TEMPORAL SEQUENCE EFFECTS: A MEMORY FRAMEWORK

DISSERTATION

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ABSTRACT

While much attention has been given recently to studying temporal sequences of events, few have offered explanations to account for how people integrate these events into a holistic evaluation of the experience, and less attention has been given to the underlying mechanism involved. A temporal sequence refers to an experience that consists of a series of outcomes spaced over time. The findings from the temporal sequence literature indicate that people form global retrospective ratings of an experience using salient characteristics of the experience, such as the peak intensity, the end intensity, and the trend. The current explanations that have been proposed to account for temporal sequence findings tend to be ad hoc in nature and are limited to explaining reported findings rather than offering a comprehensive account of the findings in the literature.

In this dissertation, I propose that adopting a memory-based framework not only provides a parsimonious explanation for the findings on retrospective evaluations of temporal sequences, but adopting such a framework also extends research in this domain. The findings from this research suggest that a memory-based structure can explain a substantial portion of how consumers evaluate past experiences that consist of series of outcomes spaced over time. In addition to accounting for past findings such as a preference for improving over declining temporal sequences and the important role of peak (both high intensity and unique) experiences, this dissertation demonstrates that
imposing a delay prior to retrospective evaluations can create a preference reversal due to the reduced accessibility of final or common instances. Further, the findings from this dissertation demonstrate that the adoption of a memory-based framework facilitates the systematic prediction of the impact of previously unstudied variables in this domain, such as similarity and repetition of temporal sequence components, on consumer evaluations of extended experiences.

From a theoretical standpoint, this dissertation contributes to the temporal sequences literature by providing a structure based on memory and learning theory to better understand how consumers form global retrospective evaluations of an experience. The finding that accessibility of affective events is responsible for how consumers evaluate experiences not only accounts for contradictory findings in the literature, but an established memory-based framework also allows marketers to make predictions about temporal sequence evaluations that would not be possible from the current set of findings in this domain. From a managerial perspective, this dissertation provides an understanding of how consumer evaluations of product and service experiences that extend over time may be enhanced.
Dedicated to my loving family
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CHAPTER 1

INTRODUCTION

“...Selected aspects of an experience are encoded and others ignored due to selective attention or memory mechanisms,” (Ariely and Carmon 2000, 198).

As people realize that events do not happen in pure isolation, researchers are placing more importance on studying experiences that consist of a series of outcomes spaced over time, known as temporal sequences (Loewenstein and Prelec 1993). For example, if a consumer goes on vacation, a variety of distinct incidents may occur that will ultimately lead to an overall evaluation of the trip. The consumer may go out to eat, see a show, or simply lay by the pool. Retrospective ratings of varied experiences like this one not only reflect the utility derived from an experience retrospectively, but they also impact a consumer’s future purchase intentions. Therefore, many researchers have focused on understanding which aspects of an experience consumers use when forming global retrospective evaluations (e.g., Ariely and Zauberman 2003).

The findings from research across a variety of different contexts, such as pain and health concerns (e.g., Redelmeier and Kahneman 1996), services (e.g., Ariely and Zauberman 2003), and advertising (e.g., Baumgartner, Sujan and Padgett 1997) indicate that people form global retrospective ratings of an experience using salient characteristics
of the experience, such as the peak intensity, the end intensity, and the trend (Ariely, Kahneman, and Loewenstein 2000). However, there appears to be little consensus on which characteristics impact retrospective evaluations of temporal sequences the most at any given time. For example, some research has indicated that the beginning of an experience heavily impacts retrospective evaluations (e.g., Ariely and Zauberman 2000), whereas other research has suggested that the end of an experience, not the beginning, has the largest impact on global evaluations of a past experience (e.g., Redelmeier and Kahneman 1996). Thus, research on temporal sequences has resulted in inconsistencies over which variables have the greatest impact on consumers’ retrospective evaluations of extended experiences.

Despite the prevalence of research focused on the predictors of temporal sequence evaluations, explanations as to why these effects occur have been relatively sparse (e.g., Ariely and Carmon 2000; Baumgartner et al. 1997), and have been advanced more as a way to explain a particular study’s findings than to provide a framework for understanding temporal sequence effects in general. The lack of understanding of the underlying mechanism responsible for consumers’ retrospective evaluations of temporal sequences has resulted in a proliferation of variables with no overall structure to account for inconsistencies in the impact of certain variables over others. Hence, a parsimonious, unified framework to better understand how consumers form retrospective evaluations of temporal sequences is called for.
THE LITERATURE

Temporal Sequence Evaluations

Past research has examined predictors of temporal sequence evaluations using a variety of different measurement techniques. Specifically, three factors distinguish research within the temporal sequences domain: the type measurement, the time of the measurement, and the nature of the extended experience (see figure 1.1). First, researchers have utilized either on-line evaluations (e.g., Ariely and Zauberman 2003; Ariely 1998; Fredrickson and Kahneman 1993) or memory-based evaluations (e.g., Kahneman et al. 1993; Redelmeier and Kahneman 1996; Ariely and Zauberman 2000) to obtain a consumer assessment of a temporal sequence. On-line or momentary ratings are evaluations assessed during an experience that are used to understand a consumer’s affective valuation of the experience while it is occurring (i.e., experienced utility) (Schreiber and Kahneman 2000). Memory-based evaluations are assessments of a past temporal sequence that are formed by requiring consumers to think back to a particular experience. That is, the experience has already occurred and is no longer ongoing. Past research has shown that these online and memory-based evaluations do not always coincide (e.g., Redelmeier and Kahneman 1996).

1 The factors that characterize temporal sequences research are not mutually exclusive.
Researchers have also varied the timing of consumers’ global evaluations of a temporal sequence in relation to the experience. Specifically, past research has assessed consumer judgments prior to an experience (i.e., prospective ratings) (e.g., Savitsky et al. 1998; Soman 2003; Lovallo and Kahneman 2000) or following an experience (i.e., retrospective ratings) (e.g., Redelmeier and Kahneman 1996; Baumgartner et al. 1997; Lau-Gesk 2005). Prospective ratings attempt to capture what consumers believe the experienced utility of outcomes will be before the experience occurs (i.e., predicted utility) (Ariely and Zauberman 2003). Retrospective ratings are used to capture consumers’ global evaluations of a past episode (i.e., remembered utility) (Schreiber and Kahneman 2000).

As with the type of measurement utilized, the timing of evaluations in relation to the experience has been shown to result in differences in consumers’ evaluations of temporal sequences (March 1978; Huber et al. 1997; Brickman et al. 1978). Findings from this research have suggested that people may use different types of information to evaluate experiences from different points in time, resulting in the apparent inconsistencies. Prospective evaluations are presumed to result from a person’s propensity to savor the expectation of a pleasant encounter and dread the future pain of an unpleasant experience (Loewenstein 1987), whereas retrospective evaluations of continuous experiences are typically developed using salient features of an experience (Ariely and Zauberman 2003).

A final factor that distinguishes studies within temporal sequences research is the use of actual experiences versus hypothetical experiences. Actual experiences are those experiences that are real for the consumer, such as taking a vacation. Hypothetical
experiences are those experiences which are simulated for the consumer, such as imagining taking a vacation. Researchers have utilized both actual (e.g., Fredrickson and Kahneman 1993; Ariely 1998; Ariely and Zauberman 2000) and hypothetical experiences (e.g., Varey and Kahneman 1992; Loewenstein and Prelec 1993; Ariely and Zauberman 2003) when studying the predictors of temporal sequence evaluations. Unlike the previously-addressed characteristics of temporal sequence research, past research has shown that the use of actual versus hypothetical experiences produces a comparable pattern of results (e.g., Ariely and Zauberman 2000).

The different measurement techniques that have been utilized in temporal sequences research, have, in some cases, resulted in different predictors of temporal sequence evaluations; therefore, in this dissertation we will focus on a subset of these measurement factors when developing a framework to account for consumers’ evaluations of temporal sequences. Specifically, the focus of this dissertation will be on understanding how consumers form memory-based, retrospective evaluations of hypothetical extended experiences. We will not focus on how consumers form on-line evaluations or prospective evaluations. Also, while this dissertation will primarily utilize hypothetical experiences to test our framework, we will make use of actual experiences in one study of this dissertation to demonstrate consistency across hypothetical and actual experiences.
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Figure 1.1: Temporal Sequences Research Domain Summary
Memory-Based Framework

Past research on retrospective evaluations of temporal sequences has focused on how people integrate the diverse experiences that are part of one event when they are asked to evaluate the entire event globally. Several variables, such as the peak intensity, the end, and the trend, and how they affect overall global retrospective evaluations of temporal sequences, have been studied in this literature (e.g., Ariely and Carmon 2000). It is evident from past research that overall evaluations are determined by numerous aspects of the sequence of experiences. What is missing, though, is a framework that unites these variables, explains current findings, and extends them further. Such a framework that is based on memory research will be presented next.

Consider an individual who has experienced an event that consists of a sequence of experiences (e.g., a vacation). When the individual is asked to evaluate that event, he or she will base their evaluations on the various experiences about that event that they can remember². For example, an individual who is asked about her vacation may first recall various experiences during the vacation (e.g., snorkeling, amusement park visit, dining at Hard Rock Café, etc.), and combine her evaluations of these experiences into an overall assessment of the vacation. Thus, factors that make experiences memorable will

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² We assume that the individual has not expressed an evaluation earlier. If an evaluation has been expressed, it is possible that the individual might just recall the evaluation and not rely on their memory for various aspects of the event.
cause them to be recalled, and those experiences that are recalled will affect the
evaluation of the overall event (e.g., Lynch and Srull 1982; Hastie and Park 1986)\(^3\).

We contend that the findings in temporal sequencing literature can be explained
by such a framework. Specifically, factors that have been shown to affect recall of
information in the memory literature will also be able to explain the findings in the
temporal sequencing literature.

PURPOSE OF DISSERTATION

While much attention has been given recently to studying temporal sequences of
events, few have offered explanations to account for how people integrate these events
into a holistic evaluation of the experience, and virtually no attention has been given to
the underlying mechanism involved. In this dissertation, we propose and test a memory-
based framework that explains how consumers form retrospective evaluations of a
temporal sequence of experiences. We show that our framework can explain the current
findings, and under certain predicted conditions eliminate or reverse the effects. Based on
an understanding of how consumers form global evaluations of a past experience, we use
the memory-based framework to propose and test extensions of temporal sequences

\(^3\) There are two stages in the process that we have outlined here. First, individual experiences constituting
an event have to be recalled by a person; next, different weights may be assigned to what is recalled as they
are combined to arrive at an overall evaluation (e.g., Anderson 1982). We focus only on the first stage in
this research because the second stage is driven by what is recalled in the first stage.
research. Specifically, we utilize the proposed framework to systematically predict how previously unstudied variables in this domain affect consumer evaluations of extended experiences.

From a theoretical standpoint, this dissertation contributes to the temporal sequences literature by providing a structure based on memory and learning theory to better understand how consumers form global retrospective evaluations of an experience. The finding that accessibility of affective events is responsible for how consumers evaluate experiences not only accounts for contradictory findings in the literature, but an established memory-based framework also allows marketers to make predictions about temporal sequence evaluations that would not be possible from the current set of findings in this domain. From a managerial perspective, this dissertation provides an understanding of how consumer evaluations of product and service experiences that extend over time may be enhanced.

APPRAOCH OF DISSERTATION

This dissertation begins by reviewing the literature relevant to developing a framework for understanding how consumers evaluate a past extended experience. Specifically, this dissertation focuses on two important streams of literature in marketing and cognitive psychology. First, we review the literature on temporal sequences and explore the characteristics found to impact global retrospective evaluations of extended
experiences. We then draw on literature from cognitive psychology related to free recall to understand the relationship between memory and consumers’ evaluations of temporal sequences.

We report seven empirical studies that test our research propositions. Studies 1 through 3 draw on literature in memory and learning to account for the impact of temporal sequence characteristics on overall retrospective evaluations of an extended experience. Specifically, Studies 1a and 1b account for the impact of the beginning intensity, end intensity, and trend of an experience, and Studies 2 and 3 account for the impact of the peak intensity. Studies 4 and 5 examine the ability of the proposed memory-based framework to systematically predict how previously unstudied variables in the temporal sequences domain impact retrospective evaluations. Study 4 examines the impact of similarity of events on evaluations, while Study 5 explores the impact of repeated events on evaluations. Finally, Study 6 utilizes real experiences to assess the applicability of the proposed framework to both hypothetical and actual temporal sequences.

The remainder of this dissertation is organized as follows. Chapter 2 reviews the literature pertinent to examining the underlying mechanism for consumers’ retrospective evaluations of temporal sequence. Chapters 3 develops and tests the hypotheses related to testing the proposed memory-based framework. Chapter 4 discusses the logic, conduct, and findings of two studies that extend the current temporal sequence findings using the proposed framework. Chapter 5 examines the ability of the memory-based framework to account for evaluations of actual experiences. Finally, chapter 6 summarizes the findings.
and the issues that this dissertation addresses. Additionally, this chapter outlines the theoretical and practical contributions of this dissertation and discusses areas for future research.
CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to examine the existing literature on temporal sequences and memory. The goal of this review is to develop a framework that will account for consumers’ retrospective evaluations of temporal sequences. We begin by reviewing the impact of a studied set of variables on retrospective evaluations of temporal sequences.

TEMPORAL SEQUENCES

Exactly what aspects of a stream of experiences that constitute an event (e.g., vacation, birthday party) people rely on to form an overall impression of the event has been the subject of study in the temporal sequencing literature. In general, a variety of studies in this area suggest that when people evaluate an event retrospectively, the evaluation is likely driven by the peak intensity of the experience, the trend of the experience (going from favorable to unfavorable or vice-versa) or the end intensity of the experience (positive or negative) (Ariely, Kahneman, and Loewenstein 2000). Several
more variables, and how they affect overall evaluations of a temporal sequence, have been studied in this literature. The first and middle panels of Appendix A show a list of the variables and the nature of the effect that has been reported in this literature. Each of these variables will be described in this section.

Trend

The trend of an experience has been shown to impact evaluations of experiences. In particular, research has shown that people prefer sequences of events that are improving to sequences of events that are declining, known as negative time preference (Loewenstein and Prelec 1993). Researchers have found support for the existence of negative time preference using a variety of contexts such as wage profiles (e.g., Loewenstein and Sicherman 1991), health sequences (e.g., Chapman 2000), and discomfort or pain (e.g., Ariely 1998; Varey and Kahneman 1992). For example, Loewenstein and Sicherman (1991) examined the impact of trend in the context of wage profiles and showed that people prefer wage profiles that increase over time rather than wage profiles that decrease over time, despite the fact that decreasing wage profiles are present-value-maximizing. Varey and Kahneman (1992) examined the impact of trend in the context of pain and demonstrated that keeping the overall sum of discomfort the same, there was a strong preference for sequences of decreasing discomfort. Ariely (1998) also examined patterns of pain using heat and mechanical pressure to determine how people evaluate temporal sequences. Across two studies, the author showed that patterns of increasing pain were evaluated as the most painful. Patterns of decreasing pain intensity
were evaluated as the least painful. In general, the findings indicate that the most
important predictor of overall pain is the trend, especially the end of the trend.

Peak and End

The end intensity of an experience, as suggested in Ariely (1998), and the peak
intensity of an experience are found to be weighted more by respondents forming
retrospective evaluations of that experience. Fredrickson and Kahneman (1993) exposed
participants to videotapes containing aversive and pleasant film clips. Participants were
asked to report global evaluations following each clip. The results from study 1 showed
that the best predictor of global evaluation of the film clips was the weighted average of
the most intense part of the experience (peak) and the final intensity (end). Research
using pain as the context has also confirmed the high correlation between the peak and
end intensities and global retrospective evaluations of an experience (e.g., Kahneman et
al. 1993; Redelmeier and Kahneman 1996; Schreiber and Kahneman 2000). For example,
Redelmeier and Kahneman (1996) asked patients undergoing either a colonoscopy or a
lithotripsy to provide real-time and retrospective evaluations of pain. Retrospective
evaluations of pain had strong positive correlations with the peak intensity and the end
intensity of the experience. In Kahneman et al. (1993) participants were instructed to
either place their hands in cold water that was 14-degrees C for 60 seconds or in water
that was 14-degrees C for 60 seconds and 15-degrees C for the remaining 30 seconds.
The majority of respondents said that when given a choice, they would choose to repeat
the longer trial. The authors concluded that adding a period of diminished discomfort to
the end of the unpleasant experience resulted in a more favorable retrospective evaluation of the experience because it raised the end intensity of the experience. The impact of the peak and end intensities on retrospective evaluations has even been shown to extend to global retrospective evaluations of advertisements, one of the few extensions of this phenomenon in the marketing domain (Baumgartner et al. 1997).

While the trend and the peak and end intensities are shown to be the most important predictors of continuous experience retrospective evaluations, there is evidence to suggest that the beginning of the experience may also contribute to retrospective evaluations. Ariely and Zauberman (2000) conducted two experiments using annoying sounds and performance feedback. Participants were asked to evaluate experiences that contained a single trend (i.e., increasing or decreasing) or multiple trends (i.e., increasing then decreasing or decreasing than increasing). The findings showed that a continuous experience without momentary ratings resulted in a large impact of pattern on overall evaluation, consistent with trend effects. However, the authors also discovered differences between the evaluations of the single-trend sequences and the evaluations of two-trend sequences. Specifically, they found that the difference between evaluations of the increasing and decreasing single-trend sequences was larger than the difference between evaluations of the increasing then decreasing and decreasing then increasing two-trend sequences. The finding that the disparity between evaluations of the single-trend sequences (increasing versus decreasing) was greater than the disparity between
evaluations of the two-trend sequences (decreasing then increasing versus increasing then decreasing) was taken as evidence that in addition to the peak and end intensities, the initial part of the experience is also important in determining retrospective evaluations.

Duration

Duration of the experience is surprisingly not an important predictor of temporal sequence evaluation. Duration neglect, or insensitivity to the duration of an experience when forming evaluations of that experience, is a phenomenon that has been consistently demonstrated in the literature (e.g., Fredrickson and Kahneman 1993). For example, Redelmeier and Kahneman (1996) found no correlation between the length of a person’s colonoscopy or lithotripsy and his or her retrospective evaluation of the medical procedure. In an experiment that induced pain by asking participants to submerge their hands in cold water, Kahneman et al. (1993) discovered that the majority of respondents said that when given a choice, they would prefer to repeat the longer trial with the short period at the end during which the water temperature increased by 1-degree C, not the shorter trial. Varey and Kahneman (1992) similarly found a striking neglect of duration when respondents were ask to retrospectively evaluate perceived pain of hypothetical aversive experiences, such as standing in an uncomfortable position and listening to a continuous high-pitched noise. Combined, these findings suggest that duration is of an extended experience does not seem to impact global retrospective evaluations of that experience.
Though overall experience duration does not affect temporal sequence judgments, velocity, or the speed with which a sequence changes in intensity, is an important predictor of retrospective evaluations. Hsee and Abelson (1991) suggested that when evaluating temporal sequences, the speed with which the sequence improves is as important as the amount of improvement when determining preference. In support of this assertion, Baumgartner et al. (1997) found that global evaluations of 30 to 90 second television commercials were significantly correlated with the pace of improvement of the emotional advertisement experience. Additional research has provided evident that in addition to actual improvement of a sequence, perception of progress towards the destination state (i.e., virtual progress) impacts consumers’ evaluations of an extended experience (Soman and Shi 2003). For example, Soman and Shi (2003) measured relative preferences and choices between hypothetical services with an elapsed time, such as medical treatments and travel options. The results showed that consumers were much less likely to choose a path that contained idle time or points of negative displacement. Consumers were more willing to choose longer paths (i.e., longer elapsed time) with higher virtual progress. Using descriptions of travel routes, Soman (2003) similarly demonstrated that retrospective evaluations are heavily impacted by obstacles (i.e., delays in the sequence, periods of negative progress in the sequence, and periods of low perceived progress) present later versus earlier in a temporal sequence. Together, these studies illustrate the importance of perceived sequence improvement in predicting temporal experience evaluations.
Partition Location

If an experience is partitioned into components, the location of the partitions is an important predictor of overall evaluation. Ariely and Zauberman (2003) conducted four experiments to examine consumers’ evaluations of continuous and partitioned service experiences. In experiment 4 subjects were shown a simulated service experience that was visually presented via a line graph that revealed itself over a 24 hour period. Respondents were asked to provide a 90% confidence interval for the predicted service over the next 24 hour period. The results indicated that measurements of predicted service quality were higher when the experience was partitioned at the peaks rather than the troughs.

Distance Between Sequence and Evaluation

Predictors of temporal sequence evaluations are not solely characteristics of the sequence, whether continuous or partitioned; temporal distance between the evaluation and the experience performance has proven to be an important predictor of evaluations. For example, Gilovich, Kerr, and Medvec (1993) found that confidence about future performance declines as the “moment of truth” (i.e., time to perform) draws near. When students were asked on the first day of class about their future performance on the midterm, they expressed greater confidence in their performance than when asked on the day of the exam about their future performance. Study 3 examined the same confidence
effects retrospectively and found that subjects reported being more confident that they would have performed well at a task when they were asked a long time after performing the task had passed. Overall, the authors discovered that people are much more optimistic about their performance the farther they are away from the moment of truth (either prospectively or retrospectively), a phenomenon later termed fading optimism. In another study, Savitsky et al. (1998) placed participants in either a distant (i.e., task temporally far) or a proximate (i.e., task temporally near) condition. Subjects in the proximate condition expressed less confidence in their future task performance than subjects in the distant condition. Monga and Houston (2006) extended this phenomenon into the consumer domain and found additional support for its existence. Their research demonstrated that for a chosen product, product expectations increased after choice and decreased when performance of the product was about to be revealed, resulting in an inverted-U shaped pattern, consistent with fading optimism. When the performance revelation was distant, optimism increased, but when revelation was imminent, optimism decreased (i.e., faded).

Several predictors of temporal sequence evaluations have been found in the literature. Evidence shows that certain characteristics of the sequence (i.e., trend, peak intensity, end intensity, velocity, and partition location) may impact evaluations. Some predictors that are not solely characteristics of the sequence (i.e., distance between evaluation and experience) also appear to be important in assessing evaluations. Finally, duration of the sequence does not seem to be important in predicting overall evaluations. Next, we will examine some mitigating factors of the effect of the predictors on sequence evaluation.
Real-Time Ratings/Segments

Measuring real-time ratings during an experience and/or segmenting an experience has shown to result in people abandoning the previously-presented predictors in favor of other alternatives. For example, Ariely (1998) instructed subjects to provide on-line ratings of pain induced by heat and mechanical pressure, resulting in a decrease in the impact of the sequence trend on global retrospective evaluations of the painful experience. Instead, overall evaluations of pain were heavily influence by the mean intensity. Ariely and Zauberman (2000) similarly found a decreased impact of the trend of the sequence when participants were instructed to provide momentary ratings during a segmented experience. When subjects were asked to evaluate a continuous aversive experience (i.e., annoying sounds, performance feedback) without providing momentary ratings, overall evaluations exhibited a large impact of the sequence pattern, consistent with trend effects presented previously. However, like Ariely (1998), when subjects were instructed to provide on-line ratings of segmented aversive experiences, their global retrospective evaluations relied more heavily on the mean intensity for each segment than the trend of the sequence. Ariely and Zauberman (2003) found additional support for the impact of segments. Respondents were asked to evaluate visually presented service experiences that unfolded on a line graph. When the experiences were partitioned into components, retrospective evaluations were influence less by the trend of the sequences,
as the number of segments increased. As with momentary evaluations, retrospective evaluations of partitioned experiences were based more heavily on mean intensity of each segment

Expertise

The final mitigating factor suggested by the literature is expertise. Huber et al. (1997) proposed that repeated, not novel, decisions are likely to result in an improvement of preference prediction accuracy, suggesting that differences may arise between novices and experts in terms of the information that they use to evaluate experiences. Consistent with this proposition, Lau-Gesk (2005) found that differences in expertise do in fact impact evaluations of temporal sequences. In her study, Lau-Gesk (2005) used aromatherapy to create an affective experience and varied source similarity (high vs. low), proximity (close vs. far), and novelty of the experience (continuous factor). Source similarity was varied by asking subjects to focus on the similarities or differences between the different aromatherapy scents presented. Following the experience, respondents’ evaluations were assessed. The results showed that respondents preferred to experience positive and negative affect in close proximity when source similarity was low. However, the reverse was true when source similarity was high. When source similarity was high, experiencing positive and negative affect in close proximity led to an unfavorable evaluation of the experience. Instead, final trend more heavily impacted evaluations, and improving sequences were preferred. This pattern of results was
eliminated for individuals for whom the experience was not novel seemingly because experience assists individuals in discriminating similar and different affective experiences.

In examining the research on temporal sequences, two factors are shown to mitigate the impact of predictors on overall sequence evaluation: real-time ratings/segments and expertise. In the presence of these mitigating factors, people seem to adopt alternative strategies (e.g., mean intensity of each segment) to evaluate an experience. The next section discusses potential explanations responsible for the temporal sequence effects presented above that have been proposed and, in some cases, tested in past research.

Explanations for Temporal Sequence Effects

Researchers have yet to fully understand the underlying mechanisms responsible for these temporal sequence effects; however, some researchers have offered potential explanations for evaluations of extended experiences (e.g., Ariely and Carmon 2000; Baumgartner et al. 1997). For example, Baumgartner et al. (1997) tested adaptation as a potential underlying mechanism in the evaluation of an ad context. Their research proposed that consumers adapt to a level of emotional experience and evaluate each succeeding emotional experience in the event as a gain or a loss accordingly, consistent with Prospect Theory (Kahneman and Tversky 1979). Thus, an improvement in an experience relative to the last experience in the event is perceived as a gain, and a decline in an experience relative to the last experience in the event is perceived as a loss,
resulting in consumers’ preferences for improving events with high ends and delayed peaks of emotional experience. Despite their assertions, the researchers did not find conclusive evidence in support of the adaptation explanation. Ariely and Carmon (2000) also offered potential explanations for temporal sequence effects, although the researchers did not test the ability of their explanations to account for consumers’ retrospective evaluations of extended experiences. Specifically, Ariely and Carmon (2000) suggested three reasons why gestalt characteristics (e.g., peak and end intensity and trend) may affect a person’s summary judgment of a sequence: extrapolation, encoding, and heuristics. The extrapolation-based explanation suggests that summary evaluations are formed with the goal of predicting future states. The encoding-based explanation proposes that consumers encode only certain aspects of an experience “due to selective attention or memory mechanisms” (Ariely and Carmon 2000, 198). Finally, the heuristic explanation implies that consumers’ cognitive limitations lead to the use of the trend improvement as a heuristic when evaluating extended experiences. Combined, this research demonstrates that one area that is underdeveloped is the temporal sequences research that examines reasons why the studied sequence characteristics impact overall evaluations of extended experiences in the manner in which they do. Several researchers have proposed that “an important direction for future research is to pursue a better understanding of the mechanisms by which gestalt characteristics affect summary judgments” (Ariely and Carmon 2000, 198).

We contend that a memory-based framework can account for a substantial portion of how consumers form retrospective evaluations of temporal sequences. That is, certain characteristics of a temporal experience are better remembered than others, giving rise to
a particular retrospective evaluation of that experience. Thus, we now turn to a discussion on the important findings in the memory literature that are relevant to this research.

MEMORY REVIEW

Memory researchers have attempted to understand the various facets of memory using a variety of tasks, such as free recall. In free recall subjects are provided with a list of items that they may recall in any order, regardless of the order of presentation (Ashcraft 2002). In this section, we provide a thorough review of the relevant memory research findings, as they relate to free recall (which is most pertinent to the current discussion).

Primacy and recency effects

The free recall literature has consistently found that items that are presented at the beginning of a list of words, and those that are presented at the end of a list, are often remembered the most (Crowder 1976; Ashcraft 2002). The superior recall of items at the beginning of a list is called the primacy effect. The greater recall of items at the end of a list is called the recency effect. Primacy and recency effects have been demonstrated across lists presented audibly and visually (Crowder 1976). While primacy and recency effects persist across lists presented via different modalities, audibly presented lists have
been shown to exhibit a recall advantage on final items on a list (i.e., recency effect) relative to visually presented lists, a phenomenon known as the modality effect (e.g., Fergus 1969; Murdock and Walker 1969; Watkins et al. 1974).

Traditional models of memory have attributed the primacy and the recency effect to two separate storage systems in memory: short-term memory (STM) and long-term memory (LTM) (Atkinson and Shiffrin 1968; Waugh and Norman 1965; Craik and Lockhart 1972; Raaijmakers and Shiffrin 1981). LTM is a relatively permanent memory storage system. Once information has been transferred to this storage system, then it may be retrieved at any time if the appropriate retrieval cue is used to access the information from memory. Thus, any errors in accessing information stored in LTM are the result of retrieval error, not encoding error. That is, respondents that are having difficulty remembering a piece of information that is stored in LTM are simply not using the correct accessibility cue; the information is not lost from memory. STM is only a temporary storage system. Information stored in STM is accessible because this information is activated through rehearsal. In the absence of rehearsal, the information will be lost from memory through a process of decay (Nairne 2002). Thus, any errors in recalling information stored in STM may be attributed to the information no longer being in that storage system as a result of the passage of time.

In the traditional model of memory, the primacy effect is attributed to the greater elaboration that these items go through, facilitating their transfer to LTM. Specifically, the first items on a list are expected to receive the most rehearsals, which increases the probability that these items will be recalled. As the amount of rehearsal time devoted to early items on a list increases, the likelihood that these initial items will be transferred
into long-term memory (LTM) increases, making them available for later recall (e.g., Ashcraft 2002; Crowder 1976). In support of the traditional model assertions, Rundus (1971) discovered an increased number of rehearsals for earlier items by instructing subjects to perform overt rehearsal on list items. Specifically, the findings indicate that the number of rehearsals was high for early items and decreased steadily as a function of serial position. Therefore, the first items in the list received the most rehearsals, and the probability of recalling the first items was influenced by the number of rehearsals. Several other researchers corroborated the finding from Rundus (1971) that elaboration is responsible for the primacy effect. For example, Fischler, Rundus, and Atkinson (1970) found that a fixed vocal rehearsal resulted in reduced primacy. Glanzer and Cunitz (1966) showed that subjects with longer presentation rates had a higher primacy, seemingly allowing them more time to rehearse each item in the list. Finally, Glenberg et al. (1980) found that long-term primacy was lowered by discouraging cumulative rehearsal of the first few pairs.

While the primacy effect is generally attributed to elaboration in traditional models of memory, the recency effect is frequently attributed to the retention of these items in the working memory. Recall performance of the final items on a list is therefore dependent on one’s ability to retain these items in short-term memory (STM) through rehearsal. For example, Rundus and Atkinson (1970) asked subjects to rehearse items aloud, and the researchers taped the sessions. Examination of the tapes revealed that those items that were rehearsed right before the test had the highest probability of recall, accounting for the rehearsal explanation for the recency effect. Consistent with the results from Rundus and Atkinson (1970), the traditional model of memory suggests that once
respondents stop rehearsing the information in STM, then this information is lost, unless it has been transferred to LTM. When prompted for recall, respondents will recall the most available information first, which is the information that is easily accessible in STM, resulting in enhanced recency effects. If respondents are not able to rehearse items long enough to maintain them in STM until prompted for recall, then recency effects will diminish (e.g., Ashcraft 2002; Crowder 1976).

Thus, increasing the amount of time between exposure to a list and the instruction to recall the list (i.e., retention interval) decreases the recency effect, despite the continued presence of the primacy effect (e.g., Glanzer and Cunitz 1966; Postman and Phillips 1965). Consistent with this assertion, Postman and Phillips (1965) showed that recency in immediate recall decreased with time, but primacy was the same regardless of the length of the retention interval. Glanzer and Cunitz (1966) further examined the impact of delay between presentation and recall on primacy and the recency effects by instructing subjects to learn a 15-item list. Subjects were divided into three recall groups. In one group, the subjects were asked to recall the list immediately after presentation (0 sec. delay condition). In the other two groups, subjects had either a 10 second or 30 second delay prior to recall during which they were asked to perform a counting task. The findings from this study demonstrated that both groups with a delay had diminished recency relative to the no delay group. All three groups had fairly equivalent primacy, however, suggesting that the delay did not affect the primacy portion of the list.

Also, consistent with the assertions of traditional memory models, increasing the presentation rate has been shown to increase the primacy effect, while not impacting the recency effect because changes in the presentation rate are believed to affect LTM but not
STM storage (Raymond 1969). For example, Glanzer and Cunitz (1966) showed that increasing the presentation rate from 3 to 9 seconds resulted in increased recall of the first 15 items in the 20-item list but not the last 5 items. They attributed the positive relationship between presentation rate and recall performance to an increased rehearsal time. That is, they asserted the longer presentation rates afforded subjects more time to rehearse each item in the list, facilitating the transfer of these items into a more permanent LTM store for later recall. Therefore, subjects with a longer presentation rate exhibited higher primacy, but no differences in recency.

Previous research on the impact of retention interval and presentation rate on primacy and recency effects offers some support to the traditional model of memory (e.g., Glanzer and Cunitz 1966); however, more recent research has offered evidence that STM may remain constant or even improve after a delay in some cases (e.g., Nairne 2002; Healy and McNamara 1996), providing support against the traditional model of memory. For example, Bjork and Whitten (1974) demonstrated a long-term recency effect, which is the presence of a recency effect following a delay. In this research subjects were instructed to learn a list of 13 pairs of words. The nature of the interval following each word pair was varied such that half of the subjects had a 12 second mental arithmetic task after every pair, and the other half had an uninterrupted interval. In the distractor condition, each pair of words was preceded and followed by a distractor activity. The interval length was also varied such that half of the subjects had a 30 second interval and the other half of the subjects had no interval (i.e., immediate recall). Recency effects were obtained when a period of distractor activity was added after the presentation of each item in a list. Bjork and Whitten (1974) explained this phenomenon by assuming that a
memory trace’s distinctiveness partly determines how easily it can be retrieved. They suggested that the distractor activity keeps items separate, making their ordering distinct for a longer time, leading to the recency effect. Howard and Kahana (1999) similarly observed the lag recency effect in delayed and continuous-distractor free recall. They proposed that a single-store model of memory can explain both the recency effect and the lag recency effect. In their proposed single-store model, “the context that is retrieved with each recalled item serves as a cue for subsequent recalls” (Howard and Kahana 1999, 923) Finally, Glenberg (1984) demonstrated a long-term recency effect for lists presented audibly, as well as visually. He showed that modality effects persisted despite the separation of word pairs by a distractor activity, suggesting that the modality effect may not be attributed to any type of limited capacity storage system as traditional models of memory proposed. Evidence that the recency effect may persist following a delay (e.g., Bjork and Whitten 1974; Glenberg; 1984; Howard and Kahana 1999), has resulted in a reassessment of the underlying mechanism responsible for primacy and recency effects.

Thus, while the traditional model of memory asserts that the primacy and the recency effect arise from elaboration and keeping information activated in STM via rehearsal, respectively, (e.g., Atkinson and Shiffrin 1968; Waugh and Norman 1965; Craik and Lockhart 1972; Raaijmakers and Shiffrin 1981), the most recent model of memory (i.e., modern model) has proposed that both the primacy and recency effects are attributed to the use of contextual or temporal cues (e.g., Greene 1986). That is, STM may be cue-driven like LTM, with different retrieval cues in effect for each memory store (Nairne 2002). Thus, the modern model of memory asserts that “people forget with an increasing delay because retrieval cues change with time – not because of spontaneous
decay,” (p.74, Nairne 2002). Consistent with this perspective, Glenberg et al. (1980) proposed that recency is due to a retrieval strategy that relies on contextual-temporal cues available at recall rather than a STM interpretation of long-term recency. According to their perspective “recall is determined by how well the stored encoding context of the item can be reactivated by the contextual-temporal cues present at the test,” (p. 363). Local contextual components are quickly changing and encode fleeting details of the context (i.e., momentary impressions of the stimuli, task, and experimenter). Global contextual components are slowly changing and encode more stable features (i.e., affective state). Local contextual components associated with the final items on a list (i.e., recency items) tend to be more available at the time of the recall test than local contextual components associated with items in earlier positions on a list. Instead, earlier items on a list must rely on global contextual components, which are not as effective cues. If enough details (i.e., local contextual components) are retrieved at the time of the recall test so that the recency items appear different from other items on the list, then recency is found and the items seem well-ordered. When only global components are retrieved, then all items appear to have the same context, order information is lost, and there is no recency effect. Put simply, the context associated with a memory task is always changing (i.e., temperature, location of experimenter in a room, etc.), but the context in which a list is being recalled is most like the context in which the last few items of a list are learned because of the relatively less temporal separation between these events. The context acts as an effective retrieval cue for the final items, and as a result, the last few items are easiest to retrieve from memory, facilitating the recency effect.
Several researchers have further explored ordinal cues (i.e., temporal tags on items) as part of the context that may facilitate retrieval of list items (Neath 1993; Bower 1971; Murdock 1960). Temporal distinctiveness is measured by taking the summation of temporal distances from other items in a presentation group (Neath 1993). Research on temporal distinctiveness has suggested that memory is better for early and final items (vs. middle items) because these items are distinctive due to their position in time. Early items may be temporally distinctive because they are not preceded by other items, and final items may be temporally distinctive because they are not followed by other items.

Additional research has proposed that ordinal cues may also be responsible for the modality effect (e.g., Greene 1986). Specifically, recent research has suggested that auditory items versus visual items are more likely to result in the use of ordinal information as a retrieval cue, resulting in the enhanced recency effect with audibly presented lists. While some researchers have attempted to distinguish between contextual and temporal cues, the generally accepted theory of memory asserts that it is impossible to distinguish between these cues since ordinal cues are part of the context (e.g., Greene 1986). Therefore, the temporal-contextual theory, a view that supports the idea that subjects may use a combination of both ordinal and contextual information during recall, is currently the most accepted explanation for of the primacy effect and the recency effect.

Von Restorff effect

Several papers have corroborated the finding that isolating an item on a list facilitates learning of that item, a phenomenon known as the von Restorff effect (von
Restorff 1933; Neath 1993; Rundus 1971; see Wallace 1965 for a review). Neath (1993) demonstrated this effect by instructing subjects to learn a list of words that contained a normal target item or an isolated target item with a larger font size. The findings indicated that recall performance on the isolated item was higher than the normal item. Similar results were obtained in a series of diary studies. Brewer (1988) instructed subjects to record daily events in a diary, and an alarm indicated which events should be recorded. They were later tested for their memory of these events, and the findings demonstrated that the best predictor that an action was remembered was uniqueness (i.e., infrequent events and locations). Wagenaar (1986) also conducted a diary study in which he recorded 2,400 events from his own life over the course of six years. He later attempted to recall events by cuing himself with different aspects of the event. The results indicated that retention of the events was related to their salience. Combined, these studies suggest that unique items are remembered better than other items.

Past research has further demonstrated that isolated items have greater impact on judgment due to increased memory for these items (Hamilton and Gifford 1976). Hamilton and Gifford (1976) presented subjects with a series of descriptive sentences about two groups, A and B. Both groups had an equal ratio of positive to negative sentences about group members, with there being fewer negative sentences. Also, there were fewer descriptors for group B, which made group B the “minority group.” After being exposed to all descriptors for groups A and B, respondents were asked to estimate the frequency of negative behaviors for each group and evaluate each group. The
researchers discovered that respondents overestimated the number of negative behaviors associated with the minority group, B, and evaluated this group more negatively than group A.

When an item is unique, research has demonstrated consistently that memory performance on that particular item increases, but there is also evidence to suggest that distinctive items impair overall list performance (Rundus 1971). In experiment two of Rundus (1971), some items on the lists (0, 1, 2, or 3 words) were printed in red to make them more distinctive, and the remaining items were printed in black. The probability of recall was higher for these distinctive items than for the normal items. However, as the number of red items on the list increased, recall for the black items decreased. The results indicated that the average number of rehearsals was higher for the distinctive items (i.e., red print) than for the normal items (i.e., black print). In addition, the number of rehearsals for the normal items decreased when distinctive items were present in the to-be-remembered list. The average number of rehearsals was especially low for items immediately after the red items, suggesting lower memory performance for items in proximity to distinctive items. Overall, the findings from Rundus (1971) suggest that the von Restorff effect is attributed to rehearsal differences.

Interference effects

The memory literature has consistently found that presenting a list of items that is similar to another presented list of items reduces the accessibility of the list of items that is stored in long-term memory (e.g., Tulving 1966). The inhibited retrieval of target
information by other information has been labeled interference. Retrieval of information may be inhibited by the learning of additional information post hoc, a phenomenon known as retroactive interference (Bower 1978; Underwood 1945), and retrieval of information may be inhibited by previously-learned information, a phenomenon termed proactive interference (Whitely 1927; Whitely and Blankenship 1936; Postman and Hasher 1972). Several researchers have demonstrated the existence of interference using paired-associate learning tasks. For example, Bower (1978) demonstrated proactive and retroactive interference using paired associate learning (A-B) with meaningful sentences that consisted of a profession name as the stimulus (A) and a verb phrase as a response (B). Subjects learned twenty sentences, and then they were given a new sentence task after the original task. In the new sentence task, subjects were instructed to learn sentences with the same profession name and a new response (A-D condition) the same profession name and a shuffled response (A-Br condition), or a completely different profession name and response (C-D condition). Additionally, some subjects were instructed not to perform the second sentence task (Rest condition). The findings indicated that task A-Br resulted in the worst forward and backward retention of the information and the greatest negative transfer. Subjects in the Rest condition exhibited the least amount of proactive interference, followed by the C-D condition, and the A-D condition. Finally, retroactive interference was equally high for the Rest, C-D, and A-D conditions. The existence of interference has further been demonstrated in related free recall memory tasks. For example, Postman and Hasher (1972) utilized multiple lists without paired-associate learning to examine proactive interference. The experimental group was given two lists, and subjects in this group was asked to recall only the second
list, the second list knowing that they would have to recall the first list afterwards, or both lists. Among these groups, the subjects that recalled only the second list had superior recall, providing additional support for interference.

Researchers have demonstrated that interference does not occur because information is unlearned or forgotten; interference occurs because some other information is inhibiting retrieval of stimulus information (i.e., Ashcraft 2002). Specifically, interference occurs “not just because there have been prior trials, but because these prior trials share some characteristics of the current trial” (Crowder 1976, 203), resulting in a loss of contextual and interitem associations (Postman and Keppel 1967). For example, Brown and Atkinson (1974) found evidence of interference in a free recall task when the to-be-remembered lists were made up of the same categories, but this effect did not occur when to-be-remembered lists were made up of discrete subcategories.

Additional research has confirmed that proactive and retroactive interference are enhanced with information that is conceptually similar (e.g., Blumenthal and Robbins 1977; Shuell 1968; Whitely and Blankenship 1934). Shuell (1968) instructed participants to learn two lists of nouns that consisted of either different examples of the same conceptual categories or different conceptual categories. The findings indicated that interference was higher when the lists were conceptually the same. Blumenthal and Robbins (1977) further provided evidence that proactive interference is attenuated when items on the first list are more homogenous than items from both lists taken together. They instructed subjects to learn multiple passages, and their findings demonstrated release from proactive interference if the topic changed on the second to last passage given to subjects. Thus, similarity of to-be-remembered information has proven to be a
critical factor in assessing how accessible learned information will be at a later time, suggesting that an individual will have a higher probability of retrieving learned information if this information is differentiated from other learned information.

Several researchers have found that topic similarity facilitates interference from one task to another (e.g., Brown and Atkinson 1974; Blumenthal and Robbins 1977), prompting other researchers to investigate the explanations for this phenomenon. Anderson and Bower (1972) proposed a model for understanding why interlist similarity hinders recall performance. Specifically, they suggest that subjects use a two-step model of free recall in which words are accessed via a retrieval process and recognized as to-be-remembered words by associated “list markers.” As list overlapping increases, the ability to retrieve words increases, but the ability to recognize words decreases, resulting in retarded performance. Shuell (1968) further argues that retroactive interference is related to similarity of organizational cues. He suggests that interference is enhanced for similar lists because when lists are conceptually similar, retroactive interference involves the loss of the category as well as the word information, while when lists are conceptually different, retroactive interference only involves the loss of category information.

In addition to similarity, the number of trials that subjects are given on multiple lists and single lists affects information retrieval. When two lists are presented, performance on the first list has been shown to decrease as the number of trials on the second list increases (i.e., retroactive interference) (Postman and Keppel 1967; Underwood 1945). In experiment A, Underwood (1945) gave subjects a list of paired adjectives to learn, and then they learned 2, 4, or 6 other lists (i.e., 4 trials each). Subjects were then asked to relearn the original list. The results indicate that retroactive
interference increased as the number of intervening lists increased. When subjects are given multiple lists, proactive interference has similarly been shown to increase as number of successive lists increases (Wipf and Web 1962; Shuell and Koehler 1970; Underwood 1945). In experiment C, Underwood (1945) instructed subjects to learn 2, 4, or 6 lists. Then, they learned the list that had been used as the original list in the previous experiments. Subjects were given a 25 minute rest before being asked to recall the list learned in the second stage of this experiment (i.e., original list in other experiments). Proactive interference increased as the number of prior lists increased. Though an increase in the successive number of trials can be detrimental to performance when multiple lists are given, an increase in the number of trials can enhance single list performance (Postman and Keppel 1967; Underwood, Zimmerman, and Freund 1971). Underwood et al. gave subjects a single list of 12 word items for each frequency (i.e., 1, 2, 3, 4, 5, or 6 times). The findings showed that as the number of trials on a list increased, performance on the recall task increased.

Repetition effects

The findings on spaced versus massed repetition suggest that repeating an item in a list increases retrieval ease of the item (e.g., Melton 1970; Crowder 1976), but more importantly, these findings demonstrate the significance of appropriately spacing repeated occurrences of an item (e.g., Janiszewski, Noel, and Sawyer 2003). Specifically, past research provides evidence that the probability of retrieving a repeated item increases by utilizing distributed presentation rather than massed presentation (Bahrick
repeated items are affected by numerous variables, such as the number of intervening items between repetitions, the nature of the items to-be-remembered (i.e., words versus pictures), the complexity of the repeated information, and the meaningfulness and familiarity of the repeated information (see Janiszewski et al. 2003 for a review). For example, Rundus (1971) demonstrated that the performance advantage of these repeated items was a function of lag. He gave students eleven lists of words to remember and repeated five words once on each list. The number of intervening items between repetitions (i.e., lag) was also varied (i.e., 0, 1, 2, 4, or 7 intervening items). The findings indicated that the probability of recalling repeated items increases systematically as the number of items between repetitions increases.

Several explanations for repetition’s impact on retrieval ease have been explored in the literature. Past research has suggested that spaced vs. massed repetition enhances performance possibly because of encoding variability or inattention (Crowder 1976). Encoding variability is the idea that spacing the repetitions allows for more cue-target (i.e., contextual) associations, enhancing overall recall. According to Tulving and Thomson (1973), “what is stored is determined by what is perceived and how it is encoded, and what is stored determines what retrieval cues are effective in providing access to what is stored.” If subjects can encode target items next to different target items, then they are increasing the number of contextual cues that can be used to access the repeated item in memory. Inattention is the idea that respondents do not pay much attention to an additional presentation of an item that occurs right after the initial presentation because it provides no additional information since the initial presentation is
still accessible in STM. Rundus (1971) offered a third explanation for spaced repetition advantages based on rehearsal time. He found that items repeated with a 0 lag received fewer rehearsals after the second presentation than items repeated with longer lags, and he concluded from this finding that the increased opportunity for rehearsal between presentations with longer lags led to increased rehearsal and recall.

Based on their recent meta-analysis, Janiszewski et al. (2003) suggest alternative explanations for the advantages of spaced versus massed repetition. Specifically, they find that the retrieval and reconstruction explanations for spacing effects are more consistent with their findings than past explanations, signifying that the best repetition strategy may involve one presentation of incidental processing and one presentation of intentional processing. Retrieval is the idea that the second presentation cues the first presentation, and if they are spaced then the second presentation forces you to retrieve the first presentation from LTM instead of working memory, which facilitates recall. Reconstruction is the idea that spacing forces someone to reconstruct the first presentation upon exposure to the second presentation, which facilitates later recall. If the two presentations occur in close proximity, then the first presentation is still accessible at the second presentation, making reconstruction unnecessary. Encoding variability, the previously-supported explanation for spacing effects (e.g., Crowder 1976) received moderate support as an explanation in the meta-analysis but not as much as retrieval or reconstruction.

In this section, we reviewed only those memory effects that are most relevant to the current research (e.g., primacy and recency effects, von restorff effect, interference effects, and repetition effects). However, several more variables, and how they affect free
recall performance, have been studied in the memory literature. The right panels of Appendix A show a more comprehensive list of the variables and the nature of the effect that has been reported in this literature.

SUMMARY

The theory and empirical evidence reviewed above suggests that a key limitation of the temporal sequences literature is the lack of understanding of the underlying mechanism responsible for consumers’ retrospective evaluations of experiences that extend over time. Much of the research in the temporal sequences domain has focused on understanding how consumers integrate the diverse experiences that are part of one event when they are asked to evaluate the entire event globally. The extensive examination of factors that influence retrospective evaluations of temporal sequences (e.g., peak intensity, end intensity, beginning intensity, trend) has led to a proliferation of variables in this stream of literature and contradictions over the relative impact of the aspects of a temporal sequence that consumers utilize when forming global evaluations (e.g., end intensity vs. beginning intensity). Significantly less attention has been devoted to understanding the explanation for consumers’ use of selective aspects of an extended experience when evaluating a past experience, hindering the ability of marketers to resolve the contradictions in the literature.

The free recall literature, which preceded research on temporal sequences, provides useful insight into how consumers may form retrospective evaluations of temporal sequences. Our examination of the free recall literature illustrates numerous
parallels between the factors that influence memory and the factors that influence retrospective evaluations of temporal sequences. For example, temporal sequences research has suggested that retrospective evaluations of an extended experience are impacted by the end intensity (e.g., Kahneman et al. 1993) and the beginning intensity (e.g., Ariely and Zauberman 2000). Correspondingly, the free recall literature has suggested that memory performance is relatively better for early items (primacy effect) and final items on a list (Crowder 1976). Appendix A shows a more comprehensive list of the parallel findings in the temporal sequences literature and the free recall literature. The left panels of the appendix provide a list of the major temporal sequences findings, and the right panels display a list of the corresponding free recall findings.

Overall, the parallels between these two streams of literature suggest that a viable explanation for retrospective evaluations of temporal sequences may be found in the memory literature. Specifically, consumers may form retrospective evaluations based on the individual aspects that they recall from an extended experience, and their ability to recall certain aspects over others is determined by factors that have been shown to impact memory performance in the free recall literature. The parallels between these two streams of research also call into question the necessity of the proliferation of variables in the temporal sequences domain given the potential of the free recall findings to not only explain the temporal sequences findings, but also to extend the temporal sequences findings by examining the impact of previously unstudied variables.
OUR CONCEPTUAL FRAMEWORK

Figure 2.1 outlines the conceptual framework for this dissertation. The purpose of this dissertation is to understand the ability of a memory-based structure to explain a substantial portion of how consumers evaluate past experiences that consist of a series of outcomes spaced over time and to utilize the proposed conceptual framework to extend findings in the temporal sequences literature. We specifically attempt to address the following questions:

1. Can a memory-based framework account for the impact of the beginning intensity, the end intensity, and the trend on retrospective evaluations of temporal sequences?
2. Can a memory-based framework account for the impact of the peak intensity on retrospective evaluations of temporal sequences?
3. How can we utilize a memory-based framework to understand the impact of similar events within an experience on global retrospective evaluations of the experience?
4. How can we utilize a memory-based framework to understand the impact of repeated events within an experience on global retrospective evaluations of the experience?
5. Is a memory-based framework applicable to both hypothetical and actual temporal sequences of events?
Hence, our focus is on developing a better understanding of how consumers form global retrospective evaluations of temporal sequences. We attempt to discover the underlying mechanism responsible for evaluations of a past experience by examining the link between the temporal sequences literature and the free recall literature. Our contention is that consumers’ formation of global retrospective evaluations of temporal sequences is largely driven by consumers’ memory for events contained within an experience. Thus, the variables that influence memory should have a predictable corresponding effect on retrospective evaluations of temporal sequences.

Our framework extends past research in two ways. First, by presenting a memory-based framework, we attempt to provide an overall structure to the temporal sequences literature in order to resolve the inconsistencies over which aspects of an experience consumers utilize when forming retrospective evaluations. In introducing the memory-based structure, we hope to demonstrate that each of the variables examined in past
research can predictably impact global evaluations of a past experience. Second, we attempt to extend the findings in the temporal sequences domain by examining the impact of previously unstudied characteristics of extended experiences on retrospective evaluations. We hope to show that the memory-based framework can accurately predict how these variables impact consumers’ evaluations of temporal sequences. This will be a significant departure from the disparate set of findings in the temporal sequences literature. Also, given the importance of enhancing consumers’ evaluations of past experiences in order to enhance consumers’ future purchase intentions to marketers, this dissertation will make significant contributions by providing them with a much needed understanding of what drives consumers’ evaluations of past experiences.

Overall, this dissertation will provide a better understanding of the process that consumers utilize when forming evaluations of a past experience that consists of a series of outcomes spaced over time.

In the next chapter, we will examine how well the memory-based framework can account for past findings in the temporal sequences domain. Specifically, we will explore the ability of the proposed memory-based structure to account for the impact of the beginning intensity, end intensity, trend, and peak intensity on consumers’ retrospective evaluations of a temporal sequence.
CHAPTER 3

MEMORY AND TEMPORAL SEQUENCES

One of the findings in the research on temporal sequences is that the end of an experience is heavily weighted in retrospective evaluations of the experience (e.g., Kahneman et al. 1993), and our memory-based framework can account for this finding based on the phenomenon of recency effect discussed earlier. Specifically, the majority of the temporal sequencing literature consists of studies that require respondents to report global evaluations immediately following an experience (e.g., Ariely 1998; Kahneman et al. 1993; Redelmeier and Kahneman 1996), conditions under which recency effect is most likely to be obtained. Because people are asked to report their evaluations immediately, those parts of the experience that are most recent are recalled well (i.e., recency effect), and therefore will show a disproportionately greater effect on evaluations than other parts of the experience that are not recalled as well.

Importantly, our memory framework makes a prediction that if the evaluation of an event takes place after a certain amount of time has elapsed between the end of the event and the evaluation, the enhanced effect of the end of the experience should disappear. This prediction derives from the findings in the learning literature that show recency effects dissipating if a time delay is introduced between exposure to a stimulus
and recall of that stimulus (e.g., Crowder 1976). Thus, our framework helps us in predicting the conditions under which some of the effects reported earlier are obtained, and the conditions under which they will not be obtained.

A related finding in the temporal sequencing literature that has often employed sequences that either improve or decline in valence (i.e., go from negative experience to positive, or vice-versa) is that consumers prefer improving sequences to declining sequences (e.g., Ariely 1998). Continuing to use the phenomenon of recency effects, our memory framework explains this finding easily. If consumers are exposed to an experience that begins poorly and improves gradually (or vice-versa), then, because the final experiences are recalled better due to recency effects, the more positive (negative) experiences will be recalled better, and should affect evaluations positively (negatively)⁴.

However, if a delay is introduced between the last experience, and measurement of evaluation of the sequence of experiences, then recency effects should diminish. Thus, the higher evaluations of improving sequences over declining sequences should vanish. Further, because of primacy effects, those experiences that occur at the beginning of a sequence should be remembered better than the rest of the experiences. This will lead to declining sequences being evaluated more positively than improving sequences, which is a reversal of the findings in the temporal sequencing literature. Thus:

⁴ We are aware that recall of events should also exhibit primacy effects. However, primacy effects dominate recency effects when a time delay is introduced between exposure and measurement and will be considered in the text that follows.
H1: Given an improving sequence of experiences, consumers who evaluate the sequence immediately will have more positive evaluations than those who evaluate the sequence after a time delay.

H2a: Consumers who evaluate an improving sequence of events versus consumers who evaluate the same events in a declining sequence will have (a) higher purchase intentions for the overall experience and (b) will be willing to pay more money for a similar experience if evaluations are assessed immediately following the experience.

H2b: Consumers who evaluate an improving sequence of events versus consumers who evaluate the same events in a declining sequence will have (c) lower purchase intentions and (d) will be willing to pay less money for a similar experience if evaluations are assessed following a delay.

STUDY 1A

The objective of Study 1a is to test our memory-based explanation by using a recall task to examine primacy and recency effects for temporal sequences. This study is designed to parallel past research by Redelmeier and Kahneman (1996) and Ariely and Zauberman (2000) who have demonstrated that the first and final moments of an affective experience tend to have more impact on retrospective evaluations. In contrast, we predict that the effect of final moments of an experience will diminish when a time delay is introduced between the experience and evaluation. To accomplish this,
consumers were exposed to descriptions of an improving vacation experience and were asked to evaluate the experience immediately or after a period of time had passed.

To develop the stimulus materials, 50 undergraduate marketing students were asked to describe two different experiences that they had on a recent vacation in exchange for course credit. They were asked to provide as much detail as possible about each of these experiences so that a person reading the description would be able to picture it in his mind.

Twenty-four experiences were selected for a pretest based on their level of detail in the description. These experiences were revised to ensure that they were all virtually the same length. Forty-five students in an undergraduate marketing class were given a subset of these various experiences. They were asked to read through the description of each incident provided to them and evaluate its affective valence (see Appendix B). Specifically, participants were told that they were being given a series of experiences ranging from very pleasant to very unpleasant that occurred on a college student’s recent vacation. They were asked to read each event and imagine that were actually experiencing it. Following each incident, they were asked to report how the experience made them feel at that given moment on a scale ranging from -7 to +7 anchored by “extremely negative” and “extremely positive.” Twelve events (six positive and six negative) ranging from very positive to very negative were selected for the main experiment based on their affective valence and their variance (see table 1).
<table>
<thead>
<tr>
<th>Incident Summary Description</th>
<th>Affective Intensity</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident 1 – A hurricane ruined plans for the day.</td>
<td>-5.40</td>
<td>1.60</td>
</tr>
<tr>
<td>Incident 2 – I went to the beach and got a bad sunburn.</td>
<td>-4.75</td>
<td>1.64</td>
</tr>
<tr>
<td>Incident 3 – I was supposed to go surfing for the first time, but the instructor cancelled the lesson due to high waves.</td>
<td>-3.75</td>
<td>1.64</td>
</tr>
<tr>
<td>Incident 4 – I lost more money than I had budgeted playing blackjack.</td>
<td>-3.50</td>
<td>2.94</td>
</tr>
<tr>
<td>Incident 5 – We went for a drive to look at the scenery, but bad weather forced us to return to the hotel.</td>
<td>-1.75</td>
<td>1.64</td>
</tr>
<tr>
<td>Incident 6 – We tried to meet at a restaurant for lunch, but our other group of friends went to the wrong location.</td>
<td>-1.0</td>
<td>3.56</td>
</tr>
<tr>
<td>Incident 7 – We played golf on one of the best courses in the world, and I beat my friend for the first time.</td>
<td>4.20</td>
<td>3.29</td>
</tr>
<tr>
<td>Incident 8 – While shopping, I bought a bottle of sangria and enjoyed it with my friends.</td>
<td>4.25</td>
<td>2.5</td>
</tr>
<tr>
<td>Incident 9 – We went to a good Mexican restaurant for dinner.</td>
<td>4.38</td>
<td>1.13</td>
</tr>
<tr>
<td>Incident 10 – I went skydiving for the first time.</td>
<td>4.60</td>
<td>2.04</td>
</tr>
<tr>
<td>Incident 11 – We went into town and discovered a festival, where we partied with the locals.</td>
<td>5.30</td>
<td>1.79</td>
</tr>
<tr>
<td>Incident 12 – My friends won a lot of money gambling. They took us out and paid for everything that evening.</td>
<td>6.38</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Table 1: Vacation Stimuli Description and Affective Intensity
Design and Procedure

A single factor, two-cell design was used, with evaluation timing (immediate vs. delay) as the factor of interest. Our intent was to show that the prior finding in the temporal sequencing literature that the last parts of an experience affect evaluations to a greater extent than say the middle parts of an experience is qualified by the timing of measurement. With a delayed measurement task, this effect should disappear.

A total of 83 students from an undergraduate marketing course received course credit in exchange for their participation. The study was conducted in groups of 20 and consisted of two parts. Participants signed up for two sessions on two consecutive days. Session one took about 25 minutes to complete, and session two took approximately 10 minutes to complete. Four students did not participate in session two and were subsequently dropped for further analysis.

The 12 incidents chosen from the pretest were presented to participants in a packet contained in a folder. The incidents were presented as an improving trend with each incident on a separate page (see Appendix D). Thus, all participants read about a vacation experience that began with an extremely negative incident and ended with an extremely positive incident (i.e., improving trend). Participants were told that they would read about an Ohio State student’s recent seven-day vacation (see Appendix C). This time specification was set forth to maintain a constant duration for both groups. Participants were not told, however, which incidents occurred on which days; they simply knew that the incidents took place sometime during the seven-day trip in the order in which they were presented. While participants read about the vacation experience, they were
instructed to imagine that they were actually experiencing each of the events described. This instruction served to place the respondents in a role-playing mode, rather than actually experiencing the event, a technique that has been used in other studies in the temporal sequencing literature (e.g., Varey and Kahneman 1992; Loewenstein and Prelec 1993; Ariely and Zauberman 2003). Respondents were then instructed to open the folder and begin reading the experience, after which they would be asked to provide their opinions. All participants in Study 1a were instructed to read the experience at their own pace, after which they would be asked to complete a short survey.

Half of the participants completed the target measures immediately following the vacation experience presentation (i.e., immediate condition), and the other half of the participants completed the target measures 24 hours after reading about the vacation experience (i.e., delay condition). The main dependent measures were purchase intentions and recall of the incidents. Purchase intentions were measured by asking respondents to indicate how likely they would be to purchase a vacation experience like the one they just read about on a scale from 0-100 where 0 is definitely will not purchase and 100 is definitely will purchase. Recall was measured by asking respondents to think back to the vacation experience, and try to recall as much information as possible. They were told to provide a brief description of each incident that they remembered in the order in which it came to mind. In the immediate condition, participants completed these measures after reading about the vacation (see Appendix E). Then, these participants were excused. In the delay condition, participants were asked to write about a recent vacation experience of their own (see Appendix F). Then, they were excused for the day. Twenty-four hours later, all respondents returned to complete the second part of the experiment. In the delay
condition, students were asked to complete the survey containing the target measures, and in the immediate condition, students were asked to complete the filler task that respondents in the delay condition completed in the earlier session.

Results

*Purchase Intentions.* A one-way ANOVA revealed a significant main effect of evaluation timing ($F(1,76) = 4.43, p < .05$) on purchase intentions. Respondents who provided purchase intentions immediately after reading about the vacation experience reported higher intent to purchase the vacation ($M = 62.20$) than respondents who provided intentions after a 24 hour delay ($M = 49.41$). Thus H1 is supported.

*Recall.* Recall was coded by incident. That is, each respondent’s recall was coded by whether a brief description of each of the 12 incidents was present or absent. Recall was analyzed by averaging incidents 1-3, incidents 4-9, and incidents 10-12 and was averaged by groups to allow us to examine memory for the initial part of the vacation experience (i.e., primacy effects), the middle part of the experience (i.e., center list recall), and the final part of the experience (i.e., recency effects). Because primacy and recency effects only impact the first few and last few items respectively (Crowder 1976), we have constrained the recall examination to only the first three incidents to examine primacy and the last three incidents to examine recency.

Recall was analyzed as 2 (evaluation timing: immediate vs. delay) X 3 (recall: primacy vs. center vs. recency) mixed design with recall as a within-subjects factor. This analysis revealed a significant main effect of recall ($F(1,76) = 15.61, p < .05$). Recall
differed depending on whether the measure was assessing memory for incidents at the beginning of the vacation ($M = 0.85$), in the middle of the vacation ($M = 0.65$), or at the end of the vacation ($M = 0.73$). The analysis also showed a main effect of evaluation timing ($F(1,76) = 21.28$, $p < .05$). Respondents in the immediate condition recalled more overall ($M = 0.88$) than respondents in the delay condition ($M = 0.60$). Finally, the analysis revealed a significant interaction between recall and evaluation timing ($F(1,76) = 13.72$, $p < .05$) (see table 2).

A priori contrasts were used to further examine the interaction. The contrasts indicated that respondents recalled the initial incidents of the vacation well, regardless of whether recall was assessed immediately after reading about the vacation ($M = 0.89$) or 24 hours later ($M = 0.81$, $t_{76} = 1.244$, $p > .1$). However, the presence of a delay retarded respondents’ memory for occurrences in the middle and at the end of the vacation. Incidents that took place in the middle of the vacation were recalled much better in the immediate condition ($M = 0.85$) than in the delay condition ($M = 0.42$, $t_{76} = 6.595$, $p < .05$). Also, events that took place at the end of the vacation were recalled much better by those respondents who reported recall immediately ($M = 0.89$) versus those respondents who reported recall following a delay ($M = 0.56$, $t_{75} = 4.297$, $p < .05$). Thus, delayed measurement affected recall of experiences, but only of those that occurred at the end of the sequence. The experiences that occurred at the beginning of the sequence were recalled slightly, but not significantly, less in the delayed condition.
<table>
<thead>
<tr>
<th>Temporal Location of Incidents</th>
<th>Immediate Recall</th>
<th>Delayed Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning (primacy)</td>
<td>0.89</td>
<td>0.81</td>
</tr>
<tr>
<td>Center</td>
<td>0.85</td>
<td>0.42</td>
</tr>
<tr>
<td>End (recency)</td>
<td>0.89</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Table 2: Study 1a Recall Results

Additional Analysis. Recall performance was expected to mediate the effects of delay on the retrospective evaluations. However, the nature of the recall task did not facilitate the use of traditional mediation analysis because recall was coded as a nominal variable (i.e., did or did not recall each incident). Therefore, to examine the impact of recall on retrospective evaluations, we compared purchase intentions between respondents that recalled well versus recalled poorly the final positive portion of the vacation experience. We expected a main effect of recency recall such that regardless of delay, respondents that had good recall performance on the final part of the experience would exhibit higher evaluations than respondents that had poor recall performance on the final part of the experience. To test our expectations, participants were divided into two separate groups for analysis based on their recall performance on the final part of the experience (i.e., incidents 10-12). Regardless of delay, participants who recalled one or fewer incidents were placed in the “poor recency recall” condition, and participants who recalled two or more incidents were placed in the “good recency recall condition.” Because we anticipated that evaluations would only increase with better memory for the final incidents in the experience, a one-tailed ANOVA test was utilized. Consistent with expectations, we find that when respondents recalled two or more of the final incidents
(i.e., good recency recall), they reported higher purchase intentions for the experience ($M = 58.97$) than respondents that recalled one or fewer of the final incidents (i.e., poor recency recall) ($M = 47.90$, $F = 2.47$, $p = .06$). Although this difference is only marginally significant, this result provides some support for the idea that recall performance mediates the effect of delay on retrospective evaluations.

Discussion

Study 1a showed that consistent with our memory-based framework, respondents evaluated the improving vacation experience more favorably immediately than after a 24-hour delay. We expected that the depressed evaluations in the delay condition may result from respondents’ decreased memory for the positive events at the end of the experience relative to respondents’ memory for negative events at the beginning of the vacation experience, a prediction consistent with primacy and recency effects. In support of this expectation, recall of the early incidents was not affected by the 24-hour delay; however, recall of the final incidents declined following a delay.

Combined, our results suggest that consumers evaluate an experience differently if evaluations are assessed immediately following the experience than if evaluations are assessed after a period of time has passed because their memory for certain events over others in the experience changes with time. Immediately following the experience, respondents exhibit both primacy and recency effects, whereas following a delay, respondents exhibit primacy effects but no recency effects. Thus, when evaluations of an
experience are assessed immediately, consumers heavily weight the initial and final events of that experience, and when evaluations are assessed after a period of time, consumers heavily weight only the initial events of the experience.

**STUDY 1B**

One limitation of Study 1a is that one can argue that evaluations decreased over time because people simply forgot the positive information, not the negative information, contained in the experience. Since Study 1a is a single-factor design, it is hard to argue against a simple forgetting explanation. The objective of Study 1b is to replicate the findings of Study 1a to situations in which temporal sequences are improving or declining. By reversing the effects found earlier in the temporal sequencing literature for both improving and declining sequences, we will be able to argue against a simple forgetting explanation because in one of the conditions, evaluations will actually become more positive with the passage of time. Those findings will also increase our confidence in our framework.

**Design and Procedure**

A 2 (evaluation timing: immediate vs. delay) X 2 (vacation experience trend: improving vs. declining) between-subjects design was employed. One-hundred nine students in a marketing undergraduate class participated in the study in exchange for course credit. Participants signed up for two sessions separated by one week. The delay
period was changed from one day to one week to ensure that the expected forgetting effects would materialize. Session one took about 25 minutes to complete, and session two took approximately 10 minutes to complete.

The procedures and stimuli were identical to Study 1a with one noted exception. Only half of the participants were presented with the improving vacation trend from Study 1a. The other half of the participants read the same vacation experience presented as a declining trend. That is, the experience began with an extremely positive incident and ended with an extremely negative incident.

Half of the participants completed the target measures immediately following the vacation experience presentation (i.e., immediate condition), and the other half of the participants completed the target measures one week after reading about the vacation experience (i.e., delay condition). The main dependent measures were purchase intentions and recall, which were measured in the same manner as in Study 1a. In addition, willingness to pay was added as a dependent measure in this study in order to test the robustness of the findings across the multiple measures utilized in the temporal sequence research. Willingness to pay was measured by asking respondents to indicate how much money they would be willing to pay to experience a vacation similar to the one that they read (see Appendix G). In the immediate condition, participants completed the target measures after reading about the vacation. Then, these participants were excused.

In the delay condition, participants were asked to perform the same filler task as in Study 1a. They were sent an e-mail four days after their participation indicating that there was a follow-up session to the experiment. They were asked to sign up for a particular session, scheduled one week after the initial session, in exchange for additional
course credit. Respondents who participated in this follow-up session were asked to complete a survey containing the target measures. Fourteen students did not complete the target measures in session two and were subsequently removed from further analysis.

Results

*Purchase intentions.* Purchase intentions were subjected to an ANOVA with evaluation timing and trend as the independent factors. The analysis revealed a significant interaction between delay and trend \(F(1,91) = 6.47, p < .05\). In the immediate condition, respondents that experienced an improving vacation had higher purchase intentions \(M = 67.55\) than respondents that experienced a declining vacation \(M = 59.09\) (see figure 3.1). Contrasts revealed that this difference is directionally consistent with our expectations but not significant \(t_{91} = 1.29, p > .05\). Thus, H2a was not supported. However, in the delay condition, contrasts revealed that respondents exposed to the improving vacation experience had lower purchase intentions \(M = 49.17\) than respondents exposed to the declining vacation experience \(M = 65.83\), contrast \(t_{91} = -2.26, p < .05\), supporting H2b. Finally, the analysis showed that there was no significant main effect of delay \(F(1,91) = 1.39, p > .1\) or trend \(F(1,91) = 0.69, p > .1\).

*Willingness to pay.* Willingness to pay scores were subjected to an ANOVA with evaluation timing and trend as the independent factors. Consistent with purchase intent scores, the analysis revealed a significant interaction between delay and trend \(F(1,90) = 10.73, p < .05\) (see figure 3.2). In the immediate condition, respondents that experienced an improving vacation were willing to pay more money to experience a similar vacation
(M = $1050.97) than respondents that experienced a declining vacation (M = $647.50), and contrasts revealed that this difference is marginally significant (t_{90} = 1.29, p < .06). In the delay condition, contrasts revealed that respondents that experienced the declining vacation were willing to pay more money to experience a similar vacation (M = $1134.80) than respondents that experienced the improving vacation (M = $529.17, t_{90} = -2.27, p < .05), consistent with the results obtained for purchase intention. No main effects were significant (all p-values > .1).
Figure 3.1: Study 1b Purchase Intentions Results

Figure 3.2: Study 1b Willingness to Pay Results
Recall. Recall was coded in a manner similar to Study 1a and was analyzed as a 2 (evaluation timing: immediate vs. delay) X 3 (recall: primacy vs. center vs. recency) mixed design with recall as a within-subjects factor. This analysis revealed a significant main effect of recall ($F(1, 92) = 18.38, p < .05$). Consistent with Study 1a, recall differed depending on whether the measure was assessing memory for incidents at the beginning of the vacation ($M = 0.75$), in the middle of the vacation ($M = 0.46$), or at the end of the vacation ($M = 0.61$). The analysis also showed a main effect of evaluation timing ($F(1, 92) = 153.95, p < .05$). Respondents in the immediate condition recalled more overall ($M = 0.77$) than respondents in the delay condition ($M = 0.39$).

Importantly, the analysis revealed a significant interaction between recall and evaluation timing ($F(1, 92) = 4.59, p < .05$). Contrasts revealed that memory for initial events, center events, and final events of the experience declined significantly following a one-week delay (all $p$-values < .05). However, the experiences that occurred at the beginning of sequence declined less following a delay than experiences that occurred in the middle or at the end of the sequences (primacy: $M = .88$ vs. .58, center: $M = .63$ vs. .25, recency: $M = .81$ vs. .36) (see table 3). Thus, delayed measurement affected recall of experiences more for those that occurred at the end and middle of the sequence. Neither the main effect of trend nor the interactions with trend as an independent factor were significant (all $p$-values > .1), indicating that differences in recall may be attributed to temporal location, not valence, of the events contained in the sequence.
### Table 3: Study 1b Recall Results

<table>
<thead>
<tr>
<th>Temporal Location of Incidents</th>
<th>Immediate Recall</th>
<th>Delayed Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increasing Trend</td>
<td>Decreasing Trend</td>
</tr>
<tr>
<td>Beginning (primacy)</td>
<td>0.88</td>
<td>0.88</td>
</tr>
<tr>
<td>Center</td>
<td>0.64</td>
<td>0.61</td>
</tr>
<tr>
<td>End (recency)</td>
<td>0.80</td>
<td>0.82</td>
</tr>
</tbody>
</table>

**Additional Analysis.** To further examine the impact of recall on retrospective evaluations, we utilized the same additional analysis as the one conducted in Study 1a, with one minor exception. Participants were divided into four groups, instead of two. In addition to dividing respondents based on their recall performance on the final part of the experience, respondents were also divided based on whether they were exposed to an improving or a declining trend. Respondents were separated by trend because those that were exposed to the improving trend had a positive final experience, whereas those that were exposed to the declining trend had a negative final experience. Thus, the final part of the experience was expected to differentially impact evaluations, depending on the valence of the last incidents. We anticipated a significant interaction of trend and recency recall on both purchase intentions and willingness to pay, such that respondents exposed to an improving (declining) trend would exhibit higher (lower) evaluations when their recalled well versus poor the final part of the experience. Consistent with expectations, we find a significant interaction for purchase intentions and willingness to pay ($F_{\text{Purchase intentions}}(1,91) = 2.95, p < .05; F_{\text{WTP}}(1,90) = 5.86, p < .05$) (see figures 3.3 and 3.4). When respondents were exposed to the increasing trend they reported higher purchase
intentions and higher WTP if they recalled two or more of the final incidents (i.e., good recency recall) ($M = 64.38, $982.35) versus one or fewer of the final incidents (i.e., poor recency recall) ($M = 51.67, $565.71). Similarly, when respondents were exposed to the decreasing trend they reported lower purchase intentions and lower WTP if they had good recency recall ($M = 60.20, $743.75) versus poor recency recall ($M = 65.33, $1110.75). These results provide additional evidence that recall performance on the final part of the experience drives retrospective evaluations.
Figure 3.3: Study 1b Purchase Intentions Additional Analysis Results

Figure 3.4: Study 1b Willingness to Pay Additional Analysis Results
Discussion

Study 1b shows a crossover pattern in which evaluations of temporal sequences in immediate measurements are reversed in the delayed measurements, as predicted by our memory framework. First, the finding in the immediate condition that respondents were more likely to purchase and pay more money for the improving versus the declining vacation is consistent with the temporal sequence literature, although in our case it did not reach statistical significance. Second, and more important is our finding that respondents in delayed conditions have lower purchase intentions and willingness to pay for improving sequences than declining sequences, a finding that is the reverse of what has been found in the temporal sequencing literature, but is predicted by our framework.

Respondents that evaluated the experience immediately were expected to heavily weight the initial and final incidents in the experience because these incidents were better recalled, whereas respondents that evaluated the experience following a delay were expected to heavily weight only the initial incidents because these were better remembered. The impact of the beginning of an experience on evaluations of sequences has been demonstrated in only one study in the temporal sequences literature (Ariely and Zauberman 2000), but this finding was treated as somewhat of an anomaly. Our research demonstrates that the beginning of an experience can impact retrospective evaluations systematically when the amount of time between an experience and the evaluation of that experience increases. Because these effects were consistent across trends (i.e., improving
and declining), and are accompanied by recall data that are consistent, we believe that the differential recall for temporally located events account for the pattern of evaluations found in Studies 1a and 1b.

Thus far, Studies 1a and 1b show that our memory framework can explain the current findings in the temporal sequencing literature, and under predicted conditions, can reverse the findings. To put it in simple terms, prior findings of beginning or end experiences having greater influence on overall evaluations can be recast as manifestations of primacy and recency effects. In the short term, end experiences are recalled at a high level, and exert significant influence on evaluations. With the passage of time, primacy effects dominate, and the beginning experiences are recalled at a high level, affecting evaluations more than other experiences. Study 2 will examine another finding in the temporal sequencing literature and show how it can be explained by the proposed framework.

**STUDY 2**

One of the findings from the temporal sequencing literature that was mentioned earlier deals with peak intensity. Specifically, it has been found that in a series of experiences that constitute an event, those experiences that are peak in intensity will have more effect on overall evaluations of the event than the rest of the experiences (e.g., Schreiber and Kahneman 2000). The memory framework we propose in this paper subsumes this finding into what has been referred to in the literature as the von Restorff effect (e.g., Wallace 1965).
The von Restorff effect states that in a series of words, if a word were made to stand out in some way (e.g., different display color), then it will be remembered better than the other words. Thus, in a series of experiences, if we make the reasonable assumption that the peak experience is distinctive, then it should be remembered better than any other experience. Since what is remembered drives evaluations in a retrospective evaluation task, it follows that the peak intensity effect reported in the temporal sequencing literature can be accounted by the von Restorff effect.

An interesting corollary is that distinctive events are remembered irrespective of where they occur in a temporal sequence. If so, our framework predicts that if a unique event occurs at the end of a sequence, it should be remembered better even after a time delay (e.g., Rundus 1971). Thus, by placing a peak (and therefore a unique) event at the end of a sequence, we should be able to reverse the findings of our own research (Studies 1a and 1b) and recover the recency effect that was lost over time. The reason for recovery, however, is the uniqueness of the experience, and not recency.

Stated differently, if a unique incident occurs at the end of an experience, where recall is normally poor after a time lag, then consumers should recall the final portion of the experience well because of the uniqueness of the event, resulting in a large impact of the end of the experience on retrospective evaluations. If a common incident occurs at the end of an experience, then consumers should have poor relative recall of the final portion of the experience, resulting in a large impact of the initial part of the experience on retrospective evaluations. Thus:
H3: Following a delay, consumers who evaluate an improving experience with a unique final incident will be willing to pay more money for a similar experience than consumers who are asked to evaluate the same experience with a common final incident.

We also hypothesize an interaction between temporal recall location and typicality of the final incident of an experience on recall performance such that

H4: Relative to consumers who evaluate an experience with a common final incident, consumers who are asked to recall events contained in an experience with a unique final incident following a delay will exhibit (a) the same level of recall for the events that occurred at the beginning of the experience (i.e., primacy) and (b) better recall performance on the final event of the experience (i.e., recency).

Design and Procedure

A one-factor, two-cell designed was utilized. The main factor of interest was typicality of the final incident in the experience (common vs. atypical). One-hundred fifty-eight participants from an undergraduate marketing course participated in groups of 20 in exchange for course credit. The study was conducted in two parts. Session one took approximately 25 minutes to complete, and session two took approximately 10 minutes to complete.

All participants read the improving vacation experience from Study 1a, but the last incident in the vacation experience stimuli differed across conditions. Respondents in
the common condition read the same final incident as in Study 1a. They were told that their friends won money at the casino, and the entire group received VIP treatment for the rest of the evening. Respondents in the atypical condition read a variation of the final incident. They were also told that their friends won money, and everyone received VIP treatment. However, they were told that the VIP treatment involved a party with some of their favorite celebrities. All 12 experiences from the Study 1 stimuli and the altered final incident developed for this study were pretested for their typicality using a procedure similar to that used by Loken and Ward (1990) (see Appendix H). A three-item scale (poor example-good example, unrepresentative, representative, atypical-typical) ranging from 0-10 was used. A reliability analysis indicated that the scales were highly reliable for all of the incidents (alpha ranged from .757 to .953). An analysis of the typicality scores revealed that the unusual incident was rated as the most unique out of all incidents in the experience. In addition, the atypical incident was rated as less common ($M = 2.17$) than its final incident counterpart ($M = 5.18, p < .05$). Affective valence of the atypical final incident was also pretested. An analysis revealed that the affective valence of the atypical final experience did not differ from the affective valence of the common final incident ($M = 4.55$ vs. $4.79$ respectively, $p > .1$).

Thus, this study replicated Study 1a with the use of the common incident. The uniqueness added to the final event did not change its affective valence, but only its typicality. If uniqueness was to affect recall, and thus evaluations, we should find more positive evaluations of the sequence with the unique incident than the sequence with the common incident in a delayed evaluation task.
All participants were asked to complete the experiment in two stages. In the first stage, they read the vacation experience at their own pace and completed a filler task before being dismissed. One week later the students were invited to participate in a follow-up study in which they completed an additional survey. Similar to the previous studies, the main dependent measures were willingness to pay and recall. Sixty-three percent of students from the first session participated in the second session, and those that did not participate in the second session were subsequently dropped from further analysis.

Results

Willingness to Pay. A one-way ANOVA revealed a significant main effect of typicality of the final incident on respondents’ willingness to pay for the vacation experience \( (F(1,95) = 4.15, p < .05) \). Consistent with our expectations, respondents were willing to pay significantly more money to experience the vacation with the unique final incident \( (M = $926.09) \) than the vacation with the common final incident \( (M = $691.18) \). Thus H3 is supported.

Recall. Recall was coded in a manner similar to Studies 1a and 1b. However, we examined recall of the end of the experience by analyzing recall of the final incident only. Recall was analyzed as 2 (evaluation timing: immediate vs. delay) X 3 (recall: primacy vs. center vs. final incident) mixed design with recall as a within-subjects factor. The analysis revealed a significant interaction between recall and evaluation timing \( (F(1,97) = 4.01, p < .05) \) (see table 4). A priori contrasts were used to further examine the interaction. Consistent with our expectations, the contrasts indicated that respondents recalled the
final incident better when it was unique ($M = 0.63$) than when it was common ($M = 0.41$, $t_{97} = -2.150, p < .05$). However, the uniqueness of the final incident did not impact recall of the initial events or the center events. As expected, respondents recalled the initial vacation events equally well regardless of the whether the final incident was atypical ($M = 0.56$) or common ($M = 0.55, t_{97} = 0.893, p > .1$). Similarly, participants that read a unique final incident recalled incidents that occurred in the center of the vacation as poorly as subjects that read a common final incident ($M = 0.26$ for both conditions, $t_{97} = 0.023, p > .1$).

<table>
<thead>
<tr>
<th>Temporal Location of Incidents</th>
<th>Common Final Incident</th>
<th>Unique Final Incident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning (primacy)</td>
<td>0.55</td>
<td>0.56</td>
</tr>
<tr>
<td>Center</td>
<td>0.26</td>
<td>0.26</td>
</tr>
<tr>
<td>Final Incident (recency)</td>
<td>0.41</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Table 4: Study 2 Recall Results

*Additional Analysis.* Consistent with the previous studies, we conducted an additional analysis to confirm the impact of recall on retrospective evaluations. We utilized a similar procedure to Study 1a. However, we divided participants into groups based on whether or not they recalled the final target incident, instead of using their recall performance on the final three incidents. We expected a significant main effect of recall of the last incident on willingness to pay such that, regardless of uniqueness of the final incident, respondents that recalled the final positive incident would be willing to pay more money for a similar vacation experience than respondents that did not recall the
final incident. Consistent with expectations, we find a significant main effect of final incident recall on WTP \( F(1,95) = 5.00, p < .05 \). Respondents that recalled the final incident reported higher WTP \( M = $929.59 \) than respondents that did not recall the final incident \( M = $672.92 \). Thus, consistent with our expectations and the results from Studies 1a and 1b, recall of the experience appears to guide retrospective evaluations.

Discussion

Consistent with the von Restorff effect (e.g., Wallace 1965), Study 2 demonstrates that following a delay, consumers tend to recall a final event in an experience better if that event is unique versus common. Additionally, consumers that experience an affectively intense unique final event tend to base their retrospective evaluations on the final event, similar to those who evaluate an experience immediately, while consumers that experience an affectively intense common final event base their evaluations on the initial events in the experience. As a result, respondents in Study 2 reported higher evaluations of the improving vacation trend when the extremely positive final incident in the experience was atypical versus common.

It is worth reiterating the fact that our framework allows to predict conditions under which we should reverse the findings of prior research. Further, it allowed us to predict a condition in which the findings of Studies 1a and 1b were reversed again.

Study 3 was conducted to provide further evidence in support of von Restorff effect. Up to this point, we have observed that recall of experiences that occur in the middle of the sequence has been relatively low. Our framework should predict that if the
unique incident that we used in study 2 were embedded in the middle of the sequence, then changes in the middle of the sequence should affect evaluations, something that has not been demonstrated by any of the research in temporal sequencing. Further, in Study 2, we kept the peak intensity constant, but changed the uniqueness of the event. In Study 3, we will change both the peak intensity and its uniqueness in a factorial design to show that changes in peak intensity without accompanying changes in its uniqueness should have no effects on evaluation of the sequence. However, changes in uniqueness should be reflected in evaluations. Therefore,

H5: Following a delay, consumers who evaluate an experience containing an incident in the center of the experience that is extremely positive versus extremely negative will report higher purchase intentions for the experience only if the high intensity event is atypical. Consumers who evaluate an experience containing an incident in the center of the experience that is extremely positive versus extremely negative will report the same intent to purchase the experience if the high intensity event is common.

STUDY 3

Design and Procedure

A 2 (typicality of the incident: common vs. atypical) X 2 (incident valence: positive vs. negative) design was employed. One-hundred twenty participants from an
undergraduate marketing course participated in groups of 20 in exchange for course credit. The study was conducted in two parts. Session one took approximately 25 minutes to complete, and session two took approximately 10 minutes to complete.

All participants read a vacation experience containing 11 incidents. The 10 mildly and moderately intense experiences from Study 1a were utilized in all conditions in this study. The temporal location of these incidents was common across all conditions and was chosen at random such that positive and negative experiences were placed in no specific order. The target incident was placed as the sixth incident in the experience across all conditions and differed on its affective valence and typicality. The positive common and unique incidents from Study 2 were used as the target incidents in two conditions of this study. Respondents in the negative-common incident condition read the peak intensity negative experience used in previous studies. They were told that poor weather caused them to stay inside the hotel all day without electricity, and they waited in the lobby to keep cool because there was no air conditioning in the hotel due to the storm. Respondents in the negative-atypical incident condition read a variation of this incident. In addition to the information conveyed in the common incident, they were told that they waited in the lobby with some of their favorite celebrities, the same manipulation utilized in the positive-atypical incident. The two negative target incidents were pretested for their typicality using the same procedure as Study 2. A reliability analysis indicated that the scales were highly reliable for these two incidents (alpha = .875). An analysis of the typicality scores revealed that the unusual negative incident was rated as less common ($M = 3.26$) than the negative common incident ($M = 4.27$), although this difference did not reach conventional levels of significance ($p > .05$). Affective valence of the atypical final
incident was also pretested. An analysis revealed that the affective valence of the atypical final experience did not differ from the affective valence of the common final incident ($M = -3.55$ vs. -3.15 respectively, $p > .1$).

The same procedure was used as in Study 2. All subjects completed the target dependent measures following a one-week delay. The main dependent measure in this study was purchase intentions, which was measured in the same manner as the previous studies. Because willingness to pay was used in Study 3, the purchase intent measure was utilized to verify the robustness of this effect across dependent measures. Sixty-three percent of students from the first session participated in the second session, and those that did not participate in the second session were subsequently dropped from further analysis.

Results

*Purchase Intentions.* Purchase intentions were subject to an ANOVA with valence and typicality as the independent factors. The analysis revealed that the interaction was not significant ($F(1,72) = 2.73, p > .1$), and no main effects were significant (all $p$-values > .1) (see figure 3.5). A priori contrasts were used to further examine the effect of valence and typicality on retrospective evaluations. Consistent with our expectations, the contrasts indicated that when the target incident was common, respondents exposed to the positive incident reported purchase intentions that did not significantly differ from respondents exposed to the negative incident ($M = 58.59$ vs. $61.57$ respectively, $t_{72} = 0.37, p > .1$). However, when the target incident was unique,
respondents that read the positive incident reported higher evaluations \((M = 67.96)\) than respondents that read the negative incident \((M = 53.73, t_{72} = -2.15, p < .05)\). Thus H5 is supported.

Thus, a unique incident affected evaluations even when it was positioned in the middle of the sequence. Importantly, if the incidents were extremely positive vs. negative, but did not appear to be unique in any way, they did not affect evaluations. In other words, our framework suggests that prior findings in the temporal sequence literature on peak intensity effects are more because of the uniqueness of those incidents rather than their peak characteristic per se. The fact that an incident placed in the middle of a temporal sequence still managed to drive evaluations if it was unique, but did not affect evaluations if it was extreme but not unique, provides further support to our framework.

![Figure 3.5: Study 3 Purchase Intentions Results](image_url)

Figure 3.5: Study 3 Purchase Intentions Results
In Studies 1 through 3, we show that the proposed memory-based framework can explain current findings in the temporal sequence literature (e.g., impact of end, beginning, and trend), and under certain predicted conditions eliminate or reverse prior findings (e.g., impact of end, preference for improving vs. declining sequence), suggesting that a memory-based structure can explain substantial portion of how consumers evaluate past experiences that consist of series of outcomes spaced over time. The finding that accessibility of affective events is largely responsible for how consumers evaluate experiences not only allows me to account for contradictory findings in the literature, but it also allows me to make predictions with this framework that have not been tested in the temporal sequence literature. Thus, the objective of Studies 4 and 5 is to use the proposed memory-based structure to extend findings in the temporal sequence literature.
Consider an individual who has experienced an event, such as a vacation, that consists of a sequence of experiences that are very similar to each other. For example, an individual may go snorkeling, sailing, swimming, waterskiing, or participate in other activities on vacation that take place in the ocean. These activities are conceptually similar to each other in that they share a common theme: water. When the individual is asked to evaluate that event, how will her evaluations be impacted by exposure to experiences that share a common theme? The temporal sequences literature has been unable to address this issue with its existing findings. However, the manner in which evaluations of such a temporal sequence are formed can be accounted for using the memory-based framework tested in Studies 1-3. Specifically, drawing on interference theory in the memory literature (e.g., Anderson 2003), we will be able to systematically predict how evaluations of temporal sequences, such as vacations, will be impacted by the presence of similar experiences within the event.

If we make the reasonable assumption that, consistent with Studies 1 through 3, individuals recall experiences from a temporal sequence (e.g., vacation experiences) that are combined to form evaluations of these experiences into an overall retrospective assessment of the event (e.g., vacation), then, consistent with interference theory in the memory literature, recall of the experiences contained within the event may be hindered by an increase in their conceptual similarity. Thus, retrospective evaluations of an event assessed after a delay may be tempered by the occurrence of multiple conceptually similar experiences.
An interesting consequence of interference theory is that similar events are remembered poorly irrespective of where they occur in a temporal sequence. If so, our framework predicts that a series of conceptually similar experiences occurring at the beginning of a sequence should be recalled poorly after a time delay. Thus, exposure to an event that consists of initial experiences of differing affective intensity that are similar to each other in content will result in less accessibility of the initial events due to interference and more moderate retrospective evaluations of the overall experience. If the evaluation of an event takes place after a certain amount of time has elapsed between the end of the event and the evaluation, primacy effects dominate (e.g., Crowder 1976), and the beginning experiences are recalled at a high level, affecting evaluations more than other experiences. However, by increasing the similarity of the experiences that occur at the beginning of an event, we should be able to diminish the impact of the initial part of an event on overall evaluations that dominated delayed evaluations in studies 1a and 1b.

Put simply, if a series of events with different themes (i.e., low conceptual similarity) occurs at the beginning of an experience, where recall is comparably high after a time lag, then consumers should recall the initial portion of the experience well, resulting in a large impact of the beginning of the experience on retrospective evaluations, consistent with previous studies in this dissertation. If a series of events with a common theme (i.e., high conceptual similarity) occurs at the beginning of an experience, then consumers should have poor relative recall of the initial portion of the experience, resulting in a low relative impact of the initial part of the experience on retrospective evaluations. Thus:
H6: Following a delay, consumers who evaluate an experience containing initial events that are positive versus negative will be willing to pay more money for a comparable experience only if the initial events are conceptually dissimilar. Consumers who evaluate an experience containing initial events that are positive versus negative will be willing to pay the same amount of money for a comparable vacation if the initial events are conceptually similar.

We also hypothesize a main effect of conceptual similarity on recall performance such that

H7: Relative to consumers who evaluate an experience with conceptually dissimilar initial events, consumers who are asked to recall an experience with conceptually similar initial events following a delay will exhibit the worse recall performance on the initial events of the experience.

Design and Procedure

A 2 (conceptual similarity of the initial incidents: similar vs. dissimilar) X 2 (valence of initial incidents: positive vs. negative) design was used. Our intent was to show that the prior finding in Studies 1a and 1b that the initial parts of an experience heavily impact delayed evaluations is contingent upon conceptual dissimilarity of the initial incidents. With a set of initial incidents that are conceptually similar to each other, this effect should disappear.
Similar to the previous studies, all participants read a vacation experience containing 12 incidents. Incidents 5-12 were incidents utilized in Studies 1 through 3. These incidents were chosen for their low affective intensity (e.g., mildly positive or mildly negative) and were common across all conditions. Their temporal location was chosen at random such that positive and negative experiences were placed in no specific order, but their order was consistent across the four conditions. The target incidents were placed as the first four incidents in the experience across all conditions and differed on their conceptual similarity and affective valence and intensity. To obtain the target incidents, 12 incidents pertaining to water (6 positive and 6 negative) and 12 incidents not pertaining to water (6 positive and 6 negative) were pretested for their affective valence and intensity (see Appendix I). To insure consistency across conditions, the incidents were developed such that each water incident (i.e., waterskiing) had a non-water counterpart incident that utilized the same basic description with a few changes (i.e., rockclimbing). Additionally, each incident used the same basic description for both the positive and negative versions, with a few minor exceptions (see Appendix J).

Fourteen events (seven positive and seven negative) were selected for the main experiment based on their affective valence and their variance (see table 5). In each condition respondents read a vacation experience that began with four incidents pertaining to water (conceptually similar condition) or four incidents that did not share a common theme (conceptually dissimilar condition). Respondents in the similar condition read incidents pertaining to jetskiing, waterskiing, sailing and swimming, while respondents in the dissimilar condition read incidents pertaining to jetskiing, rock climbing, kite buggying, and volleyball. An analysis of the affective scores of the target
incidents confirmed that each incident in the conceptually similar condition (e.g., swimming) was rated equally positive or negative to its counterpart incident in the conceptually dissimilar condition (e.g., volleyball) (all $p$-values $> .1$). Additionally, the vacation experience that each respondent read consisted of initial incidents (incidents 1-4) that were either all positive or all negative. Within each condition the incidents were placed in temporal order such that all respondents viewed an affectively intense incident in positions 1 and 2 ($M \approx \pm 6$) and an affectively mild incident in positions 3 and 4 ($M \approx \pm 2$) in order to insure that any difference in evaluations could be attributed to interference caused by conceptual similarity versus affective similarity of the incidents.

A total of 101 students from an undergraduate marketing course received course credit in exchange for their participation. The study was conducted in groups of 20 and consisted of two parts. All participants were asked to complete the experiment in two stages. In the first stage, they read the vacation experience at their own pace and completed a filler task before being dismissed. One week later the students were invited to participate in a follow-up study in which they completed an additional survey. Session one took about 25 minutes to complete, and session two took approximately 10 minutes to complete. Similar to the previous studies, the main dependent measures were willingness to pay and recall. However, an additional recall measure was added to further assess how much respondents remembered about the target incidents. Respondents were prompted with a brief description of the target incidents (e.g., waterskiing, rock climbing), and they were asked to write about that incident, providing as many details as they could
remember (see Appendix K). Eighty-one percent of students from the first session participated in the second session, and those that did not participate in the second session were subsequently dropped from further analysis.

<table>
<thead>
<tr>
<th>Conceptual Similarity of Initial Events</th>
<th>Incident Description and Temporal Order</th>
<th>Positive Affective Intensity</th>
<th>Negative Affective Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Similar</td>
<td>Incident 1 – Jet skiing</td>
<td>6.36</td>
<td>-5.40</td>
</tr>
<tr>
<td></td>
<td>Incident 2 – Waterskiing</td>
<td>6.00</td>
<td>-5.50</td>
</tr>
<tr>
<td></td>
<td>Incident 3 – Sailing</td>
<td>3.71</td>
<td>-0.78</td>
</tr>
<tr>
<td></td>
<td>Incident 4 – Swimming</td>
<td>3.83</td>
<td>-0.87</td>
</tr>
<tr>
<td>Dissimilar</td>
<td>Incident 1 – Jet skiing</td>
<td>6.36</td>
<td>-5.40</td>
</tr>
<tr>
<td></td>
<td>Incident 2 – Rock climbing</td>
<td>6.00</td>
<td>-5.00</td>
</tr>
<tr>
<td></td>
<td>Incident 3 – Kite buggying</td>
<td>3.27</td>
<td>-1.00</td>
</tr>
<tr>
<td></td>
<td>Incident 4 – Volleyball</td>
<td>4.00</td>
<td>-0.50</td>
</tr>
</tbody>
</table>

Table 5: Study 4 Vacation Incident Affective Intensity

Results

Willingness to pay. Willingness to pay scores were subjected to an ANOVA with conceptual similarity and valence as the independent factors. Consistent with our expectations, the analysis revealed a significant interaction between similarity and valence ($F(1,78) = 4.80, p < .05$) (see figure 4.1). When the initial incidents in the vacation experience were dissimilar, respondents that experienced a positive beginning to the vacation were willing to pay more money to experience a comparable vacation ($M = \$1125.00$) than respondents that experienced a negative beginning to the vacation ($M =$
$540.28), and contrasts revealed that this difference is significant ($t_{78} = -3.21, p < .05$).

However, when the initial incidents in the vacation experience were conceptually similar, contrasts indicated that respondents that experienced the positive beginning to the vacation were willing to pay an amount of money that did not differ significantly from the amount of money that respondents that experienced the negative beginning to the vacation were willing to pay ($M = \$873.68$ vs. $\$858.33$ respectively, $t_{78} = -0.08, p > .1$).

The analysis also revealed a significant main effect of valence of the initial incidents on willingness to pay scores, such that respondents that were exposed to the positive initial incidents reported a greater willingness to pay for a similar vacation ($M = \$1013.95$) than respondents that were exposed to the negative initial incidents ($M = \$711.54$, $F(1,78) = 5.33, p < .05$). The main effect of similarity on willingness to pay scores was not significant ($p > .1$).

![Figure 4.1: Study 4 Willingness to Pay Results](image)
Recall. Each respondent’s recall was coded by whether a brief description of each of the incidents was present or absent, similar to studies 1 and 2. Incidents 1-4 were averaged to allow us to examine memory for the initial part of the vacation experience (i.e., primacy effects). Recall was analyzed as a 2 (conceptual similarity of the initial incidents: similar vs. dissimilar) X 2 (valence of initial incidents: positive vs. negative) between-subjects design. The analysis revealed a significant main effect of conceptual similarity on recall performance ($F(1,78) = 3.91, p = .05$) (see table 6). Consistent with our expectations, respondents recalled the initial incidents better when they were conceptually dissimilar ($M = 0.60$) than when they were conceptually similar ($M = 0.50$). No other effects were significant (all $p$-values > .1). As expected, respondents recalled the initial vacation events equally well regardless of the whether they were positively or negatively valenced.

Recall for the target incidents was further assessed by examining the number of details that each participant remembered about the incidents. The number of details to-be-remembered from each incident was established during the affective intensity pretest. Respondents in the pretest were asked to underline each piece of information within an incident that led to their affective rating of the incident. Each detail that was underlined by three or more respondents was classified as an item to-be-remembered. In the main experiment, the details written by each respondent were examined to determine how many of the details that they listed matched the list of details for each incident that was generated by the pretest. We expected a main effect of conceptual similarity on recall performance such that respondents that were exposed to the conceptually similar initial
incidents would remember a fewer number of details about the incidents than respondents that were exposed to the conceptually dissimilar initial incidents. Consistent with expectations, we find that when respondents read the vacation experience that described four similar water events at the beginning, they recalled fewer details about the four incidents ($M = 6.86$) than respondents that read the vacation experience that described four dissimilar events ($M = 5.65$, $F = 6.19$, $p < .05$).

<table>
<thead>
<tr>
<th>Valence of Incidents</th>
<th>Similar</th>
<th>Dissimilar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>0.49</td>
<td>0.57</td>
</tr>
<tr>
<td>Negative</td>
<td>0.51</td>
<td>0.64</td>
</tr>
</tbody>
</table>

Table 6: Study 4 Recall Results

Discussion

Study 4 shows that consistent with interference effects (e.g., Tulving 1966), consumers tend to remember the initial events of an experience better following a delay if the events are dissimilar versus similar to each other. As predicted by our memory-based framework, consumers that evaluate an experience consisting of dissimilar initial events following a delay tend to base their retrospective evaluations on the beginning of the experience, consistent with primacy effects. However, consumers that evaluate an experience consisting of affectively equivalent initial events with a common theme tend to rely less on the beginning of the experience when forming their retrospective evaluations, demonstrating reduced primacy effects. As a result, respondents in Study 4
evaluated the overall vacation experience more favorably when the initial events of the experience were positive and dissimilar versus negative and dissimilar, but when the initial events were similar, respondents evaluated the experience equivalently, regardless of the affective valence of the initial events.

Thus, we were able to effectively use our memory-based framework to predict the how an additional variable, event similarity, impacts consumers’ retrospective evaluations of temporal sequences. Additionally, we were able to systematically predict and demonstrate a condition under which the primacy effects demonstrated in Studies 1a and 1b may be reduced or even eliminated. Study 5 will further extend the temporal sequence literature by examining the impact of another variable in extended experiences, event repetition, and show how the proposed framework can make predictions related to this variable.

STUDY 5

In addition to allowing us to predict how consumers form evaluations of temporal sequences containing similar experiences, our framework is able to predict how consumers form evaluations of events that contain repeated experiences, another circumstance for which the temporal sequence literature is unable to account. Consider a consumer who buys a two-day pass to an amusement park while on vacation. She may use her pass on consecutive days or on non-consecutive days during her vacation. Assuming that attending the amusement park is a positive experience, how should the consumer utilize her two-day pass in order to maximize her evaluations of the vacation?
The memory framework we propose in this paper addresses the occurrence of repeated experiences in an event using findings in the literature related to spaced versus massed repetition (e.g., Janiszewski et al. 2003).

The finding in the memory literature that the probability of recalling a repeated item is a function of lag suggests that a consumer’s ability to recall two experiences of similar content and valence (i.e., repeated experience) within one event may be a function of the temporal proximity of these experiences within the event. Specifically, our framework predicts that a repeated experience will be remembered better following a delay and hence, weighted more heavily when forming retrospective evaluations of the event, if these two experiences do not occur consecutively. Stated differently, when two experiences of similar content and valence occur in an event, the experiences will have a greater impact on delayed retrospective evaluations of an event if other experiences of differing content and affective valence and intensity take place between the occurrences of the two similar events. If an incident occurs at the beginning of an event and is repeated at the end of the event, then consumers should recall the incident well because the two occurrences of the incident are temporally separated from each other, resulting in a large impact of the incident on retrospective evaluations. If an incident occurs at the beginning of an event and is repeated immediately, then consumers should have worse relative recall of the repeated incident, resulting in a low relative impact of the incident on retrospective evaluations. Thus:
H8: Following a delay, consumers who evaluate an experience with two occurrences of the same positive event that are temporally separated by other events will be willing to pay more money for a similar experience than consumers who are asked to evaluate the same experience with the two occurrences of the positive event experienced consecutively.

We also hypothesize a main effect of magnitude of temporal separation of the repeated events on recall performance such that

H9: Relative to consumers who evaluate an experience with two occurrences of the same event that are temporally separated by other events, consumers who are asked to recall events contained in an experience with two occurrences of the same event experienced consecutively following a delay will exhibit worse recall of the repeated event in the experience.

Design and Procedure

A one-factor, two-cell designed was utilized. The main factor of interest was the temporal separation of the first instance of the repeated event and the second instance of the repeated event (0 vs. 2 intervening events). One-hundred nine participants from an undergraduate marketing course participated in groups of 20 in exchange for course credit. The study was conducted in two parts. Session one took approximately 25 minutes to complete, and session two took approximately 10 minutes to complete.

All participants read a positive vacation experience containing the same 5 incidents. The target incident was an extremely positive incident, which was developed
and pretested for affective valence and intensity using the procedures outlined in Study 4. In this incident, respondents were told that they went to a restaurant where they had very good food and service. In a separate incident, the restaurant experience was repeated. Respondents were told that they decided to go back to the restaurant to order a different menu item, but all other details were identical to the first restaurant experience. Three incidents that were used in previous studies of this dissertation were also chosen for use in this study based on their affective intensity (2 moderately positive incidents and 1 mildly positive incident) (see table 7). Respondents in the temporal separation condition read a vacation experience that contained the target restaurant incidents in the first and fourth positions in the experience. The second and third positions consisted of a moderately positive (i.e., golf) and a mildly positive incident (i.e., driving tour), respectively. Finally, the last incident in the experience was a moderately positive incident (i.e., zoo) (see table 7). Respondents in the consecutive condition read the target restaurant incidents in the first and second positions in the experience. The third and fourth positions consisted of the moderately positive (i.e., golf) and mildly positive incidents (i.e., driving tour), respectively. In the fifth position, respondents read the same final moderately positive incident (i.e., zoo) as the temporal separation condition (see Appendix L).

The same procedure was used as in Study 4. All subjects completed the target dependent measures following a one-week delay. The main dependent measures in this study were willingness to pay for a similar vacation and recall of the target event (see
Appendix M). Sixty-nine percent of students from the first session participated in the second session, and those that did not participate in the second session were subsequently dropped from further analysis.

<table>
<thead>
<tr>
<th>Incident Description and Temporal Order</th>
<th>Affective Intensity</th>
<th>Incident Description and Temporal Order</th>
<th>Affective Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident 1 – Restaurant experience 1 (target)</td>
<td>5.67</td>
<td>Incident 1 – Restaurant experience 1 (target)</td>
<td>5.67</td>
</tr>
<tr>
<td>Incident 2 – Golf</td>
<td>4.20</td>
<td>Incident 2 – Restaurant experience 2 (target)</td>
<td>5.67</td>
</tr>
<tr>
<td>Incident 3 – Driving sightseeing tour</td>
<td>3.21</td>
<td>Incident 3 – Golf</td>
<td>4.20</td>
</tr>
<tr>
<td>Incident 4 – Restaurant experience 2 (target)</td>
<td>5.67</td>
<td>Incident 4 – Driving sightseeing tour</td>
<td>3.21</td>
</tr>
<tr>
<td>Incident 5 – Zoo</td>
<td>4.33</td>
<td>Incident 5 – Zoo</td>
<td>4.33</td>
</tr>
</tbody>
</table>

Table 7: Study 5 Vacation Incident Order and Affective Intensity

Results

*Willingness to Pay.* A one-way ANOVA revealed a significant main effect of temporal separation of the two occurrences of the repeated event \( F(1,76) = 4.04, p < .05 \). Consistent with our expectations, respondents were willing to pay significantly more money to experience a similar vacation when the two occurrences of the repeated
restaurant experience were temporally separated by two other events (M = $592.51) than when the two occurrences of the repeated restaurant experience occurred consecutively, with no intervening events (M = $485.47). Thus H8 is supported.

Recall. Recall was coded by whether a brief description of the target incident (i.e., restaurant experience) was present or absent. That is, if respondents recalled one or both of the restaurant experiences, they were marked as having recalled the target incident. Recall was analyzed as 2-cell design with temporal separation of the repeated incident as a between-subjects factor. Because we anticipated that recall performance would only increase with a greater temporal separation of the occurrences of the repeated incident, a one-tailed ANOVA test was utilized. Consistent with expectations, we find that when respondents experienced a vacation containing two occurrences of a repeated event that were temporally separated by other events, they had better recall performance on the target incident (M = 1.00) than respondents that experienced a vacation containing two occurrences of a repeated event that were consecutive (M = 0.92, F = 3.17, p < .05).

Discussion

Consistent with the findings on spaced versus massed repetition (e.g., Janiszewski et al. 2003), Study 5 shows that following a delay, consumers tend to recall repeated events better if the occurrences of a repeated event are temporally separated versus consecutive. From our framework, we predicted that the lower relative recall of the positive repeated event in the consecutive condition would result in lower relative retrospective evaluations of the overall vacation experience. In support of this expectation,
we find that respondents in Study 5 were willing to pay more money for a vacation experience that contained two occurrences of a positive repeated event that were separated by two other intervening events than for a vacation experience that consisted of the same two repetitions of the event occurring with no intervening events.

Our results provide additional evidence of the explanatory power of the proposed memory-based framework by introducing another variable to the temporal sequences domain, repetition, and using the framework to systematically predict the manner in which this variable impacts consumers’ retrospective evaluations of extended experiences. Specifically, Study 5 suggests that consumer evaluate an experience differently if repeated events contained within the experience occur consecutively or with other intervening events. When one event has occurred, a second event of similar content and valence will become more accessible in memory and hence, more heavily weighted in retrospective evaluations of an affective experience, if other events of differing content and affective valence take place between the occurrences of the two similar events. Thus, when evaluating an experience following a delay, consumers tend to heavily weight a repeated event when forming their overall evaluations of the experience if the second occurrence of a repeated event occurs following other events in the experience, whereas if the second occurrence of a repeated event occurs immediately following the first occurrence of the repeated event, consumers tend to form evaluations of the experience with a lower relative weight on the repeated event.
CHAPTER 5

ACTUAL EXPERIENCES

One limitation of Studies 1-5 is that one might argue that consumers do not retrospectively evaluate real experiences in the manner proposed by the framework. To test our framework, we utilized hypothetical vacation experiences that induced role-playing. That is, our participants did not actually experience a vacation; instead, they imagined that they experienced a vacation. Since all of the previous studies utilized hypothetical experiences, it is difficult to argue that actual experiences would display a similar pattern of results. Research in the temporal sequences literature has shown comparable findings across both hypothetical and actual experiences. For example, using descriptions of aversive experiences, Varey and Kahneman (1992) showed that the end of an experience is heavily weighted in retrospective evaluations, and Kahneman et al. (1993) demonstrated the same finding by asking subjects to evaluate a sequence of experienced pain. Thus, we assume that our findings are applicable to both hypothetical and actual experiences. However, from the previous studies our framework seems unable to account for the possibility that real experiences might result in online evaluations, making the effects of delay much smaller than we observed.
Thus, the objective of Study 6 is to replicate the findings of Study 1b using actual experiences to demonstrate that the framework is not limited to accounting for consumers’ evaluations of hypothetical experiences. By replicating the effects found in Study 1b for immediate and delayed evaluations of both improving and declining sequences, we will be able to argue that our proposed framework accounts for consumers’ retrospective evaluations of both actual and hypothetical experiences, increasing our confidence in our framework.

STUDY 6

Stimulus Materials

To develop the stimulus materials, 33 undergraduate marketing students were asked to evaluate the affective valence and intensity of 12 forty-five second music clips that were used in Ratner, Kahn, and Kahneman (1999). Specifically, participants were told that they would be listening to a number of short clips from the songs of a variety of popular artists and evaluating these clips. They were instructed to listen to each song clip in its entirety before moving on in the survey. Following each song clip, they were asked to report how the song clip made them feel at that given moment on a scale ranging from -7 to +7 anchored by “extremely negative” and “extremely positive.” All 12 song clips were utilized in the main study (see table 8).
<table>
<thead>
<tr>
<th>Song Clip</th>
<th>Affective Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roxy Music: More Than This</td>
<td>-0.33</td>
</tr>
<tr>
<td>The Pretenders: Rebel Rock Me</td>
<td>0.30</td>
</tr>
<tr>
<td>Rolling Stones: Waiting on a Friend</td>
<td>0.76</td>
</tr>
<tr>
<td>Steely Dan: My Old School</td>
<td>0.79</td>
</tr>
<tr>
<td>The Moody Blues: I Know You’re Out There Somewhere</td>
<td>0.91</td>
</tr>
<tr>
<td>Jimmy Cliff: The Harder They Come</td>
<td>1.06</td>
</tr>
<tr>
<td>Police: Canary in a Coalmine</td>
<td>1.09</td>
</tr>
<tr>
<td>Elvis Costello: I Write the Book</td>
<td>1.24</td>
</tr>
<tr>
<td>New Order: Bizarre Love Triangle</td>
<td>1.52</td>
</tr>
<tr>
<td>The Cars: Best Friend’s Girl</td>
<td>2.00</td>
</tr>
<tr>
<td>Squeeze: Tempted</td>
<td>3.27</td>
</tr>
<tr>
<td>Queen: Under Pressure</td>
<td>4.24</td>
</tr>
</tbody>
</table>

Table 8: Song Clip Stimuli Affective Intensity

Design and Procedure

A 2 (evaluation timing: immediate vs. delay) X 2 (music CD trend: improving vs. declining) between-subjects design was employed. One-hundred thirty-nine students in a marketing undergraduate class participated in the study in exchange for course credit. Participants in the immediate condition completed only one session, while participants in the delay condition completed two sessions separated by one week. Session one took approximately 20 minutes to complete, and session two took approximately 10 minutes to complete.

The 12 song clips pretested prior to the main experiment were presented to participants in an online survey (see Appendix N). Participants were told that they would be listening to a number of short music clips from a compilation CD created by an Ohio
State student after which they would be asked to answer some questions. They were instructed to listen to each song clip in its entirety before moving on in the survey (see Appendix O). Half of the participants listened to a CD with an improving trend. That is, the CD began with a song that elicited a negative affective response in the pretest and ended with the song that elicited the most positive affective response in the pretest. The other half of the participants listened to the same compilation of songs in a declining trend. That is, the CD began with the most affectively positive song and ended with an affectively negative song.

Participants in the immediate condition completed the target measures immediately following the music clips (see Appendix P). Participants in the delay condition completed a filler task immediately following the music clips (see Appendix Q), and they completed the target measures one week after listening to the music clips. The main dependent measures were willingness to pay for the CD and intent to purchase the CD. These dependent variables were measured in the same manner as in the previous studies. In addition, enjoyment was added as a dependent measure since this study consisted of an actual experience. Enjoyment was measured by asking respondents to indicate how much they enjoyed listening to the CD on a scale from 0-100 where 0 is the least enjoyable experience that they could imagine and 100 is the most enjoyable experience that they could imagine.

In the delay condition, respondents answered a series of questions about downloading music immediately after listening to the CD. They were sent an e-mail one week after their participation indicating that there was a follow-up session to the experiment. At that time, they were asked to complete an online survey containing the
target measures, in exchange for additional course credit. Seventeen students did not complete the target measures in session two and were subsequently removed from further analysis.

Results

*Willingness to pay.* Willingness to pay scores were subjected to an ANOVA with evaluation timing and trend as the independent factors. Consistent with our expectations, the analysis revealed a significant interaction between evaluation timing and trend \((F(1,118) = 8.02, p < .05)\) (see figure 5.1). A priori contrasts revealed that respondents in the immediate condition were willing to pay significantly more money to purchase the CD if the songs were presented in improving versus declining order \((M = $4.16\) vs. $2.47 respectively, \(t_{118} = -1.98, p = .05\)). However, in the delay condition, respondents that listened to the declining CD were willing to pay more money to purchase the CD \((M = $4.89)\) than respondents that listened to the improving CD \((M = $2.83, t_{118} = 2.04, p < .05)\), consistent with the results obtained in Study 1b. No main effects were significant (all \(p\)-values > .1).

*Purchase intentions.* Purchase intentions were subjected to an ANOVA with evaluation timing and trend as the independent factors. Consistent with willingness to pay scores, the analysis revealed a significant interaction between evaluation timing and trend \((F(1,118) = 3.80, p = .05)\) (see figure 5.2). In the immediate condition, respondents that listened to the song clips in an improving order reported higher purchase intentions \((M = 20.82)\) than respondents that listened to the song clips in a declining order \((M = 14.32)\).
However, in the delay condition, respondents that listened to the improving CD had lower purchase intentions ($M = 14.13$) than respondents that listened to the declining CD ($M = 22.86$). While the significant interaction was consistent with our hypotheses, the analysis revealed that individual contrasts were not significant (all $p$-values $> .05$). No other effects were significant.

*Enjoyment.* Enjoyment scores were subjected to an ANOVA with evaluation timing and trend as the independent factors. As with willingness to pay scores and purchase intentions, the analysis revealed a significant interaction between evaluation timing and trend ($F(1,118) = 8.68, p < .05$) (see figure 5.3). In the immediate condition, respondents that listened to the CD with songs presented in an improving order reported more enjoyment from the experience ($M = 63.06$) than respondents that listened to the CD with songs presented in a declining order ($M = 49.08$), and planned contrasts revealed that this difference is significant ($t_{118} = -2.68, p < .05$). In the delay condition, respondents that listened to the CD with the improving song order reported less enjoyment from the experience ($M = 48.30$) than respondents that listened to the CD with the declining song order ($M = 58.18$). While this individual contrast is directionally consistent with our expectations, it did not reach conventional levels of significance ($t_{118} = 1.60, p > .05$). The analysis showed that no other effects were significant.
Figure 5.1: Study 6 Willingness to Pay Results

Figure 5.2: Study 6 Purchase Intentions Results
Discussion

Study 6 shows the same crossover pattern that was found in Study 1b. Using real experiences, not hypothetical experiences, this study demonstrates that assessing evaluations of temporal sequences following a delay reverses evaluations of temporal sequences assessed immediately. Consistent with our framework and the findings of Study 1b, which used hypothetical vacation scenarios, respondents were expected to heavily weight the songs at the beginning and end of the CD immediately, whereas they were expected to heavily weight only the songs at the beginning of the CD following a delay, resulting in the evaluation reversal. An important finding from this study is that respondents exhibited the same systematically-predicted pattern of evaluations using the CD of song clips as they did when the extended experience was simulated in Study 1b by asking respondents to read about a vacation experience. Because these effects were
consistent across both hypothetical and actual experiences, we believe that differential recall for temporally located events accounts for the pattern of evaluations found in Studies 1 and 6, regardless of whether the experiences were real for the consumer or simply simulated. Thus, Study 6 increases our confidence in the ability of our proposed memory-based framework to account for a substantial portion of how consumers retrospectively evaluate extended experiences.
CHAPTER 6

SUMMARY AND CONCLUSIONS

In this chapter, we will summarize the findings and the issues that this dissertation addresses. Additionally, we will outline the theoretical and practical contributions of this dissertation and discuss areas for future research.

OUR RESEARCH APPROACH

After reviewing the literature on temporal sequences, we discovered that research in this domain has resulted in a proliferation of variables that lacks an overall structure to account for the disparate set of findings. A temporal sequence was defined as an experience that consists of a series of outcomes spaced over time. Research on temporal sequences has generally focused on uncovering predictors of retrospective evaluations of events that consist of a series of experiences. It has been found that people prefer experiences that are improving versus declining. In addition, people heavily weight the peak affective intensity and the end affective intensity when forming global retrospective evaluations of an experience. However, a framework that integrates findings in this area
of research is missing, and this dissertation was intended to propose an initial memory-based framework that seeks to explain current findings and make predictions for others.

The memory-based framework that was proposed in this research is based on traditional memory literature that has sought to explain how information is encoded, stored, retrieved and used by people. We rely significantly on findings in the area of free recall, focusing on primacy, recency, the von Restorff effect, interference, and repetition. We argue that temporal sequences can be viewed as a set of items to be remembered and when people evaluate the sequences, those instances that are retrieved will exert greater effect on the overall evaluation of the sequences. In that sense, our explanation is comparable to explanations that rely on availability of information in memory (e.g., Feldman and Lynch 1988).

Based on the theoretical and empirical evidence that we reviewed, we developed nine hypotheses and conducted seven empirical studies to test these hypotheses. Our research was divided into three phases. In the first phase of the research we tested the ability of the proposed memory-based framework to account for past findings in the temporal sequences literature. In the second phase of the research, based on our test of the memory-based framework in the first phase as well as a review of past literature, we predicted and empirically tested extensions in the temporal sequences domain. In the third and final phase of this dissertation, we tested the applicability of the memory-based structure to real, not hypothetical, sequences of events. In the next section, we present a summary of our findings.
Consistent with our memory-based explanation, we find that when forming retrospective evaluations of an experience, consumers heavily weight the aspects of the experience that are most easily accessible in memory. Therefore,

1. When evaluations are assessed immediately, consumers base their evaluations of the experience on the end of the experience because final incidents are easily accessible. When evaluations are reported following a delay, however, consumers heavily weight the initial part of the experience because of a declining recency effect and a strong primacy effect. As a result, consumers’ evaluations of an improving experience are more favorable immediately versus following a time delay (H1), and consumers exhibit a preference for an improving experience over declining experience immediately, while displaying the opposite pattern following a time delay (H2a and H2b). Hence, consumers’ use of the beginning intensity and the end intensity when forming retrospective evaluations is dependent upon when evaluations of the experience are assessed.

2. Consumers heavily weight a peak affective intensity incident their retrospective evaluations of an experience regardless of the presence of a delay or the location of the incident within the experience (e.g., end or middle) if the incident is atypical, not common (H3 and H5). This occurs because of consumers’ better relative recall of the atypical incident (H4 and H6). Hence, consumers do not always heavily weight peak intensity incidents when evaluating a past experience, as temporal sequence research suggests. This finding implies that uniqueness of the peak intensity event, not affective
intensity alone, determines whether consumers will recall the incident well, and as a result, heavily weight the incident when forming their retrospective evaluations of the experience.

3. The impact of heavily weighted events on consumers’ delayed evaluations (i.e., initial events) is reduced if the events are similar to one another (H6). When consumers report delayed evaluations of an experience with different initial events, they heavily weight the initial part of the experience because of a strong primacy effect. However, when consumers evaluate an experience consisting of similar initial events, their relative weighting of the initial part of the experience is reduced because of a declining primacy effect. That is, consumers’ ability to recall events is inhibited if the events have one or more common characteristics (H7) resulting in their lower relative weighting in retrospective evaluations of an experience.

4. When an event is repeated within an experience, consumers’ relative weighting of the repeated event on delayed retrospective evaluations will be enhanced with intervening events between the two occurrences of the repeated event (H8). This occurs because consumers recall the repeated event better if the two occurrences are temporally separated by other events rather than experienced consecutively (H9).

5. When forming evaluations of a temporal sequence that is actual, not simulated, consumers’ immediate evaluations of an improving experience are more favorable than a declining experience, but consumers’ delayed evaluations of an improving experience are less favorable than a declining experience. This finding in Study 6, which replicates the finding from Study 1b using hypothetical experiences, implies that consumers heavily
weight events of an experience that are most easily accessible in memory when forming retrospective evaluations of the experience, regardless of whether the experience is actual or simulated.

THEORETICAL CONTRIBUTIONS

Our research contributes to the temporal sequences literature. A temporal sequence is defined as an experience that consists of a series of outcomes spaced over time. Typical research in the temporal sequences literature has attempted to uncover predictors of retrospective evaluations of temporal sequences. The findings from this stream of research indicate that people form global retrospective ratings of an experience using salient characteristics of the experience, such as the peak intensity, the end intensity, and the trend. While much attention has been given to studying temporal sequences of events, few have offered explanations to account for how people integrate these events into a holistic evaluation of the experience, and significantly less attention has been given to the underlying mechanism responsible for these effects. The current explanations that have been proposed to account for temporal sequence findings tend to be ad hoc in nature and are limited to explaining reported findings rather than offering a comprehensive account of the findings in the literature. Accordingly, an abundance of new variables has been introduced with little structure to integrate the findings.

Our research is a significant departure from typical temporal sequences research in that it provides a parsimonious structure based on memory and learning theory to better understand the process underlying consumers’ formation of global retrospective
evaluations of an experience. We examine whether a memory-based structure can explain a substantial portion of how consumers evaluate past extended experiences and allow us to make predictions that have not yet been tested in the temporal sequences literature.

A major contribution of our research is the finding that by utilizing our proposed framework, we are not only able to, under predicted conditions, replicate the impact of previously-tested predictors, but we are also able to eliminate and reverse prior findings in the temporal sequence literature. In addition to accounting for past findings such as a preference for improving over declining temporal sequences and the important role of peak (both high intensity and unique) experiences, our results also show conditions under which those findings can be reversed or eliminated. For example, though a preference for an improving versus a declining vacation experience is found in Study 1b when participants are asked to evaluate the vacation experience immediately, the results show that consumers prefer a declining sequence when respondents report evaluations following a delay. These results are contrary to the previous finding that consumers prefer improving versus declining trends (e.g., Loewenstein and Prelec 1993). The reversal is predicted by our framework based on declining recency effects over time. Thus, by adopting a memory-based structure, we are able to demonstrate control over evaluation process that consumers utilize when retrospectively evaluating temporal sequences.

We further add to the temporal sequences literature in that our framework also provides an explanation for some of the inconsistent findings reported in the literature. For example, the absence of an effect of peak intensity on overall evaluations in Ariely and Carmon (2000), while inconsistent with other findings in this literature (e.g.,
Schreiber and Kahneman 2000), can be explained by our framework. Their results suggest that peak pain intensity was not a predictor of overall pain ratings of patients in a bone marrow transplant unit. Our research similarly finds that peak affective intensity is not always a significant predictor of global evaluations. For example, in Studies 2 and 3 of our research we demonstrate that the peak affective intensity is not always weighted heavily in consumers’ evaluations of experiences as past research suggests (e.g., Redelmeier and Kahneman 1996). Instead, these studies show that the incident with the peak intensity is only heavily weighted in consumers’ evaluations of the vacation experience if the incident is viewed as atypical. A common event with the same peak affective intensity is not incorporated in consumers’ retrospective evaluations following a delay. Combined, these results suggest that peak intensity was not a predictor of overall evaluations in Ariely and Carmon (2000) because this moment was not viewed as atypical. Patients in a bone marrow transplant unit may experience highly intense moments of pain, to which they become accustomed (i.e., common), resulting in a lower relative weight being placed on these moments of intense pain when forming global evaluations.

Interestingly, Baumgartner et al. (1997) examined the correlations between momentary ratings in advertisements and retrospective evaluations of the ads and found that a delay did not appear to eliminate the impact of the final segment of the ad on global evaluations. From these findings, the authors concluded that another explanation must account for the results, not just recency. However, an examination of their findings suggests that differential memory may still have impacted the correlations. The correlations between end intensity and overall ad evaluations are much lower following a
delay (M ≈ .60) (study 2) than when evaluations are taken immediately following the presentation of the ads (M ≈ .90) (study 1). The pattern of correlations is consistent with the idea that the delay is altering respondents’ use of the end intensity in forming their overall evaluations. Specifically, the delay may be retarding respondents’ memory of the final portion of the experience, resulting in diminished use of the end intensities in forming overall evaluations of each advertisement.

Additional experimental evidence seems to support our memory-based explanation as the underlying mechanism responsible for temporal sequence findings. Fredrickson and Kahneman (1993) found that evaluations of pleasant film clips reported following a delay had only moderate correlations with retrospective evaluations made immediately (study 1) and with online ratings of affect of the film clips (.48 and .58 respectively). They speculated that the evaluation differences were attributed to respondents’ inability to accurately recall the affect they experienced while watching the film clips. This finding is consistent with the recall literature that suggests that respondents may recall items better immediately versus after a retention interval (e.g., Bahrick et al. 1974). This explanation accounts for the relatively low correlation between online ratings and overall retrospective evaluations, as compared to other temporal experience research. Research in the temporal sequences domain has also shown that the beginning of an experience may contribute to retrospective evaluations (Ariely and Zauber 2000), which is consistent with a recall explanation. Using annoying sounds and performance feedback, Ariely and Zauber (2000) found that the difference between evaluations of single-trend sequences (i.e., up or down) was larger than the difference between evaluations of two-trend sequences (i.e., up and down or down and
up). This finding was taken as evidence that besides peak and end intensities, the initial part of the experience is also important in determining retrospective evaluations. The recall literature suggests that given sufficient rehearsal time, respondents will exhibit primacy effects (Glanzer and Cunitz 1966). Thus, respondents are expected to place some weight on the initial part of an experience when forming overall evaluations. Combined, past research appears to corroborate the appropriateness of our memory-based framework in explaining how consumers form evaluations of past experiences.

The finding that accessibility of affective events is responsible for how consumers evaluate experiences not only accounts for contradictory findings in the literature, but an established memory-based framework also facilitates the systematic prediction of the impact of previously unstudied variables in this domain, such as similarity and repetition of temporal sequence components, on consumer evaluations of extended experiences. Prior temporal sequences research has not reported any effects of similar events or repeated events in a sequence on retrospective evaluations. The findings from this dissertation demonstrate that the adoption of a memory-based framework allows marketers to make predictions about temporal sequence evaluations that would not be possible from the current set of findings in this domain. Hence, a critical contribution of our research is the finding that the proposed framework allows us to predict how previously unstudied temporal sequence characteristics will impact consumers’ retrospective evaluations.
Overall, our research significantly contributes to past research in temporal sequences by creating a comprehensive framework based in memory and learning theory that not only provides a parsimonious explanation for the findings on retrospective evaluations of temporal sequences, but also extends research in this domain.

MANAGERIAL CONTRIBUTIONS

For a marketer responsible for managing consumers’ extended experiences, our findings provide evidence to suggest that the temporal structure of product and service experiences can heavily influence customer satisfaction and likelihood of repurchase, and our findings present some useful insight on how marketing managers may engineer experiences to maximize consumer enjoyment. Specifically, marketers may enhance product and service experiences that extend over time by improving the most memorable events. Our findings imply that for long term consumer enjoyment, marketers should attempt to make consumers’ initial experiences with a service or a product very positive. These initial experiences are more likely to be stored in and easily retrieved from consumers’ LTM, which will ultimately lead to more positive evaluations and higher purchase intentions. Also, marketers should attempt to make extremely positive events unique for consumers and avoid atypical negative events because unique events are much more likely to be recalled by consumers when they attempt to evaluate a service or product. Our findings also imply that if consumers have a negative event within their product or service experience, a marketer may diminish the weight that consumers place on that event by engineering similar events that are more positive. Finally, marketers
should attempt to appropriately space positive repeated events to insure that consumers recall those events and incorporate them into their global evaluations of the experiences.

Our findings further suggest to marketers that customer satisfaction ratings will be biased by evaluation timing. As we demonstrated in Studies 1a, 1b, and 6, consumers’ evaluations of an experience may not remain consistent. Instead, consumers’ evaluations will be heavily dependent on whether evaluations are assessed immediate or following delay and, accordingly, what aspects of the experience they remember. Our findings from Study 6 suggest that consumers do not spontaneously evaluate experiences; instead, it appears that consumers do not evaluate experiences until a specific need to do so arises (i.e., asking for evaluation). Therefore, we may assume that future purchase decisions are typically temporally removed from an experience that has just ended, and as a result, we propose that delayed evaluations versus immediate evaluations are a more accurate predictor of consumers’ future purchase decisions.

Overall, from a managerial perspective, this dissertation provides an understanding of the process underlying consumers’ evaluations of product and service experiences that extend over time, and how they may be enhanced.

FUTURE RESEARCH

While our findings demonstrate the power of a memory-based framework in explaining why consumers evaluate experiences using certain characteristics of the experience and not others, the use of a memory-based framework gives rise to some interesting issues to be addressed by future research in this area. One issue concerns the
potential effects of spontaneous immediate evaluations or on-line evaluations on assessments of an experience following a delay. Though our research only examines retrospective evaluations of events, our memory-based framework may account for situations where consumers evaluate an experience online. For example, if each experience in a sequence is evaluated individually and spontaneously, people would still have to recall those evaluations and integrate them. Therefore, which evaluations come to mind will drive the ultimate evaluation. Evidence from the temporal sequence literature seems to support this assertion. For example, Redelmeier and Kahneman (1996) asked subjects to provide on-line ratings of pain during a colonoscopy, and Fredrickson and Kahneman (1993) asked subjects to provide on-line ratings of affect of pleasant and aversive film clips. Despite participants’ on-line ratings, the researchers still find evidence that global retrospective ratings of the experience are highly correlated with the peak intensity and the final moment of the experience. Thus, our memory-based framework is expected to hold in those conditions where consumers develop spontaneous on-line evaluations of the individual moments of an extended experience.

However, if a spontaneous global evaluation is made immediately following an experience, then we expect that subsequent evaluations of the experience (i.e., delayed evaluations) will be more highly correlated with the initial judgment than with the affective valence of the information recalled from the experience. This assertion is based on research by Kardes (1986) that demonstrates that if consumers form spontaneous evaluations of past experiences, then the initial judgment will influence subsequent judgments. The findings from Redelmeier and Kahneman (1996) also support this assertion. The researchers find that when respondents are asked to report global
retrospective evaluations of pain both immediately and following a delay, the evaluations are highly correlated. Thus, if individuals evaluate an extended experience immediately following the experience, we assume that they will not rely on their memory for various aspects of the experience; instead, they will recall their initial evaluation of the experience when evaluating the experience following a delay (Hastie and Park 1986). However, more research is needed to examine spontaneous and on-line evaluations.

A second issue that is an interesting question for future research concerns the ability of our memory-based framework to account for events consisting of homogeneous experiences. While our research utilizes heterogeneous experiences, other temporal sequence research has utilized homogeneous experiences (e.g., Ariely 1998; Kahneman et al. 1993). Heterogeneous experiences are those that differ on multiple dimensions (e.g., various vacation experiences), while homogeneous experiences are those that vary on one dimension (e.g., pain intensity). An event that contains homogeneous experiences can be viewed as a list of words that belong to just one category. In such cases, the experiences are encoded based on their value on that particular category attribute (e.g., Miller 1958; Horowitz 1961). Thus, we assume that homogeneous experiences will be encoded based on the dimension upon which they vary (e.g., pain intensity). These values will then act as retrieval cues. Recall still follows prior findings and therefore our findings should still hold. This is evident by the ability of our framework to account for the lack of peak intensity effects in our heterogeneous sequences, as well as in a homogeneous sequence of pain in which patients were accustomed to painful episodes (Ariely and Carmon 2000). Future research should further examine the differences between events that contain heterogeneous versus homogeneous experiences.
APPENDIX A

TEMPORAL SEQUENCE FINDINGS EXPLAINED BY MEMORY-BASED FRAMEWORK
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**FREE RECALL FINDINGS**

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**REAL-TIME RATINGS**

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**EXPECTED EXPERIENCE**

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APPENDIX B

VACATION STIMULUS AFFECTIVE INTENSITY PRETEST INSTRUCTIONS
GENERAL INSTRUCTIONS

The following page contains one experience that occurred on a college student’s recent vacation. While you are reading the event, imagine that you are actually experiencing it. Following the incident, you will be asked to report how the experience made you feel. You will use the following scale to report your feelings:

-7 -6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6 +7
Extremely negative Neutral Extremely positive

The positive numbers on the scale represent degrees of any positive feelings that you may be experiencing. The negative numbers represent degrees of any negative feelings that you may be experiencing. 0 represents neutral feelings (i.e., neither positive nor negative). After reading the experience, you will be presented with a scale like the one above. When you are presented with the scale, please circle the number that most closely approximates how you are feeling at that given moment.

If you have any questions, please ask the experimenter now. Otherwise, please turn the page and begin. We thank you in advance for your participation.
GENERAL INSTRUCTIONS

Thank you for participating in our research. In this session, you will be asked to read about an Ohio State student’s recent seven-day vacation.

Due to the length of the vacation description, the vacation experience will be presented over a series of pages contained in this folder.

Please read through the vacation experience very carefully. While you are reading about the vacation, imagine that you are actually experiencing each of the events described. When you are finished reading about the vacation, you will be asked to provide your opinions on that vacation.

If you have any questions, please raise your hand. If you have no questions, please wait for the experimenter to instruct you to open the folder.
APPENDIX D

STUDY 1A STIMULI
When we first arrived at our hotel, my friends and I made several plans for the day including going to an amusement park. We were really excited to go. We all woke up and got dressed. Then, we turned on the television to see what the weather was like. The weather channel reported that a hurricane was headed our way. The hurricane was supposed to miss us, but apparently, it changed direction. A hurricane slammed into the city that day. While it was not a severe hurricane, there was still a large amount of rain and wind, so we definitely could not go to the amusement park. We were stuck in the hotel the entire day. We had no electricity, so we could not watch television. We basically had nothing to do. Since we had no electricity, we had no air conditioning either. It was very hot and muggy in the hotel, and we sat around all day dripping with sweat because of the heat outside.
During our trip, the weather gradually improved. I was so excited one morning to head to the beach to get some sun. It was a bright, sunny day, and the weather was warm. I walked towards the beach, laid down in a chair, and began to read my book. Before I knew it, I was waking up from a nap. I had no idea how long I had been asleep, but I knew that the sun was beginning to feel painful on my skin. I gathered up my book and my towel, and I began walking back to my hotel room. When I got inside, I looked at the clock and realized that I had been baking in the sun for a long time, and I had not re-applied sunscreen. I ran to the mirror, and I discovered that I was burnt to a crisp. The sunburns all over my body were extremely unpleasant. It did not hit me until later that evening when the itching and burning sensation hit my shoulders, my face, my back, and most uncomfortably, my feet. I was in constant agony and discomfort. I had to continually get in a cold bath to ease the pain, and I had to apply aloe constantly to help with the burn.
I decided it would be a good idea to do something other than lay out in the sun, so we made plans to go surfing. I was really excited because I had never been surfing before. I had always wanted to learn, but I had never had the chance. My friends and I made reservations through the hotel to receive a lesson. The day that we were supposed to go take lessons finally came, and I headed out to the beach, excited to try this new sport. My friends and I walked up to the stand where the instructors are, and we told them that we were there for lessons. They asked us our surfing level, and we told them that we were all beginners. Our assigned instructor looked at us and said that the waves were really rough that day. As a result, he did not think that it would be safe to take beginners out into the ocean. Therefore, the instructor refused to give us surfing lessons that day.
Since there was a lull in the trip, we headed downstairs to the casino. I strolled over to the tables to play Black Jack. I sat down and handed my set amount of gambling money to the dealer to get my chips. I placed my bet on the table, and with that, the dealer dealt the first hand. I had an 18. The dealer got a 20. I lost that hand. I placed another bet on the table, and I was dealt a 15, which is a terrible hand. I decided to stay. The dealer hit a 21, Black Jack, and I lost again. My bad luck continued until I had lost the money that I set aside for gambling that night. I decided to pull more money out of my wallet and throw it on the table to get more chips. I was sure that my luck would change, but it didn’t. I ended up losing more money than I thought I would. After losing money, my friends and I decided that it might be a good idea to get out of the hotel while we were on our trip.
We decide to rent a car and go out for a drive. We were out driving, and a thick fog began to roll in. A blanket of white quickly surrounded our car, and we couldn’t see to drive. We could not see more than a couple of feet in front of us, and we certainly couldn’t see the beautiful scenery that we had set out to see earlier in the day. The weather conditions forced us to pull the car over to the side of the road. We did not expect to be here for too long, as we thought the fog would clear out shortly. We stepped out of the car to see where we were. When we got out of the car, it began to rain. We jumped back into the car and began driving again. The thunderstorm became so severe that we had to pull off to the side of the road again. We finally made it back to the hotel, but it rained the entire afternoon, and we didn’t see the sun once.
My friends and I had spent the earlier part of the week doing things together, but one day we just decided that we wanted to do different things. We split off into two groups. My group went shopping to look for souvenirs, while the other group went to a local museum. We said goodbye to the other group and made plans to meet for lunch at a local restaurant that the concierge recommended. Around lunch time, we left the store and walked to the restaurant where we had promised to meet our friends. It was a slightly longer walk for the other group, so we didn’t think anything of it when they were a little late to the restaurant. We waited for our friends, and ten minutes went by. Then, thirty minutes went by. By this time, we were starving, and we decided to order some appetizers. My friends and I were mad at the other group for being so late. Before we knew it two hours had gone by. We rushed back to the hotel and saw our friends. We realized that there was more than one of that restaurant, and each group accidentally went to a different one.
The next morning we woke up early to head to the golf course. My friends and I had made a tee time at one of the Top 100 golf courses in the world. I really wanted to play my best and try to beat everyone, especially my one friend. He was a great golfer, and I had never beaten him before. I knew that this golf course had a reputation for being challenging, but I still wanted to play well. The four of us walked up to the desk to check in before heading to the first tee. I was the last one to tee off, and I was shocked to see that I had driven the ball farther than any of my other friends. At first, I thought that it might have been lucky, but when the same thing happened on the second tee, I knew it was going to be a good day. I shot my best round of golf ever. It was a great feeling going up to the 18th hole next to the driving range knowing that I had a four shot lead on my friend. I got a par on the last hole and ended up winning by five strokes. It was a great experience to finally get the lowest score on a round of golf.
We had explored the local town earlier on our trip, so we decided to head out to explore some of the neighboring areas later in the week. While driving, we decided to stop in a small town. This little city had people selling wooden animals and numerous amounts of shoes, jackets, and shirts. As we walked around the city, we browsed in the shops and spoke with the locals. The shops were small and full of Spanish-speaking people. One place that grabbed my eye was a small liquor store that had huge old barrels in the back of the store. I walked into the store and asked the clerk if I could purchase two liters of homemade sangria, a spicy fruit punch made with wine. After paying a small amount of money and walking out of the store with the bottle, I was on my way. We walked further down the sidewalk and noticed a huge port right in front of us. People were swimming freely just off of the rocky beach. We took off our shoes and socks and jumped in. I began tossing the two liter bottle around to my friends. The water was cool, but the spicy sangria kept us warm.
We enjoyed the Mexican influence in the town, as evidenced by the sangria, so we decided to go to an authentic Mexican restaurant for dinner one evening. The concierge at our hotel told us that this restaurant had decent food, so we hailed a cab and took the short 5 minute ride to the restaurant. When we pulled up, and walked into the restaurant, we saw bright, colorful walls. We were met by a friendly hostess who seated us at a table outside on the patio. She handed us the menus. I began to scan the menu for something to satisfy my hunger. I decided to order enchiladas, my favorite Mexican dish, and we ordered a pitcher of margaritas. The food was steamy when it came out, but the enchiladas were delicious. The margaritas were cool in my mouth and were a pleasant contrast to the heat of the food and the hot weather. We ate and drank margaritas all evening before heading back to the hotel.
After doing typical vacation activities, like eating out, my friends and I decided that we just wanted to do something that none of us had done or would do on an average day, so we decided to go skydiving. When we got there, we sat for a lecture and watched a video on safety precautions and techniques. Then, we got into the harnesses, got on the plane, and took off up into the air. I was so nervous yet excited. I could feel butterflies in my stomach as the plane continued to rise. All of a sudden, the instructors announced that we had gotten to the jumping height, and we were ready to go. I watched as both of my friends and their instructors stepped up to the open door and plummeted towards the ground. When it was my turn, my instructor got us set and we jumped. It was like nothing I could even imagine. I felt so free and my adrenaline was pumping. My instructor pulled the cord, and the parachute emerged from the pack jolting us. We began floating towards the ground, and it was peaceful. As the ground neared, we prepared to land. When we landed, I wanted to do it again right away, but I didn’t.
Instead, we decided to drive into town to visit some of the local shops. To our surprise, in the middle of an intersection where five roads come together, the city was throwing a festival. The roads were blocked off, and the streets were filled with people, carnival rides, and food stands. We walked up to a food stand and ordered some of the local delicacies. I ordered fried dough that was filled with apples. My first bite filled my mouth with a wonderfully sweet, sugary taste. As we continued to walk, we came across several local bars that we had never been too before. The locals were stumbling out of the bars and enjoying themselves, so we figured the bars must be good. We walked into one of the bars that had loud music coming from it. The bar was giving away free drinks in honor of the celebration, which of course we did not turn down. There were many locals at the bar, who were extremely friendly. Several of them came up to my friends and I just to have a nice chat and make sure that we were having a good time in their city. It was a pretty good time hanging out with my friends and the locals.
At the end of our trip, my friends and I agreed that we should head back to the casino to do some gambling. We walked downstairs to the first floor of our hotel where the casino was located, and we were immediately bombardied with all of the free drinks that we could handle. I placed several bets at the roulette table, some of which I won and some of which I lost. I was about even. All of a sudden, I heard a loud scream at another roulette table. I turned around and saw two of my friends yelling and jumping up and down. I quickly discovered that two of my friends had won big playing roulette. The pit boss approached our group, and we were all immediately invited to a private party at the casino with free food and drinks. My two friends were so excited that they had won so much money that they decided to pay for the rest of the night. We lived it up. We headed out to all of the exclusive clubs throwing money around until the early hours of the morning.

The End

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SURVEY

Please answer the questions below pertaining to the vacation experience that you read about last week. Please read all question instructions carefully.

1. Please indicate how likely you would be to purchase a vacation experience like the one that you just read on a scale from 0 to 100 where 0 is “definitely will not purchase” and 100 is “definitely will purchase”. On the line below, please write the number that best represents the likelihood that you would purchase a similar vacation experience.

   Purchase Likelihood ________________________
2. We would now like for you to think back to the vacation experience that you read. Try to recall as much information as possible from the experience. In the space below, please write a brief description of each incident that you remember in the order in which it comes to mind. This may or may not be in the order in which the incidents occurred.
SURVEY

We would now like for you to tell us about a recent vacation experience that you had. On the lines below, please describe the first vacation experience that comes to mind. You may use the back of this page if you need more space to write about your vacation experience.
SURVEY

Please answer the questions below pertaining to the vacation experience that you read about last week. Please read all question instructions carefully.

1. Please indicate how likely you would be to purchase a vacation experience like the one that you just read on a scale from 0 to 100 where 0 is “definitely will not purchase” and 100 is “definitely will purchase”. On the line below, please write the number that best represents the likelihood that you would purchase a similar vacation experience.

   Purchase Likelihood ________________________

2. Please indicate how much money you would be willing to pay to experience a seven-day vacation like the one that you read. On the line below, please write a dollar amount that best represents the amount of money that you would be willing to pay for a similar vacation experience.

   Willingness to Pay $___________________
3. We would now like for you to think back to the vacation experience that you read. Try to recall as much information as possible from the experience. In the space below, please write a brief description of each incident that you remember in the order in which it comes to mind. This may or may not be in the order in which the incidents occurred.
APPENDIX H

VACATION STIMULUS TYPICALITY PRETEST
GENERAL INSTRUCTIONS

In this study, you will be asked to re-read the vacation experience that you read previously. We would like you to rate how each vacation incident you will read about compares to incidents that you expect to occur on a typical vacation. Please read each incident carefully. Following each incident, you will be asked to rate how well that incident fits with your idea or image of what is common on vacation. You will be asked to rate all of the incidents contained in this packet. Please read and rate each incident before moving on to the next one. If you have questions at this time, please raise your hand. Otherwise, you may open this packet and begin.
When we first arrived at our hotel, my friends and I made several plans for the day including going to an amusement park. We were really excited to go. We all woke up and got dressed. Then, we turned on the television to see what the weather was like. The weather channel reported that a hurricane was headed our way. The hurricane was supposed to miss us, but apparently, it changed direction. A hurricane slammed into the city that day. While it was not a severe hurricane, there was still a large amount of rain and wind, so we definitely could not go to the amusement park. We were stuck in the hotel the entire day. We had no electricity, so we could not watch television. We basically had nothing to do. Since we had no electricity, we had no air conditioning either. It was very hot and muggy in the hotel, and we sat around all day dripping with sweat because of the heat outside.

Compared to incidents that I expect to occur on vacation, the incident above is…
GENERAL INSTRUCTIONS

The following pages contain a series of three experiences ranging from very pleasant to very unpleasant that occurred on a college student’s recent vacation. While you are reading each event, imagine that you are actually experiencing it. Following each incident, you will be asked to report how the experience made you feel. You will use the following scale to report your feelings:

-7   -6   -5   -4   -3   -2   -1   0   +1   +2   +3   +4   +5   +6   +7
Extremely negative   Neutral   Extremely positive

The positive numbers on the scale represent degrees of any positive feelings that you may be experiencing. The negative numbers represent degrees of any negative feelings that you may be experiencing. 0 represents neutral feelings (i.e., neither positive nor negative). After reading each experience, you will be presented with a scale like the one above. When you are presented with the scale, please circle the number that most closely approximates how you are feeling at that given moment.

If you have any questions, please ask the experimenter now. Otherwise, please turn the page and begin. We thank you in advance for your participation.
One afternoon my friends and I decided to head to the beach to play volleyball. We walked to the back of the hotel towards the sand. The weather was partly sunny with a few clouds in the sky, and the temperature was pretty moderate. We spread our blankets on the beach and headed to the volleyball courts. I walked to the center of the court with my friends, and we divided ourselves into teams. We began hitting the volleyball back and forth slowly to warm up. We gradually increased the speed of the hits as we warmed up until we were ready to begin the game. We played one very friendly game of volleyball. Then, my friends decided to head back to the blankets to lie down. I decided to stay on the court and get into a pick up game with some of the other hotel guests. After I played for a little while, I headed towards the blanket to rest for a little while. After I took a short nap, I went back to the volleyball courts to play another game, and my friends followed me. We spent the afternoon laying on the beach and playing volleyball. We didn’t really do much else that afternoon. We just hung out and relaxed.
One day my friends and I decided to go skydiving. We found a place online and called to make an appointment. When we got there, we sat for a lecture and watched a video on safety precautions and techniques. Then, we got into the harnesses, got on the plane, and took off up into the air. I was so nervous yet excited. I could feel butterflies in my stomach as the plane continued to rise. All of a sudden, the instructors announced that we had gotten to the jumping height, and we were ready to go. I watched as both of my friends and their instructors stepped up to the open door and plummeted towards the ground. When it was my turn, my instructor got us set and we jumped. A few seconds later, I felt a sharp pain as the harness cut into my body. My instructor was helpless to assist me while I struggled to position my body so that I could enjoy the jump. It was like nothing I could even imagine. My adrenaline was pumping, and I just kept hoping that I would reach the ground. Before I knew it, my instructor pulled the cord, and the parachute emerged from the pack jolting us more. When we finally landed, I decided that I did not want to do that again any time soon.
One morning my friends and I wanted to go to the local zoo. We headed down to the concierge desk to get tickets to the zoo. The hotel staff handed us our tickets and directed us to a shuttle that would take us to the zoo. When we got there, we walked through the gates and began looking at a map of all of the animal exhibits. The temperature was very moderate, which was nice for us and the animals. We slowly walked further and further into the zoo until I could no longer see the entrance. We began wandering through the different areas of the zoo looking around at all of the animals. Many animals were in the outdoor exhibits that day because the temperature was nice, so we were able to see many different types of animals. They were very active, moving around their designated areas. My friends and I saw a group of monkeys that we liked. We watched the monkeys run and play for a little while. After the monkeys went to lie down, we walked around admiring all of the other animals at the zoo. After marveling at the animals for a while longer, we decided to leave the zoo. We headed out the exit and caught the shuttle back to our hotel.
Now, we would like for you to turn back to each of the events that you read. For each event we would like for you to indicate which parts of the experience you took into account the most when you reported your feelings in response to reading the experience. Please indicate the parts of the passage that you used by underlining them. That is, if the event made you feel positive (indicated by a positive number on the scale), please underline the parts of the passage that led you to report that the experience made you feel positive. If the event made you feel negative (indicated by a negative number on the scale), please underline the parts of the passage that led you to report that the experience made you feel negative. Please do not simply underline the entire passage. Only underline the parts of the event that led to your rating. Remember to do this for all three of the events that you read, and please do not change your responses on the scales for any of the events as you perform this task.
APPENDIX J

EXCERPTS OF STUDY 4 STIMULI
Another day we made plans to go waterskiing. I was really excited because I had never been waterskiing before. My friends and I made reservations through the hotel to receive a beginner lesson. We walked up to the stand where the instructors are and told them that we were there for lessons. The instructors got me set on the skis and then started the boat. All of a sudden we started to move. I began speeding through the water on the skis. The boat pulled me faster and faster, and I could feel the breeze and water on my face. There were a lot of boats around us making wakes, but I was determined to stay up on my skis. It was so exciting! My friends and the instructors were cheering me on as I bounced along behind the speeding boat. I just kept going. I didn’t fall. Finally, the instructors stopped and pulled me into the boat. They told me that they could not believe that I was a beginner since I managed to stay up on the skis even though there were a lot of wakes today. They said that that I was a natural waterskier. Because we were all having so much fun, the instructors offered to extend our lesson for free. We ended up waterskiing the entire day.5

Another day we made plans to go rock climbing. I was really excited because I had never been rock climbing before. My friends and I made reservations through the hotel to receive a beginner lesson. We walked up to the stand where the instructors are and told them that we were there for lessons. The instructors got me set in the harness and attached me to the climbing rope. Then, I started to climb up the side of cliff. I began climbing faster and faster, and I could feel the breeze on my face. There were a lot of climbers around me dangling from their ropes off the side of the cliff because they had lost their grip, but I was determined to keep going. It was so exciting! My friends and the instructors were cheering me on from the ground as I climbed from rock to rock. I just kept going. I didn’t lose my grip once. Finally, I made it to the top of the cliff and looked out at the amazing view. When I was finished admiring the view, the instructors slowly lowered me back down to the ground using the climbing rope. They told me that they could not believe that I was a beginner since I managed to climb all the way to the top. They said that that I was a natural rock climber. Because we were all having so much fun, the instructors offered to extend our lesson for free. We ended up climbing the entire day.6

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5 Positive valence – Conceptually similar condition
6 Positive valence – Conceptually dissimilar condition
Another day we made plans to go waterskiing. I was really excited because I had never been waterskiing before. My friends and I made reservations through the hotel to receive a beginner lesson. We walked up to the stand where the instructors are and told them that we were there for lessons. The instructors got me set on the skis and then started the boat. All of a sudden we started to move. I began speeding through the water, but I was unable to stand up on the skis. Instead, my whole body was contorted as I was pulled through the water. I felt shooting pains through my body as I bounced along behind the speeding boat. Because I had never been waterskiing before, I did not know what to do. There were a lot of boats around us, so I was afraid to let go of the rope. I just held onto the rope fearful that a boat would run over me if I let go. Finally, the instructors stopped and pulled my bruised, aching body into the boat. They told me that they did not realize I was a beginner, and I should have told them earlier. Our instructors told us that there were a lot of wakes today, and it was not fit for beginners. They refused to finish our lesson.7

Another day we made plans to go rock climbing. I was really excited because I had never been rock climbing before. My friends and I made reservations through the hotel to receive a beginner lesson. We walked up to the stand where the instructors are and told them that we were there for lessons. The instructors got me set in the harness and attached me to the climbing rope. Then, I started to climb up the side of cliff. I began climbing faster and faster. Then, suddenly, I could feel my foot begin to slip. My whole body was contorted as I hit the side of the cliff and dangled from the climbing rope. I felt shooting pains through my body as I continued to bounce along the side of the cliff struggling to grab onto the rock. Because I had never been rock climbing before, I did not know what to do. I kept grabbing for the rock, fearful of what would happen if I let go. Finally, the instructors persuaded me to stop reaching for the rock, and they lowered my bruised, aching body down to the ground using the climbing rope. They told me that they did not realize I was a beginner, and I should have told them when I met them earlier. Our instructors told us that the cliff was not fit for beginners. They refused to finish our lesson.8

7 Negative valence – Conceptually similar condition
8 Negative valence – Conceptually dissimilar condition
APPENDIX K

STUDY 4 MAIN EXPERIMENT SURVEY
SURVEY

Please answer the questions below pertaining to the vacation experience that you read about last week. Please read all question instructions carefully.

1. Please indicate how much money you would be willing to pay to experience a seven-day vacation like the one that you read. On the line below, please write a dollar amount that best represents the amount of money that you would be willing to pay for a similar vacation experience.

   Willingness to Pay   $________________________
2. We would now like for you to think back to the vacation experience that you read. In each of the boxes below, please write a brief description of each incident that you remember. Please do not try to recall these incidents in the order in which they occurred in the vacation. Simply write down the incidents that you recall in the order in which they come to mind. This may or may not be in the order in which the incidents occurred. Please limit your description of each incident to one line, and please write about only one incident per box.
3. Please think back to the vacation experience again. Now, we would like you to recall as much information as possible about each of the four incidents listed below. In each box listed below an incident, write as many details as you can remember about that incident. Please do not go back and add any information about these incidents to your response on the previous question (question 4). You may use the back of this sheet if you need more room to write about each of the incidents listed below.

Jet Skiing

Rock Climbing

Kite Buggying

Volleyball
APPENDIX L

STUDY 5 STIMULI
We wanted to go to a seafood restaurant one night, so we decided to head to a restaurant down the street that we had passed earlier. We were seated and given menus. I was trying to decide whether to order the crab legs or the lobster, but I decided to order the lobster. When the food came out, I realized that it was a whole lobster, so I had to crack it open to eat it. I ate a couple of bites. Then, I cracked open another part to get the delicious lobster meat out. When I did, this green substance sprayed directly in my face! This was not good. I asked the waitress to bring me another lobster, but she declined. I asked to speak to the manager. When she came over, I told her about the problem and asked her if I could have another lobster. She also said no. I was furious. I didn’t eat any more of the lobster. When the check came, I noticed that the restaurant had also declined to knock off some of the price. As I pulled out my wallet to pay, I became angrier and angrier. My anger subsided when I got back to the hotel and started to become nauseous. Apparently, the first few bites of the lobster had made me sick. I was sick for the rest of the night.
We wanted to eat at a seafood restaurant again one night, so we decided to head back to the restaurant down the street that we had eaten at earlier because my friends had enjoyed it. Since I ordered the lobster last time and that did not work out well, I decided to order the crab legs. When the food came out, I realized that it was a lot of crab legs, so I cracked one open to eat it. I took a couple of bites. Then, I cracked open another crab leg to get the delicious crab meat out. When I did, the same green substance from before sprayed me in the face! Like before, I thought this was not good. I asked the waitress to bring me a different order of crab legs, but she declined. I asked to speak to the manager again. When she came over, I told her about the problem and told her that I wanted another order of crab legs. She also said no. I was furious again. I didn’t eat any more of the crab legs. When the check came, I noticed that the restaurant had also insisted on charging me the full price. Like before, I became angrier and angrier as I pulled out my wallet to pay. When I got back to the hotel, I became nauseous. Apparently, the crab legs had made me sick just like the lobster had. I was sick for the rest of the night.
One day my friends and I agreed that we should play golf. We woke up early to head to the golf course. I really wanted to play my best and try to beat everyone, especially my one friend. He was a great golfer, and I had never beaten him before. I knew that this golf course had a reputation for being challenging, but I still wanted to play well. The four of us walked up to the desk to check in before heading to the first tee. I was the last one to tee off, and I completely missed the ball on the first swing. I was shocked to see that I had done so much worse than my friends. At first, I thought that it might have been unlucky, but when the same thing happened on the second tee, I knew it was going to be a terrible day. I shot my worst round of golf ever. It was a horrible feeling going up to the 18th hole next to the driving range knowing that my friends each had at least a twenty stroke lead on me. I shot a twelve on the last hole and ended up with the worst score. It was a terrible experience to not only lose again to my one friend, but also to get the highest score on a round of golf.
Another day, we decide to rent a car and go out for a drive. We were out driving, and a thick fog began to roll in. A blanket of white quickly surrounded our car, and we couldn’t see to drive. We could not see more than a couple of feet in front of us, and we certainly couldn’t see the beautiful scenery that we had set out to see earlier in the day. The weather conditions forced us to pull the car over to the side of the road. We did not expect to be here for too long, as we thought the fog would clear out shortly. We stepped out of the car to see where we were. When we got out of the car, it began to rain. We jumped back into the car and began driving again. The thunderstorm became so severe that we had to pull off to the side of the road again. We finally made it back to the hotel, but it rained the entire afternoon, and we didn’t see the sun once.
One morning my friends and I wanted to go to the local zoo. We headed down to the concierge desk to get tickets to the zoo. The hotel staff handed us our tickets and directed us to a shuttle that would take us to the zoo. When we got there, we walked through the gates and began looking at a map of all of the animal exhibits. The temperature was very uncomfortable, which was bad for us and the animals. My friends and I were freezing, but we still began wandering through the different areas trying to look around at all of the animals. Many animals were not in the outdoor exhibits that day because of the cold weather. At most of the exhibits, the animals were either inside where they were not visible, or if they were outside, they were very inactive. My friends and I spotted a group of monkeys that we liked, but by the time we walked over to see them more closely, they had moved inside to stay warm. After the monkeys went inside to lie down, we tried to walk around to admire all of the other animals at the zoo, but we didn’t see any other animals out. After a while longer, we decided to leave the zoo. We headed out the exit and caught the shuttle back to our hotel.
APPENDIX M

STUDY 5 TARGET SURVEY
SURVEY

Please answer the questions below pertaining to the vacation experience that you read about last week. Please read all question instructions carefully.

1. Please indicate how much money you would be willing to pay to experience a seven-day vacation like the one that you read. On the line below, please write a dollar amount that best represents the amount of money that you would be willing to pay for a similar vacation experience.

   Willingness to Pay   $________________________
2. We would now like for you to think back to the vacation experience that you read. In each of the boxes below, please write a brief description of each incident that you remember. Please do not try to recall these incidents in the order in which they occurred in the vacation. Simply write down the incidents that you recall in the order in which they come to mind. This may or may not be in the order in which the incidents occurred. Please limit your description of each incident to one line, and please write about only one incident per box.

[Boxes for incident descriptions]
APPENDIX N

STUDY 6 PRETEST INSTRUCTIONS
GENERAL INSTRUCTIONS

Thank you for your participation in this research. In this survey, you will be listening to a number of short clips from the songs of a variety of popular artists. Following each song clip, you will be asked to report how the clip made you feel on a scale from -7 to +7. The positive numbers on the scale represent degrees of any positive feelings that you may be experiencing. The negative numbers represent degrees of any negative feelings that you may be experiencing. 0 represents neutral feelings (i.e., neither positive nor negative). When you are presented with the scale, please select the number that most closely approximates how you are feeling at that given moment.

To begin playing the song clip press the play button on the controller. Please listen to each song clip in its entirety before moving on in the survey. At this time please check to make sure that the volume on your computer is turned up so that you are able to hear the music clips. When you are ready, move to the next page to begin listening to the music clips.
APPENDIX O

STUDY 6 MAIN EXPERIMENT INSTRUCTIONS
GENERAL INSTRUCTIONS

Thank you for participating in our research. In this session, you will be asked to listen to a number of short music clips from a compilation CD created by an Ohio State student.

To begin playing a song clip, press the play button on the controller. Please listen to each song clip in its entirety before moving on in the survey. When you are finished listening to the compilation CD, you will be asked to answer some questions.

At this time, please check to make sure that the volume on your computer is turned up so that you are able to hear the music clips. When you are ready, please move to the next page to begin the survey.
Please answer the following questions pertaining to the CD that you just listened to. Please read all question instructions carefully.

Please rate how much you enjoyed listening to this CD on a scale from 0 to 100 where 0 is the least enjoyable experience that you could imagine and 100 is the most enjoyable experience that you could imagine. In the box below, please write the number that best represents your enjoyment.

Enjoyment Rating

Please indicate how likely you would be to purchase a copy of the CD that you just listened to on a scale from 0 to 100 where 0 is “definitely will not purchase” and 100 is “definitely will purchase”. In the box below, please write the number that best represents the likelihood that you would purchase this CD.

Purchase Likelihood

Please indicate how much money you would be willing to pay to purchase the CD that you just listened to. In the box below, please write a dollar amount that best represents the amount of money that you would be willing to pay for this CD.

Willingness to Pay
APPENDIX Q

STUDY 6 FILLER SURVEY
We would now like for you to tell us about your music preferences. On the following pages, please answer the questions by selecting the number that most closely reflects your opinion.

How often do you currently...

<table>
<thead>
<tr>
<th>Activity</th>
<th>1 - Rarely</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 - Frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td>Download music from the Internet</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Download music using Kazaa</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Download music using iTunes</td>
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<tr>
<td>Download music using Napster</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Download music using Walmart.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

How easy is it to download music from each of the following websites?

<table>
<thead>
<tr>
<th>Website</th>
<th>1 - Very easy</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 - Very difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kazaa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>iTunes</td>
<td></td>
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</tr>
<tr>
<td>Napster</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walmart.com</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How would you rate Kazaa as a music download site?

unfavorable      favorable
bad          good
undesirable    desirable

How would you rate iTunes as a music download site?

unfavorable      favorable
bad          good
undesirable    desirable

How would you rate Napster as a music download site?

unfavorable      favorable
bad          good
undesirable    desirable

How would you rate Walmart.com as a music download site?

unfavorable      favorable
bad          good
undesirable    desirable
Please describe in detail the factors that are important to you when choosing a site to download music and why you value each of these factors.
LIST OF REFERENCES


