Carnegie Mellon University
Research Showcase @ CMU

Dietrich College Honors Theses | Dietrich College of Humanities and Social Sciences

4-2010

# Attention Moderates the Impact of Expectations on Hedonic Experience

Emily N. Garbinsky
*Carnegie Mellon University*

Follow this and additional works at: http://repository.cmu.edu/hsshonors

This Thesis is brought to you for free and open access by the Dietrich College of Humanities and Social Sciences at Research Showcase @ CMU. It has been accepted for inclusion in Dietrich College Honors Theses by an authorized administrator of Research Showcase @ CMU. For more information, please contact research-showcase@andrew.cmu.edu.

Running head: ATTENTION AND EXPECTATIONS

# Attention Moderates the Impact of Expectations on Hedonic Experience

Emily N. Garbinsky

Advisor: Dr. Carey K. Morewedge

Carnegie Mellon University

Abstract

The ability of an expectation to affect an experience depends upon whether a discrepancy is detected. It was hypothesized that attention plays a moderating role on the effect that expectations have on hedonic experience such that participants would be less likely to notice that a discrepancy exists if another task occupied more, rather than fewer, attentional resources. The results obtained were consistent with this hypothesis. Experiments 1 and 2 showed that participants rated unfunny cartoons as significantly funnier when their attention was being allocated elsewhere in terms of time pressure (Experiment 1) and high cognitive load (Experiment 2). Experiment 3 examined whether these results were due to assimilation or contrast, but was unsuccessful in the manipulation of attention, warranting further investigation.

# Attention Moderates the Impact of Expectations on Hedonic Experience

*"It is the theory (schema) which decides what we can observe."*

(Einstein, 1954 as cited in Turk & Salovey, 1985)

The notion that one's cognitions and beliefs influence the way we see or experience events has been acknowledged for over 50 years. The psychological term schema (referenced in the quotation) refers to a generic knowledge structure that guides an individual's attention, behavior, interpretation, and reconstruction of events (Graesser & Nakamura, 1982). Schemas are a powerful influence in our lives because they typically encompass expectations about a particular event, with the formation of expectations pervading our everyday lives. According to Kubovy (1999), expectations are a product of implicit or unconscious learning; he asserts that it is this tacit knowledge (knowledge without direct awareness) that automatically causes expectations to be formed.

Although expectations are formed without awareness, they can alter the way we experience events, causing objectively similar events to be perceived in different ways. Expectations have the ability to affect experiences because both bottom-up processes (stimulus characteristics) and top-down processes (expectations) play a role in determining how an event is perceived (Lee, Frederick, & Ariely, 2006). Therefore, an experience can be altered depending upon the content of the expectation one possesses in addition to whether or not a discrepancy exists (and is noticed) between the expectation and the actual characteristics of the stimulus.

Given that the ability of an expectation to affect hedonic experience depends on whether a discrepancy is detected, it is hypothesized that attention moderates the impact of expectations such that the effect of expectations is dependent upon the cognitive resources available. In other words, having sufficient cognitive resources allows an individual to compare their expectation to

the experience while they are having it, thus increasing their ability to notice that a discrepancy exists. Alternatively, if one's cognitive resources are allocated elsewhere, they may be less likely to notice that a discrepancy exists between their expectations and the actual experience. If this hypothesis is confirmed, it will demonstrate that the amount of attention that an individual allocates toward an experience serves as a key factor in regulating the impact of expectations on experiences.

*Role of Attention in Noticing Differences*

While a single definition for attention does not yet exist, studies examining this concept tend to focus on three major topics that are all considered to be major components of attention. The first component is alertness, which allows humans to complete lengthy tasks. The second element of attention is selectivity, or the ability to select information from one source and not another. The third and final constituent of attention is processing capacity (Posner & Boies, 1971). While attention is a difficult construct to define, it can be divided into four distinct stages: 1) orientation of attention toward a stimulus, 2) engagement with the stimulus, 3) disengagement from the stimulus, and 4) avoidance of attention toward the stimulus (Oimet, Gawronski, & Dozois, 2009). Even though allocating attention to stimuli is necessary for survival, numerous studies have demonstrated that the processing capacity of attention is very limited (Broadbent, 1958, p. 25); participants often have difficulty handling two tasks simultaneously and signals that arrive during reaction time periods are typically delayed (Welford, 1968, p. 197).

Knowing that individuals have difficulty allocating attention to more than one area, researchers have examined whether attention is necessary in order to perceive discrepancies or changes. By placing brief blank fields between alternating displays of original and modified scenes, Rensink, O'Regan, and Clark (1997) showed that noticing changes was extremely

difficult and proved to be much easier only when a verbal cue was provided. Their results indicate that "perception of change is mediated through a narrow attentional bottleneck" and that visual perception of discrepancies occurs only when focused attention is given to the element of change (Rensink, O'Regan, & Clark, 1997). Furthermore, it was shown that in the absence of attention, visual memory is replaced by subsequent stimuli, prohibiting participants from being able to make comparisons. This suggests that attention causes relevant information to be stored in a more robust space, such as visual short term memory (Sperling, 1960) to enable comparisons to be made and discrepancies to be detected.

### *Effect of Expectations on Hedonic Experience*

Since attention is a necessary component for noticing changes, the purpose of this study is to examine whether attention is a moderating factor in the effect of expectations on an experience, particularly when the expectation and experience are discrepant. Numerous studies suggest that expectations affect many aspects of our lives, including how we react to events, perform in school, and respond to medication (Spencer, Steele, & Quinn, 1999; Wager, et al., Wilson, Lisle, Kraft, & Wetzel, 1989). Placebos, for example, are actually more effective when the placebo is believed to be expensive rather than available at a discount (Shiv, Carmon, & Ariely, 2005). Wilson, et al. (1989) outlined four cases that demonstrate the possible relationships between a stimulus and an expectation.

#### Case 1: No Affective Expectation

The first case involves the evaluation of a stimulus that lacks any prior expectations. In this instance, people encounter a novel stimulus and are uncertain of whether they will expect to like or dislike it. Situations such as these involve going to a new amusement park on opening day or testing a new product; these are conditions in which preconceived notions are absent.

However, Wilson, et al. (1989) mention that "in everyday life, such pure cases of no expectations are probably rare, because people almost always know enough about a stimulus to form at least a rudimentary expectation about their reaction to it" (520). In the case of the new amusement park, most people have visited other amusement parks throughout their lives and would therefore be able to base their expectations on experiences they encountered in the past. Even if they had never been to an amusement park, they would still be able to base their expectations on experiences that others have shared with them. A similar rationale could be applied to the case of a new product.

There are multiple explanations for why cases with no prior expectations are rare. First, people constantly seek to categorize and organize their environment, and these categorizations ultimately lead to the formation of expectations since people expect stimuli in the same category to evoke similar expectations (Wilson, et al., 1989). Also, when people encounter a novel stimulus, their experience may cause them to engage in counterfactual thinking, where they imagine what the stimulus could have been like (Kahneman & Miller, 1986). Lastly, people always reference their memory when evaluating a novel stimulus so they can compare it to similar stimuli they have encountered in the past; Hsee, Lowenstein, Blount, and Bazerman (1999) have discussed a hypothetical example of a prospective home buyer who compares each new house with ones retrieved from memory. All of these reasons serve as possible explanations for the rarity of encountering a stimulus with no prior expectations about it.

## Case 2: Stimulus Value Confirms an Affective Expectation

The second case occurs when one's expectations match the actual stimulus. This arises, for example, if one attends a concert expecting it to be enjoyable, and it actually is quite fun. According to Wilson, et al. (1989), these situations differ from Case 1 because people do not

need to spend as much time processing the stimulus in order to decide if they actually like it; "if people have an expectation about their evaluation, and the value of the stimulus is consistent with that expectation, less processing is necessary to determine how they feel" (520). Once the stimulus has been examined in order to determine if it is consistent with one's prior expectations, and if the stimulus does match these expectations, it becomes unnecessary to examine the stimulus further to assess liking.

### Case 3: The Stimulus Value is Discrepant with an Affective Expectation, But the Discrepancy is NOT Noticed

The third case occurs when a stimulus fails to match a prior expectation, but the discrepancy goes unnoticed. An example of this includes expecting to like a certain restaurant so much that you actually do like it, but in the absence of this expectation, you would have found the restaurant to be mediocre at best. While stimulus processing occurs quickly, similar to Case 2, an important difference is that the stimulus is objectively inconsistent with the expectation, causing people who possess no prior expectations to evaluate it differently (Wilson, et al., 1989). Since people fail to notice the discrepancy between the stimulus and their expectation, and they ultimately assimilate the stimulus with their expectation, Case 3 can be viewed in terms of a self-fulfilling prophecy or confirmatory bias.

For instance, in a study conducted by Wilson, et al. (1989), participants watched three funny cartoons followed by three cartoons that were not considered funny. Additionally, some participants were given no expectations about the cartoons while others were primed with the expectation that they were going to like them. While participants in both the no-expectation and the expect-to-like conditions rated the first three cartoons similarly, the ratings for the last three (unfunny) cartoons were significantly different; participants in the no expectation condition rated

them as relatively unfunny while those in the expect-to-like condition rated them as funnier than the first three cartoons. As a result, Wilson, et al. (1989) concluded that when a discrepancy exists between a stimulus and people's prior expectations, but the discrepancy goes unnoticed, people's affective reaction toward the stimulus is to assimilate it to their prior expectation.

This effect of assimilation has been demonstrated in several areas pertaining to hedonic experience. For example, in the domain of pain, there has been much research on placebo analgesia, which is the phenomenon that the mere belief that one is receiving an analgesic causes a reduction in the experience of pain. In a study conducted by Wager, et al. (2004), it was found that participants who were informed they were receiving placebos demonstrated increased activity in the prefrontal cortex during the anticipation of pain. More importantly, the placebo manipulations decreased neural responses in pain sensitive regions of the brain. The magnitude of these neural decreases was also correlated with reports in reduction of experienced pain, providing evidence that the expectation of receiving an analgesic reduced the actual experience of pain, even though the participants merely received a placebo.

A great deal of research has shown that the inherent bias to seek confirmatory evidence is ubiquitous (Nickerson, 1998). An important implication of this finding is the polarization hypothesis, which is the idea that attitude polarization increases when people are presented with contradictory findings. In other words, information supporting people's beliefs should be given greater weight than information disconfirming them. In order to test this, Lord, Ross, and Lepper (1979) recruited 24 proponents and 24 opponents of the death penalty and asked them to read results from two different studies. One's study's results were favorable toward the death penalty while the other study's results were not. After reading each of these results, participants rated changes in their attitude toward capital punishment. The results were in favor of the polarization

hypothesis; after reading the mixed findings, proponents reported that they were more in favor of capital punishment while opponents reported that they were less in favor of capital punishment. These results suggest that people have a tendency to give greater weight to information that is in line with their current beliefs.

Confirmation bias is found in many other aspects of daily life, including social interaction. Snyder and Swann (1978) examined how people test their hypotheses about others by informing participants that people they were about to meet were either introverts or extroverts. This personality information dictated the kinds of questions that participants chose to ask this person upon meeting them. Additionally, it was found that participants tended to search for behavioral evidence that confirmed his or her hypothesis (that the person was an introvert or an extrovert). Furthermore, the participants' interactions with the other person resulted in a self-fulfilling prophecy such that the participants' questions and behavior toward the other person caused them to act in a manner that was consistent with the participant's expectations (either an introvert or an extrovert). This effectively demonstrates that people have a tendency to search for confirmatory evidence even when they are interacting with others.

## Case 4: The Stimulus Value is Discrepant with an Affective Experience, But the Discrepancy IS Noticed

The fourth case occurs when there is a discrepancy between the stimulus and one's expectations, and this discrepancy cannot be ignored. Wilson, et al. (1989) have argued that processing in this case is the slowest since people attempt to resolve the discrepancy. Additionally, contrast effects are likely to occur, with people evaluating the stimulus in the opposite direction from their initial expectation (Strack, et al., 1993). An example of this includes going to see a movie with the expectation that it will be humorous, but the movie

ultimately ends up being dull and predictable. When people notice that the movie is discrepant with their prior expectations about it, they tend to dislike the movie even more than they would have if they lacked expectations about it.

For this reason, contrast effects have the ability to make experiences less satisfying than they could be because they make the evaluation of an experience relative to one's expectations and if one's expectations are unrealistically high, the actual experience can never parallel them. If this discrepancy is detected, the perceiver will evaluate the event or experience in an even more negative manner. Schwartz (2004) provides numerous examples of this phenomenon in everyday life. He points to the instance of American healthcare, which currently provides patients with the best care in its history of operation; people in the United States tend to live longer and experience a better quality of life than they did years ago. However, most Americans remain unsatisfied. This increase in healthcare services has been accompanied by an increase in Americans' expectations, with many U.S. citizens expecting to live even longer. For this reason, even though modern healthcare practices have been shown to prolong lives, this extension has not been accompanied by what Schwartz deems "an appropriate degree of satisfaction" (p. 186).

Real world instances abound that illustrate the idea that contrast effects occur when the discrepancy between expectations and the stimulus is noticed. In the domain of marketing, Cardozo (1965) found that people's satisfaction with products is lower when the product fails to meet one's prior expectations. In cases such as these when the discrepancy is noticed, people failed to assimilate their affective reactions with their expectations, and instead, rated the product unfavorably. This finding has important implications for advertising; if advertising leads to false expectations and people realize that they have been misled, their affective reactions are likely to

be contrasted away from their expectations and they may even magnify the difference between their expectations and the actual stimulus.

Sheppard and McNulty (2002) also examined situations in which one's expectations failed to match the actual outcome. They demonstrated that when participants expected bad news, but received good news, they displayed a greater positive affect than those who expected good news and received it. In this case, when one's expectations failed to match the outcome, it caused a more favorable result than when there was a match between their expectation and the outcome. This is because participants displayed a contrast effect by evaluating the stimulus (the good news) in the direction that was opposite from their original expectation; since their original expectation was that they would be receiving bad news, this contrast effect caused them to magnify the difference between the expectation and stimulus, resulting in an increased positive affect when they ultimately received the good news. Schwartz (2004) claims that one of the reasons why possessing unfavorable expectations may be advantageous is due to the fact that "they leave room for many experiences to be a pleasant surprise, a hedonic plus" (p. 187).

*Experimental Design*

In order to investigate whether attention plays a moderating role on the effect that expectations have on hedonic experience, a modified version of the procedure used by Wilson, et al. (1989) was utilized, where participants were asked to rate the humor of a set of unfunny cartoons. By varying the amount of cognitive resources available in addition to priming them with different expectations about the cartoons, humor ratings were assessed. It was hypothesized that participants would be less likely to notice that a discrepancy exists if another task occupied more, rather than fewer, attentional resources.

## Experiment 1: Time and Expectation Manipulation

### Method

*Participants*

Sixty-six people (31 men and 35 women; $M_{age}$ = 26.6, SD = 8.8) from the surrounding Pittsburgh area participated in this experiment in exchange for $3.

*Materials*

The 48 cartoons that were used in this experiment were selected from *The Complete Cartoons of the New Yorker* (Mankoff, 2006). All of the cartoons were given humor ratings on a scale ranging from 1 (not at all funny) to 7 (extremely funny) by a group of 40 participants who were recruited from the surrounding Pittsburgh area (17 men and 23 women; $M_{age}$ = 23.4). The cartoons selected for this experiment were then sorted into three groups: 1) the funny cartoons (which received ratings between 4.2 and 5.35), 2) the unfunny cartoons (which received ratings between 2.6 and 2.95), and 3) the most unfunny cartoons (which received ratings between 1.6 and 2.5). All of the cartoons were shown to participants using DirectRT (Empirisoft, New York, NY) on a PC computer.

*Design*

A 2 x 2 between subjects design was employed. The first independent variable was the attentional resources (time pressure) manipulation. This variable had two levels: the *high time pressure* condition (where participants were given 4 seconds to rate each cartoon) or the *low time pressure* condition (where participants were given 10 seconds to rate each cartoon). The second independent variable was the expectation manipulation. This variable had two levels: the expectation that the cartoons would be *funny* (by first showing participants the 16 funny cartoons) or the expectation that the cartoons would *not be funny* (by first showing participants

the 16 unfunny cartoons). The dependent variable was the participants' humor ratings of the 16 most unfunny cartoons. Assignment to condition in all experiments was random.

*Procedure*

After the participants signed the consent form, they were seated in front of a computer screen. The experimenter explained that they would be given a few seconds to rate a series of cartoons in terms of hilarity because the main purpose of the study was to examine people's initial reactions to humor. In order to help participants become comfortable with the equipment and the amount of time to rate (either 4 seconds or 10 seconds), they were shown a series of 8 different shapes and asked to rate their pleasantness on a scale ranging from 1 (not at all pleasant) to 7 (extremely pleasant).

Next, participants were shown a series of 32 cartoons and were asked to rate them on a scale ranging from 1 (not at all funny) to 7 (extremely funny). The first 16 cartoons that participants saw were funny or not funny, according to their condition assignment. Participants in the funny expectation condition first saw the 16 funny cartoons while participants in the unfunny expectation condition first saw the 16 unfunny cartoons. The last 16 cartoons were the same for all participants; they all saw the 16 most unfunny cartoons at the end of the experiment. Upon completing the experiment, participants were debriefed and compensated.

## Results and Discussion

Participants' ratings for the 16 most unfunny cartoons were submitted to a 2 (time pressure: high, low) by 2 (expectations: funny, not funny) between-subjects ANOVA. Most important, the analysis revealed a significant interaction between the rating speed and the content of expectations given, $F(1, 62) = 4.05$, $p = 0.049$, $\acute{\eta}_p^2 = 0.06$ but no main effect of expectations, $F(1, 62) = 1.72$, $p = 0.195$, or time pressure, $F(1, 62) = 0.97$, $p = 0.328$. Simple effects tests

revealed that participants who were given expectations that the cartoons would be funny rated them as significantly funnier when they only had 4 seconds ($M = 4.13$, $SD = 0.81$) as opposed to 10 seconds ($M = 3.33$, $SD = 0.95$), $t(34) = 2.7$, $p = 0.011$. However, when participants were given expectations that the cartoons would not be funny, there was no significant difference when they were given 4 seconds ($M = 3.24$, $SD = 0.97$) or 10 seconds ($M = 3.52$, $SD = 1.48$), $t(28) < 1$, $p = 0.561$ (see Figure 1). In other words, participants only noticed a mismatch between their expectations and the target stimuli – the second set of cartoons – when they were under low time pressure. Thus, the results suggest that ratings of the target stimuli were assimilated toward participants' expectations when participants lacked sufficient attentional resources to notice a difference.

## Experiment 2: Load Manipulation

In the second experiment, attentional resources were manipulated in an alternative way in an attempt to replicate the results from Experiment 1. In Experiment 2, attention was manipulated by placing participants under high cognitive load or low cognitive load. This was done so that participants placed under high cognitive load had less attention to allocate toward the cartoon rating task than those placed under low cognitive load.

### Method

*Participants*

Thirty-seven people (25 men and 12 women; $M_{age} = 24.4$, SD = 4.4) from the surrounding Pittsburgh area volunteered to participate in this experiment in exchange for $3.

*Materials*

Participants in Experiment 2 rated the 16 funny and the 16 most unfunny cartoons used in Experiment 1.

*Design*

A one-way between subjects design was employed. The independent variable was the cognitive load manipulation. This variable had two levels: *low load* (in which participants were asked to memorize a 2-character string) and *high load* (in which participants were asked to memorize a 7-character string). Participants were asked to keep this string in mind while they rated the 16 most unfunny cartoons. As in Experiment 1, the dependent variable was the participants' humor ratings of the 16 most unfunny cartoons.

*Procedure*

After the participants signed the consent form, they were seated in front of a computer screen. The experimenter explained that they would have to memorize a string of letters and numbers and keep this string in mind while they rate a series of cartoons in terms of humor. The experimenter further explained that all of the cartoons were previously given very high humor ratings by people in another experiment because the purpose of the present study was to investigate how humor affects memory.

All participants were given expectations that the cartoons would be funny by first seeing the 16 funny cartoons. They had 10 seconds to rate each one on a scale ranging from 1 (not at all funny) to 7 (extremely funny). Then, participants were given a string of letters and numbers to keep in mind while they rated the 16 most unfunny cartoons. Those placed in the low load condition were given a 2-character string to memorize (8Q) and those placed in the high load condition were given a 7-character string to memorize (3WS94NT). After they provided ratings

for the 16 most unfunny cartoons, participants entered the string they were asked to memorize. Upon completing the experiment, participants were debriefed and compensated.

## Results and Discussion

Participants' ratings for the 16 funny cartoons and the 16 most unfunny cartoons were submitted to a mixed ANOVA, with the funny vs. unfunny cartoons as the within subjects variable and cognitive load as the between subjects variable. Most important, the analysis revealed a significant interaction between the type of cartoon being rated (funny vs. unfunny) and load (high vs. low), $F(1, 35) = 5.09$, $p = 0.03$, $\acute{\eta}_p^2 = 0.127$. Simple effects tests revealed that participants in the high load condition rated the unfunny cartoons as significantly funnier ($M$ = 3.99, $SD$ = 1.23) than those in the low load condition ($M$ = 2.79, $SD$ = 0.89), $t(17) = 7.485$, $p <$ 0.0001 (see Figure 2). In other words, participants only noticed a mismatch between their expectations and the target stimuli – the second set of cartoons – when they were under low cognitive load. Once again, the results suggest that ratings of the target stimuli were assimilated toward participants' expectations when participants lacked sufficient attentional resources to notice a difference.

## Experiment 3: Control with Load

Experiments 1 and 2 demonstrated that participants that were given expectations that the cartoons would be funny rated them as significantly funnier when another task occupied more of their attentional resources. The purpose of Experiment 3 was to determine whether the statistically significant difference in ratings was due to assimilation (because participants' attention was allocated elsewhere and they failed to notice the discrepancy) or contrast (because participants had enough cognitive resources available to notice the difference and thus rated the cartoons less favorably).

## Method

### *Participants*

One hundred and twenty-one people (66 men and 55 women; $M_{age}$ = 25.8, SD = 11.6) from the Carnegie Mellon community and surrounding Pittsburgh area volunteered to participate in this experiment in exchange for $3.

### *Materials*

The 32 cartoons used in Experiment 3 were the 16 funny cartoons and the 16 most unfunny cartoons that were used in Experiments 1 and 2.

### *Design*

A 2 x 2 between subjects design was employed. The first independent variable was the attentional resources manipulation. This variable had two levels: *high load* (in which participants were asked to memorize a 7-character string) and *low load* (in which participants were asked to memorize a 2-character string). The second independent variable was the expectation manipulation. This variable had two levels: the expectation that the cartoons would be *funny* (in which participants first rated the 16 funny cartoons) and *no expectations* at all (in which participants first rated the brightness of 16 squares). The dependent variable was the participants' subsequent humor ratings of the 16 most unfunny cartoons.

### *Procedure*

After the participants signed the consent form, they were seated in front of a computer screen. The experimenter explained that they would have to memorize a string of letters and numbers and keep this string in mind while they rate a series of cartoons in terms of humor. For those placed in the funny expectation condition, the experimenter further explained that all of the

cartoons were previously given very high humor ratings by people in another experiment because the purpose of the present study was to investigate how humor affects memory.

The first images that participants saw varied by condition. Those in the no expectation condition were asked to rate the brightness of 16 squares while those in the funny expectation condition rated the humor of the 16 funny cartoons. Once these ratings were completed, participants were placed under high or low load before being asked to rate the 16 most unfunny cartoons. Those placed in the low load condition were given a 2-character string to memorize (8Q) and those placed in the high load condition were given a 7-character string to memorize (3WS94NT). After they provided ratings for the 16 most unfunny cartoons, participants entered the string they were asked to memorize. Upon completing the experiment, participants were debriefed and compensated.

## Results and Discussion

Participants' ratings for the 16 most unfunny cartoons were submitted to a 2 (load: high, low) by 2 (expectations: funny, none) between-subjects ANOVA. It revealed no significant interaction between the load and expectation manipulation, $F(1, 117) = 0.685$, $p = 0.410$. Additionally, there was no main effect of expectations, $F(1, 117) = 2.127$, $p = 0.147$, or load, $F(1, 117) = 0.439$, $p = 0.509$. This suggests that the non-significant findings are a result of an ineffective load manipulation and further investigation in this area is warranted.

Even though the results were not significant, the general trend of the data suggests that assimilation occurs when another task is occupying more, as opposed to fewer, of one's attentional resources. This is evidenced by the fact that participants who were given expectations that the cartoons would be funny rated them as funnier when they were placed under high load ($M = 3.70$, $SD = 1.07$) as opposed to low load ($M = 3.43$, $SD = 1.16$). This difference in ratings is

not observed when participants were placed in the no expectation condition, with participants under high ($M$ = 3.28, $SD$ = 0.98) and low load ($M$ = 3.31, $SD$ = 0.71) providing similar ratings (see Figure 3).

## General Discussion

Although expectations can affect experiences, the extent of this effect varies and is dependent upon whether individuals notice a discrepancy between their expectation and the actual experience (Wilson, et al., 1989). The goal of this research was to investigate whether attention plays a moderating role in the discrepancy recognition process. It was hypothesized that participants would be less likely to notice that a discrepancy exists if another task occupied more, rather than fewer, attentional resources. The results obtained were generally consistent with this hypothesis. Experiment 1 showed that participants who were given expectations that the cartoons would be funny rated the unfunny cartoons as significantly funnier when their attention was constrained by time pressure. Experiment 2 demonstrated that the unfunny cartoons received significantly higher ratings when participants were placed under high, rather than low, cognitive load. Both of these studies effectively illustrated that those who expected the cartoons to be funny found them more humorous when another task required more, rather than fewer, attentional resources. Experiment 3 attempted to examine whether these results were due to assimilation or contrast, but the results were not significant due to the unsuccessful manipulation of attention. However, the general trend of the data suggested that assimilation occurred when another task was occupying a great deal of one's attention.

These results offer insight into the extent to which expectations can affect cognitively engaging experiences, particularly when the expectation is discrepant from the actual experience. Since the amount of attentional resources available dictates the effect of expectations, activities

may be perceived differently dependent upon the amount of cognitive resources they require. For instance, a film may be perceived as more enjoyable if an individual possesses expectations that the film will be pleasant and it is very engaging. However, a film may be perceived as less enjoyable if an individual possesses expectations that the film will be pleasant and it is rather dull because the lack of engagement in the film will enable the viewer to notice that the film is discrepant from their prior expectations.

In addition to offering insight regarding the nature of the effect of expectations on everyday experiences, the results can be used to explain various observations in the domain of marketing and consumer product experiences. Research has shown that potential buyers view advertisements as tentative hypotheses regarding product performance (Deighton, 1984). Once they have obtained a hypothesis about a product, they tend to seek confirming evidence. In other words, the effectiveness of advertising can be summarized in two steps. An advertisement arouses expectations in the potential buyer, which then causes the buyer to want to confirm his or her expectations about the product once he or she has purchased it (Deighton, 1984).

Consumers' expectations influence their product experience and are key determinants of customer satisfaction and loyalty (Ofir & Simonson, 2007). Company advertisements that accurately portray expectations of a product or service experience benefit favorably since consumers use their expectations to search for confirmatory evidence to aid in their decision to purchase the product. However, the results may differ for companies who employ irresponsible advertising techniques and provide consumers with unrealistic expectations. The consequences of negligent advertising depend on whether or not the discrepancy between the product and the consumer's expectations is noticed, with the results of our investigation suggesting that attention plays a moderating role in this recognition process.

As a result, our study has important implications for companies who choose to mislead consumers, especially if potential buyers have sufficient cognitive resources available when evaluating the product. For example, Anderson (1973) gave participants various expectations about a ballpoint pen (its features were understated, overstated, accurate, etc.). Participants were then asked to rate the pen based on features and performance. Results showed that the mean product rating scores were consistent with consumer expectations until the expectations were unrealistic due to overstatement, which caused a significant decrease in product ratings. This led Anderson (1973) to conclude that there is a point where consumers will no longer accept disparity between advertisement claims and actual product performance. Based on the findings of our study, it appears reasonable to conclude that if consumers have sufficient attentional resources available to reach this point, they will perceive the product less favorably than they would have if their expectations were not so unrealistic.

The moderating role of attentional resources can also be used to explain the results obtained by Cohen and Goldberg (1970), who manipulated the taste of instant coffee. When participant expectations about the coffee were confirmed, they evaluated the product favorably. However, when their expectations were disconfirmed, they gave the coffee a negative evaluation. These studies should serve as warnings to companies contemplating the use of unrealistic advertisements. As studies have demonstrated, using advertisements to overstate the features of a product have drastic consequences if consumers have adequate attentional resources available to evaluate the product because this will result in a less favorable product evaluation. This evaluation will in turn affect the attitude that the consumer has toward the product (Aaker & Day, 1974), and may result in their decision to purchase a different product in the future. These

findings have numerous implications for the decisions that must be made by companies when they must choose how to promote their products.

While the obtained results can be used to explain numerous phenomena, the experiments had several potential limitations. Mainly, results from the studies relied solely on ratings of humor, which is a subjective measure since degree of humor is perceived differently by each individual. Even though the cartoons used for the study were selected based on independent participant ratings of humor, future research should attempt to examine the moderating role of attention by utilizing objective stimuli such as color or sound. This would aid in eliminating individual differences in ratings.

Also, future studies should examine whether the difference in humor ratings is due to assimilation (because more attentional resources are being allocated elsewhere and the discrepancy goes unnoticed) or contrast (because less attentional resources are being allocated to another task and the discrepancy becomes evident). While I attempted to examine this mechanism in Experiment 3, the attentional resources manipulation was ineffective so the results could not be interpreted. However, future studies will include this control (no expectation) condition by utilizing either time pressure or a more difficult load task in order to make the manipulation successful.

Additionally, future researchers may wish to replicate this study in the marketing domain. For instance, participants could be provided with product expectations and then be asked to rate the product on various attributes. Different conditions should examine how the ratings differ if participants' attention is being allocated elsewhere (by other distractions, etc.) thus enabling more generalization to real world experiences.

In conclusion, the results obtained support the idea that attention plays a moderating role in the effect of expectations on hedonic experience and serve to explain numerous everyday phenomena. In particular, the influence of expectations varies depending upon the amount of attentional resources an experience consumes, with less cognitively engaging experiences making it more likely for discrepancies to be detected. This investigation not only provides insight into everyday life experiences and offers a viable explanation for numerous study results, but also serves as a guideline for anyone who provides others with expectations regarding hedonic experiences.

References

Aaker, D., & Day, G. (1974). A dynamic model of relationships among advertising, consumer awareness, attitudes, and behavior. *Journal of Applied Psychology*, *59(3)*, 281-286.

Anderson, R. (1973). Consumer dissatisfaction: The effect of disconfirmed expectancy on perceived product performance. *Journal of Marketing Research*, *10(1)*, 38-44.

Broadbent, D. (1958). *Perception and communication*. London: Pergamon Press.

Cardozo, R. (1965). An experimental study of customer effort, expectation, and satisfaction. *Journal of Marketing Research, 2(3)*, 244-249.

Cohen, J., & Goldberg, M. (1970). The dissonance model in post-decision product evaluation. *Journal of Marketing Research*, *7(3)*, 315-321.

Deighton, J. (1984). The interaction of advertising and evidence. *The Journal of Consumer Research*, *11(3)*, 763-770.

Graesser, A., & Nakamura, G. (1982). The impact of schema on comprehension and memory. In G. Bower (Ed.), The psychology of learning and motivation (pp. 60-105). New York: Academic Press.

Hsee, C., Lowenstein, G., Blount, S., & Bazerman, M. (1999). Preference reversals between joint and separate evaluation of options: A review and theoretical analysis. *Psychological Bulletin*, *125*, 576-590.

Kahneman, D., & Miller, D. (1986). Norm theory: Comparing reality to its alternatives. *Psychological Review, 93*, 136-153.

Kubovy, M. (1999). On the pleasures of the mind. In D. Kahneman, E. Diener, & N. Schwartz, *Well-being: The foundations of hedonic psychology* (pp. 134-154). New York: Russell Sage.

Lee, L., Frederick, S., & Ariely, D. (2006). Try it, you'll like it: The influence of expectation, consumption, and revelation on preferences for beer. *Psychological Science, 17(12)*, 1054-1058.

Lord, C., Ross, L., & Lepper, M. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality and Social Psychology*, *37(11)*, 2098-2109.

Mankoff, R. (2006). *The complete cartoons of the New Yorker*. New York: Black Dog and Leventhal Publishers.

Nickerson, R. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology*, *2*, 175-220.

Ofir, C., & Simonson, I. (2007). The effect of stating expectations on customer satisfaction and shopping experience. *Journal of Marketing Research*, *44(1)*, 164-174.

Ouimet, A., Gawronski, B., & Dozois, D. (2009). Cognitive vulnerability to anxiety: A review and an integrative model. *Clinical Psychology Review*, *29*, 459-470.

Posner, M., & Boies, S. (1971). Components of attention. *Psychological Review*, *5*, 391-408.

Rensink, R., O'Regan, J., & Clark, J. (1997). To see or not to see: The need for attention to perceive changes in scenes. *Psychological Science*, *8*, 368-373.

Schwartz, B. (2004). *The paradox of choice: Why more is less*. New York, NY: HarperCollins.

Shepperd J., & McNulty, J. (2002). The affective consequences of expected and unexpected outcomes. *Psychological Science, 13(1)*, 85-88.

Shiv, B., Carmon, Z., & Ariely, D. (2005). Placebo effects of marketing actions: Consumers may get what they pay for. *Journal of Marketing Research*, *42*, 383-393.

Snyder, M., & Swann, W. (1978). Hypothesis-testing processes in social interaction. *Journal of Personality and Social Psychology*, *36(11)*, 1202-1212.

Spencer, S., Steele, C., & Quinn, D. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology*, *35*, 4-28.

Sperling, G. (1960). The information available in brief visual presentations. *Psychological Monographs*, *74*, 1-29.

Strack, F., Schwarz, N., Bless, H., Kübler, A., & Wänke, M. (1993). Awareness of the influence as a determinant of assimilation versus contrast. *European Journal of Social Psychology*, *23*, 53-62.

Turk., D., & Salovey, P. (1985). Cognitive structures, cognitive processes, and cognitive behavior modification: Judgments and inferences of the clinician. *Cognitive Therapy Research*, *9(1)*, 19-33.

Wager, T., Rilling, J., Smith, E., Sokolik, A., Casey, K., Davidson, R., et al. (2004). Placebo-induced changes in fMRI in the anticipation and experience of pain. *Science, 303*, 1162-1167.

Welford, A. (1968). *Fundamentals of skill*. London: Methuen.

Wilson, T., Lisle, D., Kraft, D., & Wetzel, C. (1989). Preferences as expectation-driven inferences: Effects of affective expectations on affective experience. *Journal of Personality and Social Psychology, 56(4)*, 519-530.

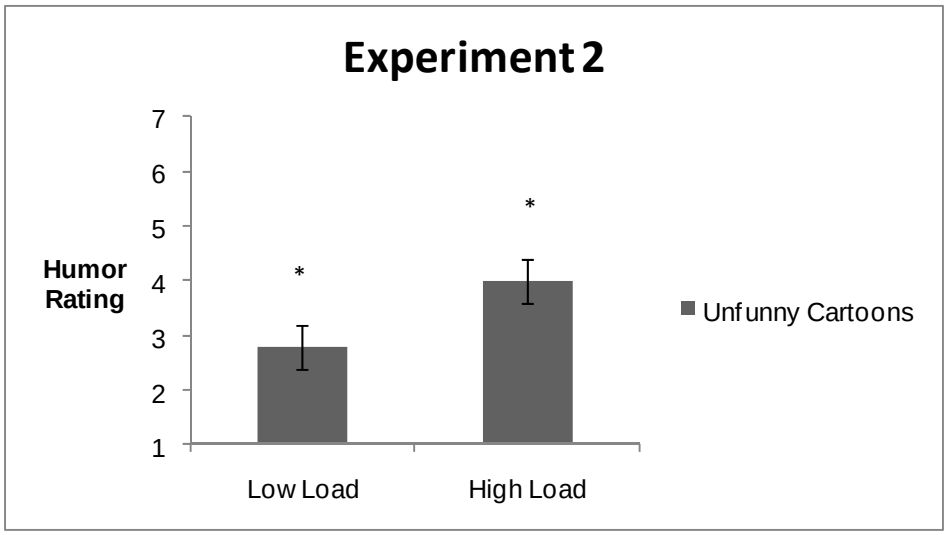
Figure Caption

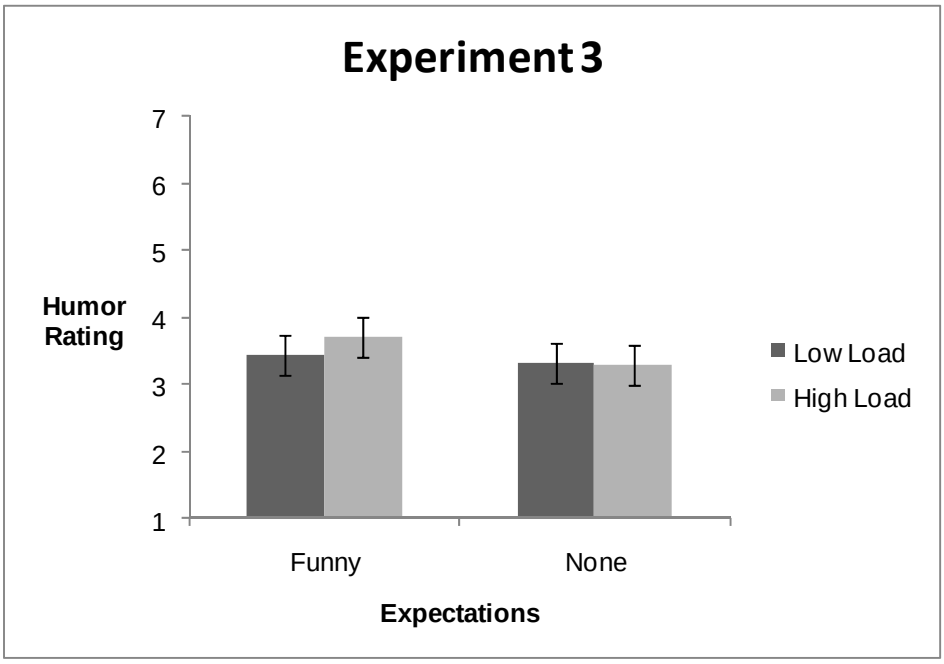
*Figure 1*. Humor ratings for all four conditions (funny/10 secs, funny/4 secs, unfunny/10 secs, unfunny 4 secs). The average scores are out of a total of seven. Error bars show one standard error of the mean.

*Figure 2*. Humor ratings for the unfunny cartoons in both conditions (high load/ low load). The average scores are out of a total of seven. Error bars show one standard of the mean.

*Figure 3*. Humor ratings for all four conditions (funny/high load, funny/low load, control/high load, control/low load). The average scores are out of a total of seven. Error bars show one standard error of the mean.

Experiment 1
Humor Rating
7
6
5
4
3
2
1
*
*
Funny
Not Funny
Expectations
10 seconds
4 seconds


Experiment 2
Humor Rating
7
6
5
4
3
2
1
*
*
Low Load
High Load
Unfunny Cartoons


Experiment 3
Humor Rating
7
6
5
4
3
2
1
Funny
None
Expectations
Low Load
High Load