes when forming impressions (e.g., Devine, 1989; Gilbert & Hixon, 1991, Macrae, Milne, & Bodenhausen, 1994, Pratto & Bargh, 1991). That is, when cognitive resources are low, people tend to make judgments in terms pre-existing knowledge structures.

For instance, Dijksterhuis, Spears, and Lepinasse (2001, Experiment 2) presented participants with 20 identical sentences describing a person in a person perception task. Participants were given a photograph and told that that the photograph was of the person being described. However, half the participants were given a photograph of a younger person; the other half were given a photograph of an older person. Previous research has shown that when the elderly stereotype is activated, participants show behavioral assimilation—for instance, they walk more slowly to the elevator (Bargh, Chen, & Burrows, 1996). However, Dijksterhuis et al. (1998) demonstrated that priming participants with an exemplar of a stereotype category—and exemplar being a single, vivid instance of the category—can actually result in behavioral contrast. Participants in Dijksterhuis et al. (1998) actually walked more quickly to the elevator after being primed with an exemplar of the elderly category. Thus, when participants are given photographs

of single young and elderly individuals, they tend to show behavioral contrast (e.g., Dijksterhuis et al., 2001, Experiment 1).

Half of participants in Dijksterhuis et al. (2001, Experiment 2) completed the person perception task under cognitive load conditions. They were instructed to remember a seven-digit number while reviewing the sentences describing the target person. To the extent that cognitive load facilitates reliance on heuristic processing and stereotypes, participants under load should show activation of the young and elderly stereotypes, and thus behavioral assimilation. Results of a subsequent lexical decision task were consistent with this hypothesis. Participants who formed an impression of an elderly person under cognitive load remembered recalled less words and responded more slowly than participants under no cognitive load. Furthermore, participants under cognitive load formed more stereotypical impressions of the elderly person in the impression formation task.

These effects may be interpretable in terms of Martin's (1986) set/reset model of impression formation. According to the model, assimilation occurs when a target is evaluated in terms of previously activated information, and contrast occurs when previously activated information is suppressed. In other words, assimilation is contingent on the context-dependent evaluation of previously activated contextual information about a target (i.e., primes, expectations), whereas contrast is contingent on a more context-independent evaluation of a target. As such, contrast might require more effortful processing than assimilation (e.g., Martin et al., 1990), as assimilation requires only evaluation in terms of previously activated information. In an elegant demonstration of the model, Martin et al. (1990, Experiment 1) presented participants with either positive

or negative information about a target person. Participants in a cognitive load condition, however, were distracted by a recording of male voice reciting strings of letters and numbers. Load participants were further required to recall the random strings. Later, participants were asked to write their impressions of the target person, which were coded for positivity/negativity by independent raters. Results indicated that participants under no load condition contrasted their impressions from the contextual information. Participants presented with negative information formed more positive impressions and participants presented with positive information less negative impressions of the target person. However, participants under cognitive load showed a pattern of assimilation to the contextual information. Participants presented with negative information formed more negative impressions and participants presented with positive information formed more positive impressions of the target person.

Taken together, this research suggests that contrast requires more effortful processing than assimilation, and that when resources are low, people will tend to evaluate stimuli in terms of previously activated information.

APPENDIX B: CONSENT FORM FOR EXPERIMENTS

Consent Form for "Mental exercises and eating"

1. We are asking you to be a participant in a research study.
2. Dr. Jeff T. Larsen of the Department of Psychology at Texas Tech is in charge of the study. His phone number is 742-3711 x234 and his email address is jeff.larsen@ttu.edu.
3. The purpose of this project is to study the effects of different mental exercises on taste perceptions.
4. You will perform a simple mental exercise. You will also eat a fresh-baked chocolate-chip cookie. You will then fill out a questionnaire about the cookie.
5. It will take less than 1 hour to complete the experiment.
6. Completing the mental exercise and the survey shouldn't put you in any risk or cause any discomfort. Some people have chocolate allergies. By signing this consent form you are also indicating that you are not allergic to chocolate.
7. You will receive 1 credit for your PSY 1300 research requirement in exchange for your participation.
8. No one but Dr. Larsen and his assistants will see your data, and none of your data will be associated with your name. They will be kept in secure file cabinets and computer files in his offices at Texas Tech. Your answers will be put into a computer without your name.
9. Completing this experiment is up to you. No one can force you to do it and you will receive research requirement credit for the time you've spent here even if you choose not to complete it or choose to quit partway through. For example, if you quit after 15 minutes, you'll get .25 credits.
10. Dr. Larsen or his assistant will answer any questions you have about the study. For questions about your rights as a participant, contact: Texas Tech University Institutional Review Board for the Protection of Human Subjects, Office of Research Services, Texas Tech University, Lubbock, TX 79409. Or you can call 806-742-3884.
11. This consent form is not valid after 7.31.07.

If you sign this sheet, it means that you have read this form and that all of your questions have been answered.

I certify that (please check one):

____ I am not allergic to chocolate.

____I am allergic to chocolate.

_____

Signature of Participant Date

_____

Printed Name

APPENDIX C: BIOGRAPHICAL QUESTIONNAIRE FOR EXPERIMENTS 1-4

Participant # ____ Demographics

Age: _____

I am a (circle one): male female

Please tell us how hungry you are right now:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not at all				Somewhat			Moderately			Quite a bit				Extremely

Please tell us how much you like chocolate chip cookies:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not at all				Somewhat			Moderately			Quite a bit				Extremely

APPENDIX D: THE NEED FOR COGNITION SCALE (Cacioppo & Petty, 1982)

For each of the statements below, please indicate to what extent the statement is characteristic of you. If the statement is extremely uncharacteristic of you (not at all like you) please write a "1" to the left of the question; if the statement is extremely characteristic of you (very much like you) please write a "5" next to the question. Of course, a statement may be neither extremely uncharacteristic nor extremely characteristic of you; if so, please use the number in the middle of the scale that describes the best fit. Please keep the following scale in mind as you rate each of the statements below:

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

____ I would prefer complex to simple problems.

____ I like to have the responsibility of handling a situation that requires a lot of thinking.

____ Thinking is not my idea of fun.

____ I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.

____ I try to anticipate and avoid situations where there is likely a chance I will have to think in depth about something.

____I find satisfaction in deliberating hard and for long hours.

____ I only think as hard as I have to.

____ I prefer to think about small, daily projects to long-term ones.

____ I like tasks that require little thought once I've learned them.

____ The idea of relying on thought to make my way to the top appeals to me.

____ I really enjoy a task that involves coming up with new solutions to problems.

____ Learning new ways to think doesn't excite me very much.

____ I prefer my life to be filled with puzzles that I must solve.

____ The notion of thinking abstractly is appealing to me.

____ I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.

____ I feel relief rather than satisfaction after completing a task that required a lot of mental effort.

____ It's enough for me that something gets the job done; I don't care how or why it works.

____ I usually end up deliberating about issues even when they do not affect me personally.

APPENDIX E: EXPERIMENT 1 SCRIPT

Greet participant and give informed consent.

We are interested in how your senses interact with each other. Specifically, we want to know how processing different kinds of auditory information affects your taste perceptions. You are going to listen to a series of tones while you eat a cookie. Then we would like you tell us a little about your experiences eating the cookie.

First let me tell you a little about the cookie you are going to eat. We are actually going to bake you a fresh homemade chocolate chip cookie from scratch that we mixed up this morning.

Let me go make sure my assistant prepared the cookie for baking.

Show the cookie dough on the cookie tray to the participant.

Neutral expectations condition

You're probably excited about getting to eat a cookie in a psychology experiment, but don't get your hopes up too high, most participants say it's not all that great, it's just an OK cookie.

Extreme expectations condition

And by the way this should probably be your favorite psychology experiment of the semester because most participants say this is a really good cookie.

OK, so now I am going to take this dough around the corner to where our toaster oven is so I can bake it for you. Since it is just a single cookie and we are going to bake it in the toaster oven, which always works really fast, it should only take about 10 minutes, so you won't have too wait long. In the meantime we've got a few questionnaires we would like you to complete. Please carefully read through the instructions at the top of each questionnaire. I'll be right back.

Leave the room, and simply put the tray with the cookie dough on it back in the refrigerator.

(When participant is finished with the questionnaires)

Introduce cognitive load manipulation

OK, that cookie will be ready in just a couple of minutes, so now we are going to go through the instructions for the taste perception task. Like I said, we are interested in the effects of auditory processing on perceptions of taste. So while you eat the cookie, you are going to a listen to a series of audio tones that you will hear through these headphones. You will three distinct tones, one low-pitch tone, one medium-pitch tone, and one high-pitch tone.

Put on the headphones, and press the spacebar to hear these three tones in succession.

Were you able to discriminate the three tones? Good.

(Cognitive load condition): It is very important that you listen to these tones carefully, as you eat the cookie, because we need you to keep track of the number of low-pitch tones that you hear. At the end of the experiment you will be asked how many of the low pitch tones you heard.

(No load condition): However, you do not have to pay any attention to the tones – in fact, just ignore them. But we are interested in whether or not you enjoy the cookie, so we will ask you some questions about the cookie after you eat it.

Before I check the cookie press the spacebar once more and you will hear a short demonstration of how all three tones will sound together.

Do you have any questions about the task?

OK, I am going to get the fresh-baked cookie out of toaster oven and prepare it for you to eat – I'll be right back.

Leave the room. Retrieve a cookie from the drawer and a plate. Place the cookie on the paper plate and microwave on high for 1 minute. Return to the lab w/ the cookie on the plate and a napkin. Set cookie in front of the participant.

OK, here is your cookie. But remember you must listen to the tones while you eat the cookie.

No Load: (*of course, you will just ignore them)*
Load: *(and count the number of low tones that you hear.)*

Before you begin, press the spacebar on the computer to start the tones. When you are finished eating the cookie, press the X key to end to the tones. Then follow the on-screen instructions. Do you have any questions?

Oh, and I am going to step out into the hallway so I don't distract you.

Leave the room. Return to the room.

OK, now we would like you to complete this questionnaire about the experiment. Now this is a study of taste perceptions so we do want your honest evaluations. Everyone's different and some people like the cookie a lot more than others, so please give us your honest opinions about the cookie.

****

REMIND THE PARTICIPANT NOT TO DISCUSS THE EXPERIMENT!

APPENDIX F: EXPERIMENT 1 AFFECTIVE EXPERIENCE QUESTIONNAIRE

Experimental Questionnaire

1) How much did you enjoy the cookie?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not at all				Somewhat			Moderately			Quite a bit				Extremely

2) How good did the cookie taste?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not at all				Somewhat			Moderately			Quite a bit				Extremely

3) How pleasant was eating the cookie?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not at all				Somewhat			Moderately			Quite a bit				Extremely

4) How good did you *expect* the cookie to be, *before* you ate it?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not at all				Somewhat			Moderately			Quite a bit				Extremely

5) How *certain* were you of this expectation?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not at all				Somewhat			Moderately			Quite a bit				Extremely

If you listened to tones while you ate the cookie (if not please ignore)

6) Do you feel like you paid more attention to the audio tones or to eating the cookie?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Audio tones only				More to audio tones			Equal to tones and cookie			More to the cookie				Cookie only

7) How difficult did you find it to count the tones while you ate the cookie?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not at all				Somewhat			Moderately			Quite a bit				Extremely

APPENDIX G: EXPERIMENT 2 SCRIPT

Before participants arrives:

- Have consent form ready on the computer desk where the participant will sit.
- Get a ball of cookie dough from the refrigerator and place on the toaster oven tray.
- Check the participant record sheet to prepare the appropriate LOA questionnaire.
- Have the PoT study loaded and ready to go for the end of the experimental session – leave the program on the confirmation screen and turn off the monitor.

When participant arrives:

> Hello, you must be _____." My name is _____. First of all, thanks for coming and being on time. You can go ahead and have a seat at this computer. Please read over the consent form and sign it – feel free to ask me any questions if you have any. You may also answer the questions on the slip of paper at your workstation.

(Collect the consent form and file it away)

> This experiment is actually going to include two separate tasks. One of these tasks is a taste perception task, and the other is a mental imagery task.
>
> First of all, we are interested in how people analyze their sensory experiences when they eat certain foods. So you are going to get to eat a chocolate chip cookie, and then we are going to have you answer a series of questions about your experience eating the cookie.

(Retrieve toaster oven tray)

> So this is the cookie you are going to eat. As you can see, we bake you a fresh chocolate chip cookie in a toaster oven that we have in the kitchenette around the corner. We want you to eat the cookie warm and fresh so obviously we wait to bake it until you arrive. Now that you are here and we are set I am going to go put the cookie in the toaster oven, and I'll be back in just a minute.

(Leave the lab and place cookie tray in toaster oven. Set timer. Return to lab.)

All participants:

> The taste perception task will take place once the cookie has finished baking, and it usually takes about 12 minutes to bake a single cookie in our toaster oven. While we wait for the cookie, I've got a couple of measures for you to fill out, and then we will go through the instructions for the other experimental task. *(pause)*

*(Give participant individual difference measures. If participant is in the **before** condition, **give them expectation questionnaire at the end of the measures**.)*

(When participant has finished individual difference measures)

BEFORE CONDITION: OK, now I've got one more set of simple questions for you to answer.

OK, the cookie still has about 6 minutes left. So let's go through the instructions for the other task that you are going to perform.

Something else we have been interested in lately is the way that people form mental images of future events.

So we have chosen a simple and familiar event for you to imagine -since you are going to eat a cookie at the end of this task, we've decided it makes sense that eating a cookie is the future event that you imagine. After you perform the taste perception task, we'll ask you some questions about your mental imagery of eating the cookie, so be sure to form clear, vivid images.

Imagine, as clearly as possible, that you are eating the chocolate chip cookie now. Imagine that the cookie has just been taken out of the toaster oven and brought into the room. Imagine the way the freshly-baked cookie smells. Imagine how it looks, how it feels, and imagine how it tastes.

Now, continue to imagine eating the cookie, from the first bite, all the way to the last bite. Vividly imagine all the aspects of eating the cookie: the sight of the cookie, the smell of the cookie, the feel of the cookie, the taste of the cookie. Imagine how you will feel, imagine what you will be thinking and feeling as you eat the cookie. Remember to form clear, detailed, mental images, as you will be asked questions about your mental imagery at the end of the experiment.

(give participant scrap paper)

Once you have clear, vivid, mental images in mind, begin writing about eating the cookie. Simply put into words the thoughts, feelings, and sensations that your imagination of eating the cookie brings to mind. Continue to hold clear mental images of the cookie in mind as you write. You will have about 5 minutes to perform this mental imagery task.

(After 5 minutes).

AFTER CONDITION: OK, before we continue with the taste perception task, I'd like for you to answer a couple of questions about your mental imagery.

Let me know when you are finished with the cookie, and I will give you the experimental

questionnaire.

(When finished with cookie)

Here are the questions you will answer about the cookie. This is a study of taste perceptions, so it is important that you give us your honest opinions about the cookie. Some people are afraid of hurting our feelings or ruining the experiment. Don't worry about that, just give us your honest

evaluations of the cookie. Please review the instructions at the top of the questionnaire before you begin answering the questions.

APPENDIX H: EXPERIMENT 2 AFFECTIVE EXPECTATIONS MEASURE

1) How much do you expect to enjoy the cookie?

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
Extremely unenjoyable			Moderately unenjoyable			Somewhat unenjoyable				Somewhat enjoyable			Moderately enjoyable			Extremely enjoyable		

2) How good do you expect the cookie to be?

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
Extremely untasty			Moderately untasty			Somewhat untasty				Somewhat tasty			Moderately tasty			Extremely tasty		

3) How pleasant do you expect eating the cookie to be?

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
Extremely unpleasant			Moderately unpleasant			Somewhat unpleasant				Somewhat pleasant			Moderately pleasant			Extremely pleasant		

4) How *certain* are you of these expectations?

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
Extremely uncertain			Moderately uncertain			Somewhat uncertain				Somewhat certain			Moderately certain			Extremely certain		

APPENDIX I: EXPERIMENT 2 AFFECTIVE EXPERIENCE MEASURE

1) How much did you enjoy the cookie?

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
Extremely unenjoyable			Moderately unenjoyable			Somewhat unenjoyable				Somewhat enjoyable			Moderately enjoyable			Extremely enjoyable		

2) How good did the cookie taste?

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
Extremely untasty			Moderately untasty			Somewhat untasty				Somewhat tasty			Moderately tasty			Extremely tasty		

3) How pleasant was eating the cookie?

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
Extremely unpleasant			Moderately unpleasant			Somewhat unpleasant				Somewhat pleasant			Moderately pleasant			Extremely pleasant		

APPENDIX J: EXPERIMENTS 3 & 4 SCRIPT

C = Cookie simulation	**D = Day simulation**
No Load = 1	**Load = 2**

(have cookie prop ready)

Greet participant. Give informed consent and brief questionnaire.

This experiment is actually going to include two separate tasks. One of these tasks is a taste perception task, and the other is a mental imagery task.

In the taste perception task, we are interested in how your senses interact with each other. Specifically, we want to know how processing different kinds of auditory information affects your taste perceptions.

You are going to listen to a series of tones while you eat a cookie. Then we would like you tell us a little about your experiences eating the cookie.

(Pick up toaster oven tray)

So this is the cookie you are going to eat. As you can see, we bake you a fresh chocolate chip cookie in a toaster oven that we have in the kitchenette around the corner. We want you to eat the cookie warm and fresh so obviously we wait to bake it until you arrive. Now that you are here and we are set I am going to go put the cookie in the toaster oven, and I'll be back in just a minute.

(Leave lab. Return cookie tray to refrigerator.)

The taste perception task will take place once the cookie has finished baking, and it usually takes about 10 minutes to bake a single cookie in our toaster oven. In the meantime we will complete the mental imagery task. However, like I said, we are interested in the effects of auditory processing on perceptions of taste. So before we do anything let's go through the instructions for the auditory processing task.

While you eat the cookie, you are going to a listen to a series of audio tones that you will hear through these headphones. You will three distinct tones, one low-pitch tone, one medium-pitch tone, and one high-pitch tone.

Put on the headphones, and press the spacebar to hear these three tones in succession.

Were you able to discriminate the three tones? Good.

It is very important that you listen to these tones carefully as you eat the cookie, because we need you to keep track of the number of low-pitch tones that you hear. At the end of the experiment you will be asked how many of the low pitch tones you heard.

Before we move on to the mental imagery task you will hear a short demonstration of how the task will sound with all three tones together. Remember to count the number of low tones that you hear. Press the spacebar to begin the demonstration.

How many low tones did you hear?

Do you have any questions about the task?

OK, Great. You may take off the headphones for now, and we'll go through the instructions for the mental imagery task.

Something else we have been interested in lately is the way that people form mental images of future events.

COOKIE SIMULATION

So we have chosen a simple and familiar event for you to imagine -since you are going to eat a cookie at the end of this task, we've decided it makes sense that eating a cookie is the future event that you imagine. After you perform the auditory processing task, we'll ask you some questions about your mental imagery of eating the cookie, so be sure to form clear, vivid images.

(Give participant worksheet)

Imagine, as clearly as possible, that you are eating the chocolate chip cookie now. Imagine that the cookie has just been taken out of the toaster oven and brought into the room. Imagine the way the freshly-baked cookie smells. Imagine how it looks, how it feels, and imagine how it tastes.

Now, continue to imagine eating the cookie, from the first bite, all the way to the last bite. Vividly imagine all the aspects of eating the cookie: the sight of the cookie, the smell of the cookie, the feel of the cookie, the taste of the cookie. Imagine how you will feel, imagine what you will be thinking and feeling as you eat the cookie. Remember to form clear, detailed, mental images, as you will be asked questions about your mental imagery at the end of the experiment.

Once you have clear, vivid, mental images in mind, begin writing about eating the cookie. Simply put into words the thoughts, feelings, and sensations that your imagination of eating the cookie brings to mind. Continue to hold clear mental images of the cookie in mind as you write. You will have about 5 minutes to perform this mental imagery task. Please write about the cookie for the whole time period and try to fill up all of the space. There are additional lines on the back.

DAY SIMULATION

So we have chosen a simple and familiar event for you to imagine - we want you to imagine the events of a typical day. Say, tomorrow. After you perform the auditory processing task, we'll ask you some questions about your mental imagery for your typical day, so be sure to form clear, vivid images.

(Give participant worksheet)

Imagine, as clearly as possible, that you are beginning the day tomorrow. Close your eyes. Imagine that you have just gotten out of bed. Imagine what things look like, imagine what things feel like.

Now, continue to imagine the events of the day, from the time you leave the house to the time you come home at night and the time you go to bed. Imagine how you will feel, imagine what you will be thinking and feeling. Remember to form clear, vivid images as you will be asked questions about your imagery at the end of the experiment.

Once you have clear, vivid, mental images in mind, begin writing about your typical day. Simply put into words the thoughts, feelings, and sensations that your imagination of a typical day brings to mind. Continue to hold clear mental images of this typical day in mind as you write. You will have about 5 minutes to perform this mental imagery task. Please write about your typical day for the whole time period and try to fill up all of the space. There are additional lines on the back.

After 5 minutes, collect imagery worksheets.

Thank you. Now please press the spacebar on the computer and answer the questions that the program asks you. I'll be back in a moment.

(Leave and return with cookie).

<u>NO</u> LOAD CONDITION (1)

OK. Here is your cookie. In your condition you actually will not be listening to the tones. You will press the 'x' key when you are finished with the cookie. The computer program will then ask you how many low tones you heard. Since you are not listening to the tones please enter a zero. Make sure you enter a zero and not the letter O. Please do not press backspace at any point, if you make a mistake just tell the experimenter. After you enter 0 you will be asked a series of questions. I am going to step out into the hallway while you perform the task. You may come notify me when you are finished. Please press the spacebar for further instructions.

LOAD CONDITION (2)

OK. Here is your cookie. Please put the headphones back on. Remember you must count the number of low tones while you eat the cookie. You will press the 'x' key when you are finished with the cookie. The computer program will then ask you how many low tones you heard. Please do not press backspace at any point, if you enter the wrong number just tell the experimenter. After you enter a number you will be asked a series of questions. I am going to step out into the hallway while you perform the task. You may come notify me when you are finished. Please press the spacebar for further instructions.

(When you have returned to the lab)

Now I just have a few measures for you to fill out. Please read through the instructions at the top of each one and let me know if you have any questions. When you have finished these measures, I will ask you a few more questions about the experiment and then you will be free to leave.

(Funnel debriefing)

APPENDIX K: FUNNEL DEBRIEFING FOR EXPERIMENTS 1-4

Debriefing

Participant # _____

Did you think that all the questions on the questionnaire were clear? Did you have any confusion as to how you should answer them?

What were your expectations for the cookie? That is, how good did you expect it to be?

How did the cookie compare w/ your expectations? Was it better or worse than you expected it to be?

Do you remember what we told you about the cookie (fish for: expectations)

Do you think that what we told you influenced your expectations for the cookie?
Do you think your expectations would have been different if I had not told you anything about the cookie?

Did anything about the experiment seem suspicious (elaborate)?

Did anything in particular about the cookie seem suspicious?

Did you ever have the impression that we may not have been telling you the truth about the cookie?

So did you ever have any doubts that you were eating a fresh-baked homemade cookie? Why, or why not?

How difficult did you find the audio processing task (if relevant)?

We want to make sure that you have not heard anything about this experiment from others and that you will not talk about the experiment with your classmates. Thank you.