Aspects of Experiences: The Role of Novelty in Retrospective Summary Assessments

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ABSTRACT

Consumers often seek out and marketers regularly introduce novel experiences. How does the novelty of an experience influence its affective value? Existing literature discusses novelty's role in experienced affect. This paper investigates how novelty influences remembered affect, as expressed in retrospective evaluations. Prior research on remembered affect finds that some aspects of experiences, including peak intensity and end intensity, influence retrospective evaluations more than others. This past work mostly studied evaluations that were collected immediately after experiences, but consumers are often faced with decisions that require them to access experiences that took place some time ago. My studies demonstrate that delayed evaluations are more likely to integrate affect derived from novel than familiar aspects of experiences. Whereas familiar aspects may influence immediate evaluations, they are less likely to influence delayed evaluations. This temporal interaction suggests that the basis of retrospective evaluations may shift systematically over time, driven by the experience's novelty. These findings augment our understanding of affective experiences and explicate novelty, which yields different outcomes on retrospective evaluations compared to related constructs, such as affective intensity and incongruity.

Consumption episodes are often defined by their experienced affect. For instance, when a consumer visits an art gallery, he may experience different levels of enjoyment upon seeing various pieces. Later, he may recall his overall enjoyment of the visit, and he'll rely on this retrospective evaluation when recommending the gallery to a friend. On-line affect from such an experience stems from response to the episode as it unfolds. However, as I argue in this paper, memory of the affective experience may also depend on its novelty. The visit would be remembered differently if it was the consumer's first time viewing art of the featured genre compared to if he has visited similar such galleries in the past. Prior research finds that novelty may intensify or temper on-line affect (Berlyne 1960; Zajonc 1968; Maddi 1968). In this paper I examine how novelty influences the correspondence between on-line affect and remembered experience, as expressed in retrospective evaluations.

Past research has identified various factors that determine retrospective evaluations of affective episodes. Prior work finds that retrospective evaluations are largely determined by an episode's intensity at key points in time as well as a few of the episode's over-arching properties (Fredrickson and Kahneman 1993; Ariely and Carmon 2000). In particular, a robust result is that the affect derived from two transient states, the most intense moment (the 'peak') and the end of the episode, heavily impact retrospective evaluations. In contrast, other aspects provide a small marginal contribution to these evaluations (Kahneman et al. 1993; Fredrickson and Kahneman 1993). Over-arching properties of experiences, such as their cohesiveness and trend (Ariely and Zauberman 2000) and their role in goal pursuit (Carmon and Kahneman 1996), have also been found to govern evaluations.

A recurring theme in past research is that people are sensitive to changes in their affective response, and these changes in intensity influence remembered experience. However, an individual's subjective experience may also depend on whether the episode introduces changes on other dimensions. Compared

to the individual's totality of life experience, an episode or aspect of an episode can be perceived as novel due to associated changes on stimulus or conceptual characteristics. These novel episodes may be experienced and recounted differently than episodes that are perceived as similar to those encountered in the past. As such, one objective of this paper is to augment our understanding of retrospective evaluations by studying how novelty influences these evaluations.

Novelty can be a powerful motivator for consumption as consumers desire to seek out or to avoid novel experiences. Novelty also varies across episodes and over time through consumers' accumulation of experiences and exposure to new offerings. I draw on the perception and memory literature in defining novelty; a consumer will perceive a consumption episode as novel if he has had limited prior exposure to it, and if it is considered dissimilar to previously experienced episodes (Berlyne 1960). I focus on novelty as a source of memorial differences, investigating episodes that are entirely novel (e.g., when a consumer has never visited any art gallery) as well as episodes in which only aspects of the episode are novel (e.g., when a few art pieces are unlike pieces viewed in other galleries). Importantly, I distinguish novelty from related constructs such as affective intensity, demonstrating how they yield different outcomes on retrospective evaluations. In sum, another goal of this research is to explicate novelty as a distinct dimension using retrospective evaluation as a framework.

Because the present research investigates memories for episodes, an additional factor studied is the length of delay between an episode and its retrospective evaluation. Delayed evaluations are of interest in this paper, because consumers' decisions to repeat experiences are likewise delayed in many consumption domains. The present investigation underscores the importance of delayed judgments, both because they differ from immediate judgments and because they are prevalent. However, past research on retrospective evaluations has mostly studied evaluations that occur immediately after the end of episodes. A few

investigations have mapped people's evaluations over time, but in most cases immediate evaluations have been compared to repeated evaluations measured later (e.g., Redelmeier and Kahneman 1996; Kemp, Burt, and Furneaux 2008). In other cases, evaluations were measured only after a delay, depicting situations in which delayed evaluations concur with immediate evaluations (e.g., Baumgartner, Sujan, and Padgett 1997). I research how delayed evaluations differ from immediate and repeated evaluations depending on the novelty of the experience.

I argue that novelty interacts with the timing of the evaluation to determine the correspondence between on-line affect and retrospective evaluations. Delayed evaluations are more (less) likely to reflect on-line affect derived from novel (familiar) experiences or novel (familiar) aspects of experiences. In particular, delayed evaluations are more likely to be influenced by novel peaks and ends compared to immediate evaluations, which are heavily influenced by peaks and ends regardless of their novelty. This temporal interaction suggests that the basis of retrospective evaluations may shift systematically over time to incorporate less of some aspects of on-line affect. As well this interaction shows that novelty influences consumers' judgments differently than related constructs, such as affective intensity or incongruity. I elaborate on these arguments, their theoretical background, and their empirical support below.

THEORETICAL BACKGROUND

Considerable past research investigated how people form an overall evaluation of an affective episode (for a review see Ariely and Carmon 2003). I refer to this type of evaluation as a 'retrospective summary assessment' (henceforth 'RSA'). These are *retrospective* evaluations because they are measured after the episode has concluded. RSAs may diverge from on-line measures of the experience due to selective memory and other factors that alter the perception of the experience over time. These are *summary*

evaluations because they assess the entire episode in terms of one overall measure of goodness, badness, or other affective dimension. For instance, past research has studied experiences in terms of their overall pain (Kahneman et al. 1993; Redelmeier and Kahneman 1996; Ariely 1998; Redelmeier, Katz, and Kahneman 2003), annoyance (Ariely and Zauberman 2000; Schreiber and Kahneman 2000), enjoyment (Fredrickson and Kahneman 1993; Rozin, Rozin, and Goldberg 2004; Rode, Rozin, and Durlach 2007), and satisfaction (Verhoef, Antonides, and de Hoog 2004; Diehl and Zauberman 2006).

The substantive motivation for research on RSAs is that they often guide people's decisions. People summarize episodes in terms of one encompassing affective evaluation, because such an evaluation is an efficient representation of the experience's inherent value (Ariely and Carmon 2000). RSAs often differ from the sum or average of on-line affect, but people may rely on their RSA for an experience rather than their on-line affect when deciding whether to repeat an experience or recommend it to others. Kahneman et al. (1993) found that participants submerging their hand in ice-cold temperature were more willing to repeat the experience they remembered as being less painful than to repeat the experience their on-line measures revealed to be less painful. In addition, Wirtz et al. (2003) found that on-line enjoyment of a vacation often diverged from the RSA of the experience, but consumers' decisions to return to vacation spots were based on their RSAs.

Of theoretical interest to research on consumption episodes is how RSAs differ from on-line affect. According to the 'snapshot model,' when people remember an experience they do not replay the entire experience like a film. Instead they retrieve a few key characteristics or 'snapshots' of the experience (Fredrickson and Kahneman 1993). As such, RSAs integrate some aspects of episodes more than others. One stylized result is the 'peak-end rule,' the affective intensity of the most intense moment (the 'peak') and the end largely predict RSAs (Fredrickson and Kahneman 1993; Redelmeier and Kahneman 1996).

Limited integration of other components of episodes can lead to counter-normative phenomena, such as the duration of the episode having a minimal marginal impact on RSAs.

The emphasis on the peak and end stems, in part, from their greater accessibility when forming RSAs (Ariely and Carmon 2000). Peak moments are encoded particularly elaborately because of the strong positive relationship between affective intensity and involvement (Gold 1987; Heuer and Reisberg 1990). The end of an episode is more accessible largely due to its recency (Miller and Campbell 1959; Zauberman, Diehl, and Ariely 2006). As well, the end may draw more attention when it represents finality, which occurs when the end of the experience is known a priori or when the end is the outcome of a goal-directed experience (Carmon and Kahneman 1996; Baumgartner et al. 1997; Frederickson 2000). These drivers of accessibility cut across various settings, but other accessibility factors may also impact RSAs.

One source of enhanced accessibility is distinctiveness, which is achieved when an aspect is experienced differently from surrounding aspects or previous episodes (Hunt and Worthen 2006). According to the isolation effect, also known as the 'Von Restorff effect,' elements of a set that are distinctively processed are more likely to be remembered (Von Restorff 1933; Hunt 1995). Novel aspects, those that are uncommon and dissimilar to previous episodes, are processed distinctively compared to familiar aspects (Schmidt 1991). Novel aspects arouse an orienting response, and they require further processing in order to make sense of them (Berlyne 1960; McDaniel and Geraci 2006).

Novelty-induced encoding differs from greater encoding of the peak of the episode, because novelty-induced encoding may emerge from differences on stimulus or conceptual characteristics rather than affective intensity. For instance, an exotic entrée may be muted in its enjoyment, but it could still be

processed distinctively from intensely-liked, familiar dishes if it is experienced as novel in its ingredients, presentation, or other culinary features. Still, novelty could be related to affective intensity in different ways. Novelty may be positively related to affective intensity when novel experiences are more arousing, such as when new experiences are more involving the first time compared to subsequent repeats of the experience (Berlyne 1960). In some domains experiences may be perceived as novel due to their intensity alone. For example, a consumer daring herself to eat the hottest chili pepper she has ever confronted might find this episode novel due to the unmatched discomfort she will sustain or the unparalleled bravado she will display after accomplishing the feat. Alternatively, novelty may be negatively related to affective intensity when familiar stimuli are better liked, as is often evident due to mere-exposure effects in judgments of liking for hedonic experiences (Zajonc 1968). In sum, although novelty has several potential ways by which it may be related to affective intensity, these characteristics can also be de-coupled experimentally, and they may be unrelated in many real-world consumption experiences.

Novel and intense aspects of experiences both benefit from enhanced encoding, but they differ at retrieval, leading to differential impact on RSAs. Novel episodes or aspects of episodes are easier to discriminate from other experiences, resulting in less interference at retrieval (Hunt and McDaniel 1993). This interference mechanism is especially influential when there is a delay between an episode and a memory task (Burke and Srull 1988). Immediately after an episode, memory interference is less likely, because the focal episode is fresh compared to previous episodes. However, as time elapses, the focal episode may become harder to distinguish from previous episodes. Thus, over time novel aspects are more likely to be accessed relative to familiar aspects, because interference with other episodes plays a larger role as time elapses past the focal episode. Such a mechanism does not apply to intense aspects of experiences, which do not benefit from reduced interference unless they are also novel. Other factors that

enhance encoding, such as stimulus vividness, also do not impact delayed memory tasks differently than immediate tasks.

Distinctive processing may also occur through sources other than novelty. Discrepancy underlies all distinctive processing, but discrepancy can stem from different comparisons. Novelty, as defined here, involves discrepancy from the totality of an individual's life experience. For instance, a consumer who has never visited a tropical island may find a trip to Jamaica novel, because it differs from all of her previous vacations. Another form of discrepancy can occur through comparisons to a schema, leading to incongruity or surprise (Hunt and Worthen 2006). For instance, if the tourist visiting Jamaica found fellow tourists there acting uptight and fussy, such behavior may be discrepant from her expectation of meeting people with more carefree attitudes. Expectations may be based on lay theories, or they may be established by the prevailing context. Violations of context result in 'oddball' effects; elements that do not fit the situation are distinctively processed, leading to reduced interference in forced recall tasks and enhanced accessibility for these elements (Von Restorff 1933; Berlyne 1960; Hunt and Worthen 2006).

Whether a distinctively processed element will be incorporated in delayed memory-based judgments depends on the form of discrepancy. Whereas discrepancy through incongruity or oddity leads to greater accessibility in forced recall tasks and immediate memory-based judgments, it may lead to diminished accessibility in delayed memory-based judgments (Nunes and Novemsky 2008). In particular, since delayed memory-based judgments rely heavily on schema-driven memory (Robinson and Clore 2002), aspects that violate existing schema are less likely to be accessed after a delay. One boundary condition to this result is that discordant experiences may still be accessed in delayed memory-based judgments if they are extreme enough to call into question the schema itself (Nunes and Novemsky 2008). Thus, novel aspects are more accessible after a delay when they are dissociated from other sources of distinctive

processing, which have been termed ‘incongruity,’ ‘atypicality’, and ‘surprise,’ among other things. The association between novelty and these other factors depends on the strength and specificity of an experience’s schema. For instance, a traveler eating a novel dish on a visit to a remote village in a faraway land may not perceive the food as incongruous because he does not know what the cuisine will be like there (i.e., he has a general and very uncertain mental representation of the cuisine). In fact, in such a context, he may find a familiar dish, such as pizza, incongruous with his expectation of being offered exotic entrées.

HYPOTHESES

Together encoding and retrieval mechanisms lead to greater accessibility for novel aspects, which has been demonstrated in recognition, free-recall, and cued recall memory tasks (Worthen 2006). Yet, novelty’s effect on accessibility has not been tested in RSAs. One straightforward prediction is that novelty will exert a simple effect on accessibility in RSAs due to more elaborate encoding; i.e., because novel but not familiar aspects are easily accessed, RSAs will be more likely to incorporate novel aspects. These results would be evident in experiences that include a mix of familiar and novel aspects, in which distinctive processing occurs (Hunt and Elliot 1980). If all of the elements of an experience are novel, then no one aspect is relatively more accessible due to its novelty.

In this simple effect novelty does not differ from other contributors to elaborate encoding, such as affective intensity. However, I argue that novelty and intensity are separable factors, which suggests that even aspects of experiences that are mild in their intensity but which are merely novel are likely to be integrated in RSAs. As well, novel aspects may influence RSAs when they are not at the end, whereas

familiar aspects are relatively less likely to impact RSAs when they are not the peak or end. Thus, my first hypothesis concerning the simple effect of novelty on RSAs is as follows:

> **H1:** RSAs are more likely to incorporate aspects that are relatively novel compared to more familiar aspects. Novel aspects will influence RSAs even when these aspects are not the peak or end of the experience. In contrast, aspects that are more familiar are less likely to be integrated in RSAs if they are not the peak or end.

Novelty may also have a separate effect on delayed RSAs that differentiates it from affective intensity. Delayed evaluations are often important when they inform subsequent behavior. Consumers do not always form spontaneous evaluations immediately after an episode, resulting in differences between immediate and delayed affective evaluations (Novemsky and Ratner 2003; Nunes and Novemsky 2008). For instance, a party may not be evaluated during the trip home. Instead an RSA may be formed a few weeks later when deciding whether to attend the hosts' next party. Little existing work examines RSAs measured after a delay, and the few investigations that have tested delayed RSAs have emphasized their similarity to immediate RSAs. For instance, Redelmeier and Kahneman (1996) found that patients' delayed retrospective evaluation of painful medical treatments correlated very highly with the evaluations they provided immediately after the procedure. As well, delayed evaluations and immediate evaluations were heavily influenced by the same aspects of the experience, peak and end intensity. Baumgartner et al. (1997) found that the end of television advertisements impacted immediate as well as delayed judgments of the overall enjoyment of the advertisement. This illustrated that the end effect is not just a recency phenomenon, because the end may be accessed if it provides meaning to the experience. These past results indicate at least some correspondence between immediate and delayed RSAs, but they do not resolve other possibilities by which these evaluations may diverge.

How might delayed RSAs differ from immediate RSAs? After a delay, evaluations may be based less on the episode itself and more on lay theories (Novemsky and Ratner 2003) or category expectations (Nunes and Novemsky 2008). That delayed evaluations regress is consistent with other memory research which demonstrates that delayed judgments are based more on semantic knowledge (e.g., schemas) and less on episodic memory (Bjork and Landauer 1978; Alba and Hasher 1983). Delayed evaluations could regress both due to random loss of details over time as well as through systematic diminishment of accessibility (Robinson and Clore 2002). Comparing aspects within a given experience, some aspects could endure in their influence on RSAs and others may become less important. Comparing different experiences, some experiences may lead to greater integration of on-line affect in delayed RSAs and others may exhibit more regression to schemas. As discussed earlier, interference plays a larger role in delayed evaluations, which may reduce the importance of on-line affect derived from familiar experiences or familiar aspects of experiences. As such, aspects that are incorporated in immediate evaluations, including peaks and ends, may be more likely to be incorporated in delayed evaluations if they are novel. Moreover, experiences that are entirely novel would be less likely to exhibit regression than experiences that are entirely familiar. I summarize these predictions in terms of two related hypotheses:

> **H2a:** Peak intensity and end intensity will have a more enduring influence on RSAs when these aspects are novel. That is, peaks and ends will be equally likely to influence immediate evaluations regardless of their novelty, but these aspects will be more influential on delayed evaluations if they are novel.

> **H2b:** The degree of correspondence between on-line affect and delayed RSAs will depend on the novelty of the experience. If the entire experience is novel, delayed RSAs will be more likely to incorporate on-line affect than if the entire experience is familiar. If the entire experience is

familiar, delayed RSAs will regress, incorporating less of on-line affect derived from the actual episode.

OVERVIEW OF STUDIES

I test these hypotheses in three studies involving hedonic experiences. In all studies, I disentangle affective intensity from novelty. This approach separates novelty's effect on on-line affect from its effect on RSAs. I employ three methods to control for affective intensity: measuring intensity during a repeat of an experience, manipulating intensity, and measuring intensity during an experience. As I will elaborate on in the discussion of these studies and the general discussion, these studies also distinguish novelty from other sources of distinctive processing, such as unexpectedness and incongruity. Study 1 investigates H1; using an annoying sound sequence as the focal experience, I test whether RSAs will be more likely to incorporate the beginning of an experience if the beginning is novel. This study involves both mild and intense novel sounds, because I argue that RSAs will be pulled in the direction of novel aspects regardless of their intensity. Study 2— also an annoying sounds study—tests H2a, examining whether the end of an experience will have a more enduring influence on RSAs if the end is novel. Finally, Study 3 tests H2b using pleasant images as the experienced stimulus. In Study 3 I examine if delayed evaluations are more likely to reflect on-line affect, specifically the peak of the experience, if the episode is novel.

STUDY 1: MANIPULATING THE BEGINNING OF ANNOYING SOUNDS

Study 1 is exploratory, testing the simple effect of novelty on RSAs, as described by H1. Prior theory predicts that the beginning intensity of an experience is less likely to be incorporated in RSAs relative to the peak and end intensity. In contrast, I predict that the intensity of a novel beginning will be reflected in RSAs, but the intensity of a familiar beginning will not. In this study, on-line experience was manipulated

by including a familiar or novel sound to begin a sequence of annoying sounds. Previous research on RSAs has also studied annoying sounds for a number of reasons (see Schreiber and Kahneman 2000; Ariely and Zauberman 2000). Auditory stimuli can be edited through sound software, and the relationship between auditory features, such as pitch, volume, or distortion and affective response is established in sensory research. As well, sounds offer the possibility of continuously measuring on-line affect. When listened to intently, annoying sounds can provide negative affect at every moment of exposure to the stimulus.

Method

Participants and Design. Participants (n = 111), undergraduate and graduate students at a large East Coast University, completed this study as part of an experimental lab session for which they were paid $10. The study followed a 2 (familiar, novel beginning sound) X 2 (aversive, mild beginning sound) between-subjects design.

Selection of Sounds. All sounds included in the focal study were pretested for their perceived intensity and novelty as separate factors. Sixty-one participants who did not take part in the focal study were asked to listen to 27 sounds, which were each approximately 16 seconds long. Sounds were presented in random order with short labels describing their content. As participants listened to each sound, they were asked to rate their on-line affect on a scale including both valences, from 'very unpleasant' to 'very pleasant.' Participants reported on-line affect by continuously moving a probe along this scale as they listened to the sound. The average position of the probe over the 16-second duration provided a measure of the sound's valence and intensity. Considering these measures, six sounds were selected to construct sequences in the focal study. Two sounds were common to all participants in the focal study. These sounds were labeled 'A mosquito buzzing close by' and 'The busy signal for a

telephone.' The 'mosquito' sound was rated the worst of all sounds. The sounds chosen for the aversive beginning conditions were 'An electric razor being used to shave' (familiar) and 'An electric surge caused by a voltage spike' (novel) which resembled an electric distortion noise. These sounds were rated to be significantly lower than the mid-point of the on-line affect scale, indicating that participants found these sounds annoying. The two mild sounds selected for the focal task, labeled 'a helicopter hovering' (familiar) and 'beluga whales communicating through clicking chatter' (novel), were rated to be less unpleasant than the aversive sounds and below but not significantly different from the mid-point of the scale. For the focal study, these mild sounds were edited through sound software to be slightly more unpleasant; I increased the volume of these two sounds so that they would be experienced as unpleasant and not neutral sounds.

In the pretest, a measure of novelty was also collected after the on-line affect rating for each sound. Perceived novelty was operationalized in terms of a familiarity rating. Participants responded to the question 'How familiar are you with this sound or sounds of this type?' using a scale from 1 to 7 from 'not at all familiar' to 'very familiar.' The 'helicopter' and 'razor' sounds were rated as more familiar than the 'surge' and 'beluga whales' sounds, and the common 'mosquito' and 'busy signal' sounds were also rated as more familiar than the 'surge' and 'beluga whales' sounds. Thus, this pretest was conducted to identify sounds that differed in their intensity and novelty as separate factors. However, the sounds may have been experienced with different levels of intensity in the focal study, because the mild sounds were edited to be louder. As well, the focal study involved a smaller subset of sounds, and participants' on-line affect could depend on the other sounds they had been exposed to. Consequently, I rely on on-line measures collected during the focal study to control for intensity differences by novelty condition.

Procedure and Stimulus. In the focal study, participants listened to a three-sound sequence at the beginning of a lab session. Although no cover story was provided, participants were exposed to the sounds prior to evaluating a set of audio speakers in a shopping task. As such, they may have inferred that their response to the sound would be relevant for the subsequent task. The sound sequence was 48 seconds long; each sound was approximately 16 seconds long and there were no breaks between sounds. Participants were asked to listen to the sounds through their head phones, and the sounds played on a computer program. As they listened, a list of the sound labels was provided. Participants listened to one of four sounds to begin the sequence depending on their condition: familiar-aversive ('razor'), novel-aversive ('surge'), familiar-mild ('helicopter'), or novel-mild ('beluga whales'). The second and third sounds in the sequence were 'mosquito' and 'busy signal' for all participants. Unlike the pretest, in the focal study participants did not provide ratings of on-line affect during the sequence itself; see Figure 1 for a schematic depicting Study 1.

Insert Figure 1 about here

Measures. After listening to the sound sequence, participants were asked to provide an overall evaluation of the entire experience. Specifically, they were asked, "Looking back at the entire experience, how unpleasant was listening to the sound track?" They responded on an unmarked scale by moving a probe to a position on a line anchored by 'Not at all unpleasant' to 'Very unpleasant.' This RSA was measured only on a negative valence because all sounds in the sequence had been pretested to be unpleasant, and even the mild sounds were unpleasant in the focal study. A scale focused only on aversiveness allowed participants to provide more precise distinctions in RSAs. The probe's singular position on the scale was translated to a number from 0 to -100, with lower numbers indicating more overall unpleasantness.

At the end of the lab session (*M* =35 minutes later), after participants completed other unrelated studies they responded to a second set of measures. At this second stage, participants were asked to report how familiar the individual sounds were to them using the same familiarity scale that was employed in the pretest. Participants then listened to the entire sound sequence again, during which they responded to the on-line affect measure. For the on-line measure, participants were asked to move a probe continuously at every moment on a scale from 'not at all unpleasant' to 'very unpleasant' as they listened to the sound. An on-line measure was not taken during the initial experience itself, because prior research finds that measuring on-line affect can disrupt people's experience (see Ariely and Zauberman 2000). In particular, on-line measurement tends to segment the experience more, reducing the effect of trend on RSAs. As well, because participants may be engrossed in the experience they may not be able to provide accurate concurrent ratings. In this study, a combination of an uninterrupted first play of the sequence and a delayed, repeat of the experience with an on-line measure helps to eliminate such disruption. The delay between the focal experience and its repeat was included to minimize repeated exposure effects, such as fatigue. This methodology has prior precedent for other temporally-extended affective experiences, and measuring on-line affect during a delayed, repeated presentation of an experience has been shown to be a useful and reliable proxy for experienced affect (see Gottman and Levenson 1985).

Results

Manipulation Check. The novel set of sounds, 'surge' and 'beluga whales,' were rated to be less familiar than the familiar set of sounds, 'razor' and 'helicopter' ($F(1,110) = 52.19$, $p < .001$). As well, the novel set of sounds were each less familiar than the common sounds, 'mosquito' and 'busy signal' (each planned contrast $p < .0001$).

Overall Evaluations (RSAs). The RSAs of the sound sequence exhibited a significant 2 (aversiveness of first sound) X 2 (novelty of first sound) interaction ($F(1,107) = 10.55$, $p = .001$). The RSA for the sequence with the novel, aversive first sound ($M = -73.76$) was significantly worse than the RSA for the sequence with the novel, mild first sound ($M = -56.12$; $t(55) = 3.65$, $p < .001$). On the other hand, the RSA for the familiar sound sequences were not different from each other ($t(52) = 3.74$, $p >. 2$). In fact, the direction of the influence was reversed; the sequence with the familiar, mild first sound was rated as more unpleasant ($M = -69.73$) than the sequence with the familiar, aversive first sound ($M = -62.03$), see Figure 2.

Insert Figure 2 about here

On-line Measures. The aversive set of first sounds were rated to be worse on-line than the mild set of first sounds, as reflected in their average of moment-to-moment ratings ($F(1,110) = 110.35$, $p < .001$). The planned contrasts were significant in both the novel and familiar set of sounds (Familiar: $M_{Aversive} = -55.96$, $M_{Mild} = -33.75$; Novel: $M_{Aversive} = -71.49$, $M_{Mild} = -32.11$; both $p < .001$). However, this effect was larger in the novel set of sounds than in the familiar set of sounds ($F(1,110) = 8.57$, $p < .005$). This result lends some support to a positive relationship between affective intensity and novelty, at least for the more aversive set of sounds in this study (i.e., the novel 'surge' sound was more aversive than the familiar 'razor' sound). The second and third sounds produced hedonic contrast effects. The second sound ('mosquito') was rated to be worse on-line when it followed a mild first sound than when it followed an aversive first sound ($F(1,110) = 11.85$, $p < .001$). Similarly, the third sound ('busy signal') was rated as more unpleasant in the mild first sound conditions ($F(1,110) = 9.93$, $p < .005$). These hedonic contrast results may explain the reversal of RSAs in the familiar sounds conditions. If only the peak intensity and

end intensity are reflected in RSAs, then RSAs would be more negative in the mild first sound condition than in the aversive first sound condition because the mild beginning led to more intense peaks and ends. On the other hand, if the intensity of the peak, end, and first sound are all reflected in RSAs, then the mild first sound may mitigate RSAs, as occurred in the novel condition.

Regression Analysis. To explain RSAs while controlling for intensity differences by novelty condition, I regressed RSAs on participants' on-line affect measures. In each model, predictors of RSAs were peak intensity, end intensity, novelty condition, a parameter based on on-line ratings collected during the first sound, and an interaction term for that parameter by novelty condition. These models account for two predictors established by prior theory, peak intensity and end intensity. For peak intensity I extracted participants' maximum rating of on-line affect for the entire three-sound sequence. For end intensity I identified the mean of the last one second of on-line affect from the third sound. I varied the parameter for the first sound to be either the mean, median, or mode of on-line ratings collected during the first sound. The first sound can also be thought of as a separable experience for which its own peak intensity and end intensity may explain its remembered affect. As such, I extracted the peak intensity and end intensity of only the first sound on-line ratings and used the combined peak-end to represent the affective response to the first sound. Thus, four models were analyzed with varying parameters to represent on-line affect from the first sound. The regression analyses revealed that peak intensity and end intensity (of the entire sequence) are significant predictors of RSAs ($p < .01$ for both predictors in each regression model). None of the four parameters based on the first sound on-line ratings is a significant predictor of RSAs ($p > .35$ in each model). This result is qualified by a significant interaction of the first sound parameter by novelty condition in each model, see Table 1. RSAs are better predicted by on-line ratings collected during the first sound in the novel than in the familiar condition. For example, the mean

on-line rating of the first sound predicted RSAs better when the sound was novel than when it was familiar ($t(105) = 2.44$, $p = .016$).

Insert Table 1 about here

Because the novel-aversive first sound ('surge') was rated as worse on-line than the familiar-aversive first sound ('razor'), it was possible that the novel sound was more likely to include the peak of the sequence, which might contribute to these results due to peak intensity rather than novelty. However, in a restricted set of regression analyses, I considered only situations in which the peak of the sequence was not experienced during the first sound. Most participants experienced their peak only during the second sound, 'mosquito.' The restricted analyses exclude 8 participants in the familiar and 20 participants in the novel condition who also experienced their peak during the first sound. The same interaction of first sound parameter by novelty condition held with these restrictions, see Table 1.

R^2 Change Analysis. The effect size of the interaction can be illustrated by analyzing RSAs separately by novelty condition. I compared pairs of regression models in each condition in order to determine whether the affective response to the first sound accounted for significant unique variance in RSAs. In each condition a baseline model with just the peak and end intensity was compared to a model that includes one of the four parameters representing on-line affect derived from the first sound. The marginal influence of the first sound parameter on RSAs can be determined by the change in R^2 from the baseline model to the larger model.

Across all four parameters tested, affective response to the first sound accounted for significant unique variance in RSAs when the first sound was novel but not when it was familiar, see Table 2. For example,

when the first sound was familiar, the smaller peak-end model accounted for 48.92% of the variance in RSAs, whereas a larger model with peak and end intensity of the sequence and the mean on-line rating of the first sound accounted for 49.15% of the variance. For the familiar first sound conditions, the mean on-line rating of the first sound was not a significant predictor of RSAs (b = .05, $t(54)$ = .47, p > .6), and adding this parameter did not improve the fit of the model ($F(3,48)$ = 0.07, p > .97). On the other hand, when the first sound was novel, the smaller model accounted for only 24.78% of the variance in RSAs, whereas the larger model accounted for 54.95% of the variance. In this case, the mean on-line rating of the first sound significantly predicted RSAs (b = 0.45, $t(57)$ = 5.96, p <.001), and adding this parameter significantly improved the fit of the model ($F(3,51)$ = 11.38, p <.001). These changes in R^2 were replicated across the other three parameters representing affective response to the first sound (median, mode, and peak-end of on-line ratings during the first sound). The results also held when the analysis was restricted to participants who did not experience their peak during the first sound.

Insert Table 2 about here

Discussion

Study 1 found support for H1, demonstrating that novel aspects of experiences are more likely to be incorporated in RSAs than familiar aspects when these aspects are not the peak or end of the experience. In this study, RSAs were pulled in the direction of the affective response to a novel but not a familiar beginning. This study also found that novelty is a separate factor from intensity. Novel aspects can be more or less intense than familiar aspects depending on whether arousal (Berlyne 1960; Steenkamp and Baumgartner 1992) or mere-exposure (Zajonc 1968) is the underlying mechanism. In this study, novelty was positively related to affective intensity. This relationship was evident in the on-line affect ratings, but

it does not explain the differences in the correspondence between on-line affect and RSAs, which is the focal outcome of this study. The regression analysis accounts for any differences in experienced affect. As well, the RSAs reflected the intensity of the novel beginning in both directions; the experience was considered more unpleasant when the novel beginning was aversive and less unpleasant when the novel beginning was mild. This finding suggests that novelty is not an added measure that only enhances or only diminishes remembered affect. Instead, novelty increases the correspondence between experienced and remembered affect.

One potential limitation of this study is in the measurement of on-line affect. The approach used here, measuring affect during a repeated presentation of the experience, helps to mitigate disruption arising from on-line measurement (see Ariely and Zauberman 2000). This approach was motivated in part to reduce false negatives for testing on-line intensity differences. Specifically, during a repeated presentation, participants were better able to use the scale because they had been exposed to the entire range of stimuli and were not distracted by uncertain incoming information. However, it is possible that this approach introduces another set of concerns. Participants may have had expectations coming into the second experience, and on-line intensity ratings may be assimilated to these expectations. This possibility may be aggravated in the novel conditions, working against the hypothesis; participants in the novel conditions would have formed more extreme expectations because they had already provided more divergent overall evaluations. Alternatively, if the replay is rated without drawing on expectations, this repeated presentation may exhibit reduced intensity differences if participants have adapted to the stimuli. These measurement concerns can be explored in further studies that manipulate the timing of on-line affect measures—either during the experience or during a repeat of the experience.

The simple effect of novelty found in study 1 places novelty alongside intensity and serial positioning as factors that influence the accessibility of aspects of experiences. In the next study I test how novelty differs from other factors in determining RSAs. Specifically, I examine the effect of novelty on immediate versus delayed RSAs.

STUDY 2: MANIPULATING THE ENDING OF ANNOYING SOUNDS

Study 2 tests H2a, the prediction that novel aspects will have a more enduring influence on RSAs than familiar aspects. Specifically, I predict that the end intensity of an experience will be incorporated in immediate RSAs, replicating prior research. However, the end intensity of an experience will be incorporated in delayed RSAs only if it is novel. This study uses a methodology similar to that of Study 1; on-line experience was manipulated by including a familiar or novel sound to end a sequence of annoying sounds.

Method

Participants and Design. Participants (n = 207), undergraduate and graduate students at a large East Coast University, completed this study as part of an experimental lab session for which they were paid $10. The study followed a 2 (familiar, novel end sound) X 2 (aversive, mild end sound) X 2 (immediate-and-delayed evaluation, delayed-only evaluation) between-subjects design.

Procedure. This study also involved an annoying sounds sequence. The sounds used in this study were the same as those in study 1, with the critical difference being that the focal sound was moved to the end of the sequence. The first two sounds in the sequence were ‘A mosquito buzzing close by’ and ‘The

busy signal for a telephone.' The third sound in the sequence varied as 2 (familiar, novel) X 2 (aversive, mild) between-subjects design. The familiar sound was either 'an electric razor being used to shave' (aversive) or 'a helicopter hovering' (mild). The novel sound was either 'an electric surge caused by a voltage spike' (aversive) or 'beluga whales communicating through clicking chatter' (mild). Participants listened to the sounds in the same way as in study 1, with the sequence coming at the beginning of the lab session.

Measures. Participants provided the same overall evaluation (RSA) as in study 1. However, the timing of this measure varied. Some participants provided an RSA immediately after the sequence concluded. These participants also provided a repeated measure at a second point in time, the end of the lab session. Other participants only provided an RSA after this delay. The delayed set of measures (M = 36 minutes later) included the RSA as well as the manipulation check of novelty, the same one used in Study 1 and the pretest. In this study, participants were not asked to provide an on-line measure of affect because such a measure was not necessary for testing the hypothesis or controlling for intensity differences, as will be discussed later. See Figure 3 for a schematic depicting Study 2.

Insert Figure 3 about here

Results

Manipulation Check. The novel set of sounds, 'surge' and 'beluga whales,' were rated to be less familiar than the familiar set of sounds, 'razor' and 'helicopter' ($F(1,187) = 57.82$, $p < .001$). As well, the novel set of sounds were each less familiar than the common sounds, 'mosquito' and 'busy signal' (each planned contrast $p < .0001$).

Overall Evaluations (RSAs). Combining the RSAs formed immediately after the conclusion of the sequence with those formed only after a delay, there was a three-way interaction between the final sound's aversiveness, its novelty, and the timing of the overall evaluation ($F(1, 192) = 4.23$, $p = .04$), see Figure 4. The final sound's intensity was reflected in immediate RSAs regardless of novelty condition, but only in delayed RSAs if the final sound was novel. There was also a main effect of timing of evaluations; RSAs were lower in the delayed measure ($F(1, 192) = 9.06$, $p < .01$). In the following sections, these results are explained separately by the timing of the measure.

Insert Figure 4 about here

Immediate RSAs. For RSAs that were formed immediately after the conclusion of the sequence (n = 111), there was a main effect of the final sound's aversiveness such that ending the experience with an aversive sound pulled down RSAs ($F(1, 107) = 5.12$, $p < .01$). There was no main effect of novelty ($F(1, 107) = 2.21$, $p > .14$) and no interaction between the final sound's aversiveness and its novelty ($F(1, 107) = 1.07$, $p > .3$). Planned contrasts revealed that the sequence with the familiar, aversive end sound was rated as significantly worse than the sequence with the familiar, mild end sound ($M_{Aversive} = -73.65$, $M_{Mild} = -57.05$; $t(51) = 2.86$, $p < .001$). The sequence with the novel, aversive end sound was also rated as worse than the sequence with the novel, mild end sound ($M_{Aversive} = -61.6$, $M_{Mild} = -54.89$), but this difference was not significant ($t(56) = 0.91$, $p > .3$).

Delay-Only RSAs. Some participants (n = 90) only provided an RSA after the delay. For these delayed RSAs the main effect of the final sound's aversiveness was muted ($F(1, 86) = 2.16$, $p > .14$). There was no main effect of novelty ($F(1, 86) = 0.24$, $p > .6$), but there was a marginally significant

interaction between the final sound's aversiveness and its novelty ($F(1, 86) = 2.78$, $p = .09$). The sequence with the familiar, aversive end sound was rated as nearly equally bad as the sequence with the familiar, mild end sound ($M_{Aversive} = -72.4$, $M_{Mild} = -73.35$; $t(48) = 0.18$, $p > .8$). On the other hand, the sequence with the novel, aversive end sound was rated as worse than the sequence with the novel, mild end sound ($M_{Aversive} = -78.05$, $M_{Mild} = -62.95$, $t(38) = 1.80$, $p = .08$).

Delay-Repeated RSAs. The same participants who provided an RSA immediately after the sequence concluded also provided a second delayed RSA measure. Fewer participants (n = 101) responded to the repeated measure because 10 participants were not able to stay in the lab for the entire duration of the study. Curiously, repeated RSAs exhibited results consistent with immediate RSAs, see Figure 5. There was a main effect of the final sound's aversiveness ($F(1, 97) = 8.07$, $p < .01$). There was a marginal main effect of novelty ($F(1, 97) = 0.77$, $p = .08$) and no interaction between the final sound's aversiveness and its novelty ($F(1, 97) = 0.91$, $p > .3$). Planned contrasts revealed that the sequence with the familiar, aversive end sound was rated as significantly worse than the sequence with the familiar, mild end sound ($M_{Aversive} = -75.07$, $M_{Mild} = -56.8$; $t(46) = 2.96$, $p < .005$). The sequence with the novel, aversive end sound was also rated as worse than the sequence with the novel, mild end sound ($M_{Aversive} = -69.07$, $M_{Mild} = -60$), but this difference was not significant ($t(51) = 1.25$, $p > .2$). A repeated measures model that includes within subjects effects for the timing of the RSA measure shows that the main effect of the final sound's aversiveness, the main effect of novelty, and the interaction of these stimulus characteristics on RSA did not differ across the timing of the measure (all $p > .25$). However, there was a marginal main effect of the timing of evaluation; RSAs were lower in the second measure ($F(1, 97) = 3.52$, $p = .06$).

Insert Figure 5 about here

Discussion

Study 2 provides evidence for H2a, demonstrating that the end intensity of an experience influences immediate evaluations, but the end intensity only influences delayed evaluations if it is novel. Unlike Study 1, on-line affect was not measured in this study, because the pattern of means supports the temporal interaction interpretation. If there were differences in intensity between the novel and familiar sounds, this should be captured by the immediate RSAs when the experience was fresh in memory. Instead, novelty only influenced RSAs after a delay. One potential explanation for this result is differences in memory interference. When the sequence of sounds had just been experienced, participants may have had little difficulty in accessing the most recent sound they encountered, resulting in both familiar and novel ends influencing RSAs. After a delay, familiar sounds may have been less accessible because recency effects diminish for delayed memory tasks (Bjork and Whitten 1974), and these sounds were similar to other sounds encountered outside of the lab. In contrast, because the novel sounds were unique to the specific episode, they may still have been accessible after a delay and continued to influence RSAs.

It is also noteworthy that delay-only RSAs differed from delay-repeated RSAs, which were not influenced by novelty. When people form an RSA for the first time, their on-the-spot construction of the RSA will depend on which aspects are accessible at that time. However, once an RSA is formed, people might not completely re-interpret the experience on subsequent judgment occasions. Instead, they may rely to some extent on their earlier judgment (Feldman and Lynch 1988; Ariely and Zauberman 2003). The differences between delay-only and delay-repeated RSAs found in this study suggest that people do not always form spontaneous RSAs of affective experiences, lending support to previous research with similar findings in other affective judgments (e.g., Novemsky and Ratner 2003; Nunes and Novemsky 2008).

Whereas novelty influenced delay-only RSAs differently than delay-repeated RSAs, both measures exhibited some bias compared to immediate evaluations. Specifically, RSAs were worse in the delay-repeated evaluation compared to the immediate evaluation, replicating the main effect of timing of evaluation found in the between-subjects comparison (i.e., immediate vs. delay-only RSAs). Employing an unmarked sliding scale to measure RSAs prevented participants from retrieving a specific number they had provided earlier. As such, participants forming a delay-repeated RSA were not retrieving their earlier judgment directly, but instead were affected to some extent by bias in their memory for the experience. The present investigation is silent on the source of such bias. However, based on prior research, one could argue that participants relied on a more extreme theory-driven memory for the annoying sounds experience when forming delayed RSAs (Robinson and Clore 2002). Alternatively, evaluations may have worsened over time due to the particular context of the later evaluation (e.g., incidental mood was translated into more unpleasant memories of the annoying sounds).

If delay-repeated judgments were also biased why were these judgments not influenced by novelty? One plausible explanation is that rendering an immediate RSA helped participants encode the experience. Even if delay-repeated judgments were biased, they were not completely baseless as participants were still able to incorporate differences in end intensity. This result may be specific to the experimental context, and it is possible that other judgment domains may show delay-repeated evaluations converging to delay-only evaluations. In many experiences that are not directly monitored, people's RSAs may not be so explicitly stated, resulting in poorer encoding of immediate attitudes and lesser correspondence between immediate and delay-repeated RSAs. Consequently, in those situations novelty may also have an impact on delay-repeated RSAs. Further studies can test different forms of measuring RSAs to examine if immediate RSAs would still concur with delay-repeated RSAs with these other measurements.

One alternative explanation for the set of findings in this study is that encountering novel aspects encourages spontaneous evaluations, resulting in better correspondence between immediate and delay-only RSAs in the novel conditions. However, although encountering a novel aspect may lead participants to spontaneously encode their on-line affect, it is less likely that they would spontaneously summarize the overall experience investigated here. The experience was designed without a script; the three sounds were loosely tied, and the study did not have a cover story. I argue that in this context people would only form an RSA when they were asked to consider all three sounds together. Otherwise, participants had no purpose for evaluating the entire experience in terms of one summarized assessment. On the other hand, one could speculate in more naturalistic experiences that encountering a novel aspect may enhance consumers' monitoring of the overall experience, which would contribute to the results due to more spontaneous immediate construction of an RSA.

Further, the amount of time used for the delay in this study should be generalized with caution. This study involved a short affective experience lasting only 48 seconds with little sensory information. Participants did not have a personal stake in the outcome of the experience as they would with goal-directed experiences. In this study, approximately 35 minutes was sufficient for evaluations to differ systematically, driven by novelty and a general worsening of evaluations. One might imagine that for a more involving experience, such as a week-long vacation, a longer delay would be necessary to reveal such discrepancies between immediate and delayed RSAs.

Study 2 demonstrates that one aspect of an experience, its end, has an immediate influence on RSAs that does not depend on novelty, but it has a delayed influence that is strengthened by novelty. In the next study I examine delayed RSAs of experiences in which the entire experience is either familiar or novel.

STUDY 3: ARTISTIC SHAPES STUDY

Study 3 tests H2b, the prediction that novel experiences will have better correspondence between on-line affect and delayed RSAs than familiar experiences. RSAs for familiar experiences will exhibit more loss of on-line affect. This study used a different methodology compared to Study 1 and 2. On-line affect was measured for an experience in which participants viewed pleasant artistic shapes. Novelty or familiarity was manipulated by prior exposure. The memory and perception literature defines novelty as a characteristic that depends on the amount and recency of exposure to similar stimuli (Berlyne 1960). In this study, a relatively unique set of images was presented, which became familiar for some participants through recent prior exposure to similar images.

Method

Participants and Design. Participants (n = 64), undergraduate and graduate students at a large East Coast University, completed this study as part of an experimental lab session for which they were paid $10. The study followed a one factor between-subjects design in which the entire experience was either familiar (n = 34) or novel (n = 30); participants were either exposed to or not exposed to similar images in the recent past.

Procedure. The focal experience in this study was viewing a series of artistic shapes on a computer program. Specifically, the shapes selected for this task were all ‘fractal’ images culled from a website that included a gallery of fractals. A fractal is a shape that can be split into parts, each of which is approximately a microcosm of the whole shape. Mathematicians study fractals because they have properties similar to shapes from the natural world, such as coastlines and snowflakes. Consumers also

enjoy looking at fractals, which are sometimes depicted in posters and screensavers. Due to the well-defined mathematical properties of fractals, new fractal images can be created by computer programs, leading to a proliferation of unique images with similar appearance. See Figure 6 for a sample of a fractal displayed in the focal experience.

Insert Figure 6 about here

The study proceeded in three stages within the lab session; see Figure 7 for a schematic depicting the stages of the study. At the beginning of the session, participants were either exposed to 20 images of fractals or no images as a between-subjects manipulation of novelty. The images were displayed on a computer screen. The computer program advanced each image after an exposure period of 2.2 seconds. Participants who viewed these images were not asked to report their on-line affect, and no cover story was provided for the image viewing task. Participants in the novel condition instead participated in other lab studies, which were not related to fractals or viewing images. After this first stage of the study, all participants moved on to other unrelated experiments in the lab session.

Insert Figure 7 about here

In the second stage, M = 25 minutes later all participants saw a set of seven focal images. These seven images were different from the 20 that participants in the familiar condition viewed earlier. Participants controlled the pace at which they viewed the seven images, and they responded to an on-line measure of affect. The first of the seven images was viewed the longest (M = 5.42 seconds), but all other images were viewed very briefly (range from M = 2.33 seconds to M = 3.21 seconds). This second stage of the study, which comprised the entire viewing task, was brief (M = 21.53 seconds).

After viewing the images, participants moved on to stage three, which included the delay and the RSA measure. Immediately after the fractal viewing experience, all participants experienced a delay lasting approximately five minutes. During this delay, participants listened to the theme song from ‘Chariots of Fire’ and read three short poems: 'Stopping by Woods on a Snowy Evening' by Robert Frost, 'There is another sky' by Emily Dickinson, and 'Composed Upon Westminster Bridge' by William Wordsworth. These traditional aesthetic experiences were selected to occupy participants’ time so that they would not be aggravated by an empty wait. As well, participants would not find any conceptual similarity between these filler experiences and the fractal viewing experience. After these other hedonic experiences concluded, participants responded to the RSA measure.

Measures. As they viewed the focal set of fractal images, participants were asked to rate each image for its on-line enjoyment. Specifically, participants were asked ‘How much do you enjoy looking at this image?’ They responded on a 15-point scale from ‘Not at all’ to ‘Very much.’ After they clicked on a response, the computer program advanced and displayed the next image with the same rating scale.

The key delayed measure was the overall evaluation (RSA) of the experience. In an instructions section provided prior to this measure, participants in the novel condition were asked to consider the images they saw, whereas participants in the familiar condition were asked to focus only on the most recent set of images they saw. This instruction was necessary to ensure that familiar condition participants would focus on the same set of images as those considered by participants in the novel condition. For participants in the familiar condition the approximately half-hour delay between the prior exposure task and the focal experience, the stark differences in the number of images (20 vs. 7), and the procedural differences in viewing experience (images that automatically advanced as a slideshow vs. images that were controlled

through on-line affect ratings) helped to alleviate any confusion as to which set of images the RSA was referring to. All participants were asked, "Overall, how much did you enjoy looking at these images?" Their responses were collected on an unmarked sliding scale that resembled the RSA scale used in studies 1 and 2; participants moved a probe to a position on a line anchored by 'Did not enjoy at all' to 'Enjoyed a lot.' The probe's singular position on the scale was translated to a number from 0 to 100, with higher numbers indicating more overall enjoyment.

Results

On-line Measures. Ratings of enjoyment during the image viewing experience revealed some differences by novelty condition. The average of on-line ratings across all seven images differed marginally; participants who viewed fractal images previously enjoyed the focal experience less than participants for whom the focal experience was novel ($M_{Familiar}$ = 7.55, M_{Novel} = 8.91; $t(62) = 1.80$, $p = .08$). An image-by-image analysis suggests that this result was driven by the low of the experience, defined as the least enjoyed image. The low for participants in the familiar condition was less enjoyed than the low for participants in the novel condition ($M_{Familiar}$ = 3.97, M_{Novel} = 5.66; $t(62) = 2.03$, $p = .04$). No specific image was the low for all participants, but two images exhibited significantly less enjoyment in the familiar condition: the first image ($t(62) = 2.38$, $p = .02$) and the fourth image ($t(62) = 2.26$, $p = .03$). As such, this study finds a positive relationship between novelty and intensity of enjoyment, at least for two images and the low of the experience. However, the peak of the experience, defined as the most enjoyed image, did not differ in enjoyment by novelty condition ($M_{Familiar}$ = 11.53, M_{Novel} = 12.3; $t(62) = 1.20$, $p = .23$). Because only ten participants (3 in the familiar and 7 in the novel condition) maxed out on the scale for rating their most enjoyed image, this lack of difference is unlikely to be due to a ceiling effect. The

end of the experience (i.e., the final image in the sequence) also did not differ in enjoyment by novelty condition ($M_{Familiar}$ = 7.58, M_{Novel} = 8.36; $t(62) = 0.77$, $p = .44$).

Overall Evaluations (RSAs). The delayed RSA for the viewing experience did not differ by novelty condition. Participants who had viewed fractal images previously evaluated the focal experience as being just as enjoyable in retrospect as participants who had not viewed fractal images previously ($M_{Familiar}$ = 59.24, M_{Novel} = 62.94; $t(62) = 0.69$, $p = .49$).

Regression Analysis. The main outcome of interest in this study was the correspondence between on-line measures of affect and the delayed RSAs. There were seven measures of on-line affect in this study, each based on one of the seven images displayed. Regressing the delayed RSA on all seven of these measures resulted in different coefficients of determination for the regression model by novelty condition. The seven on-line ratings accounted for only 39% of the variation in RSAs for the familiar condition but 70% of the variation in RSAs for the novel condition. However, in either condition this regression model was inefficient; none of the on-line measures significantly predicted RSAs when all seven measures were included in the model. In addition, the overall trend of the experience, defined as the linear trend of all seven on-line measures for each participant, was not a significant predictor of RSAs when considered alone in a regression analysis ($p > .5$ for both conditions). On the other hand, the mean of on-line measures and each individual on-line measure was a significant predictor of RSAs when considered in separate regression analyses (with the exception of the third on-line measure in the familiar condition). As well, each predictor explained more of the variation in RSAs for the novel condition than for the familiar condition, see Table 3.

Insert Table 3 about here

The peak of on-line ratings is a theoretically informed predictor of RSAs. Peak intensity accounted for 11% of the variation in RSAs for the familiar condition and 51% of the variation in RSAs for the novel condition. In order to test whether peak intensity determined RSAs differently by novelty condition, I combined both conditions in a regression analysis. Specifically, I regressed RSAs on the on-line peak intensity, a dummy variable for novelty condition, and the interaction of peak intensity by novelty condition. This model resulted in a significant peak by novelty interaction ($t(60) = 2.27$, $p = .03$), suggesting that the peak intensity had a larger influence on RSAs when the experience was novel.

One potential explanation for this interaction may be that the peak was more intense in the novel condition, resulting in the peak being more accessible in the novel than in the familiar condition. Although participants' rating of their peak did not differ by novelty condition ($t(62) = 1.20$, $p = .23$), the subjective intensity of their peak might also depend on the intensity of the other aspects they had experienced in the focal episode. In further analyses I normalized peak intensity by including relevant control variables in separate regression analyses. The peak by novelty interaction was significant even when including each of the following predictors as control variables to normalize peak intensity: the mean of other on-line ratings ($t(59) = 1.98$, $p = .05$), the range of on-line ratings—by extension, the low of on-line ratings ($t(59) = 2.35$, $p = .02$), and the kurtosis of distribution of on-line ratings, which captured the 'peakedness' of on-line ratings ($t(59) = 2.27$, $p = .02$). As well, 23 participants rated more than one image at their peak level, but including the number of peaks as a control variable still resulted in a significant peak by novelty interaction in the regression analysis ($t(59) = 2.09$, $p = .04$).

The peak by novelty interaction is particularly relevant to existing theory, but this interaction was also replicated for other aspects of the experience. This suggests that delayed RSAs reflect general loss of on-line affect for familiar but not novel experiences, and this loss of on-line affect is not just contained to

peak intensity. I performed additional regression analyses separately for all seven on-line measures. In each analysis, RSAs were regressed on to one on-line measure, a dummy variable for novelty condition, and the interaction of the on-line measure by novelty condition, see Table 4. These analyses revealed that the interaction was directionally consistent across all seven on-line measures; each on-line measure had a larger influence on RSAs when the experience was novel than when it was familiar. Three of these interactions were significant (for the second, third, and fourth on-line measures), one interaction was marginally significant (for the first on-line measure), and three interactions were not significant (the fifth, sixth, and seventh on-line measures). Moreover, regressing RSAs on the mean of on-line measures, novelty condition, and the interaction of the mean by novelty condition resulted in a marginally significant interaction ($t(60) = 1.70$, $p = .09$). Although the mean is based on seven on-line measures, as an individual parameter it models RSAs most parsimoniously, accounting for the greatest variance in RSAs in each condition. As well, no other predictor accounts for significant unique variance in RSAs beyond the mean of on-line measures. Due to high correlation between on-line measures, RSAs can also be predicted well by fewer on-line measures, but no model predicts RSAs better in the familiar condition than in the novel condition.

Insert Table 4 about here

Discussion

Study 3 provides evidence for H2b, demonstrating that delayed RSAs are more likely to incorporate on-line affect if the experience is novel than if it is familiar. From the standpoint of existing theory it is particularly noteworthy that the peak intensity had a larger influence on RSAs when the experience was novel. This provides a moderator of the peak's influence on RSAs. As well, the greater integration of peak

intensity for the RSA of novel experiences was not offset by other aspects having a larger influence on the RSAs of familiar experiences. Instead, each on-line measure explained RSAs better in the novel condition than in the familiar condition. Thus, the delayed RSAs for the familiar experience were based less on on-line affect.

If delayed RSAs in the familiar condition were less likely to capture on-line affect, what else might these RSAs reflect? One possibility is that participants in the familiar condition were unable to access their on-line affect from the focal episode because their previous experiences and established attitudes interfered when they were forming delayed RSAs. As such, one predictor of RSAs could be the affect participants experienced in previous, related episodes. Participants' on-line affect for the previously viewed images was not measured in this study. In a future study it would be useful to measure on-line affect for initial experiences and to examine whether these on-line measures predict RSAs for a later, focal experience. Another possible predictor of delayed RSAs for familiar experiences could be participants' category perceptions (Nunes and Novemsky 2008). If participants came into the focal experience with existing attitudes towards the fractal viewing experience, then these attitudes would likely influence their delayed RSAs when the focal experience was difficult to access.

Ariely and Carmon (2000) also found that peak intensity had a muted impact on RSAs when the focal experience was one of many recent encounters in the stimulus domain. In their study, long-term patients in the bone marrow transplant unit were asked to evaluate a day of medical pain they had just experienced. Peak intensity was not a significant predictor of overall evaluations of pain. They argued that peak intensity may have had a muted impact because these patients were not able to separate the peak intensity of their focal experience from that of previous experiences. Although they did not test the role of novelty and delay directly, their results are consistent with the findings of the present investigation.

Whereas in studies 1 and 2 novelty was pre-tested for different stimuli, in this study novelty was manipulated through prior exposure. This alternative approach for manipulating novelty disentangles novelty from other domain-specific stimulus characteristics; all participants in Study 3 rated the same set of focal images. However, one limitation to this study is that it leaves unanswered the question of what characteristics of the fractal viewing experience were perceived as novel. Since the fractal viewing experience became familiar due to just one viewing, one possibility is that participants did not necessarily find the images novel as much as the context in which they were viewed. Whereas many participants may have been exposed to fractals in the past, few would have viewed fractals in a series or in a controlled context, such as an experimental lab session. Future studies should examine more closely the features of an experience that contribute to its perceived novelty or familiarity.

GENERAL DISCUSSION

This paper focuses on the role of novelty in affective experiences. One of my objectives was to investigate how novelty impacts retrospective summary assessments (RSAs) of affective experiences. I found a simple effect of novelty; aspects of experiences that are merely novel but which are not the peak or end are more likely to influence RSAs than equally intense and similarly placed familiar aspects. I also found that novelty interacted with the timing of evaluations to influence RSAs. Delayed RSAs considered on-line affect derived from novel but not familiar peaks and ends. In contrast, immediate RSAs considered these aspects regardless of their novelty.

The present findings generalize existing knowledge on RSAs. I broaden the scope of factors that influence RSAs to include related past experiences. When consumers engage in or remember a consumption episode, they draw on a frame of reference that includes their past experiences in the domain. Thus,

novelty is a critical factor in real-world affective experiences, and I show how this factor influences RSAs. Additionally, I study delayed RSAs, which commonly impact consumers' decisions and recommendations. This paper discusses how delayed RSAs differ from immediate RSAs, whereas past research on RSAs has provided little direction on how delay would influence such evaluations.

A second objective was to use the framework of affective evaluations to explicate novelty. I show that novelty is distinct from affective intensity, and the two factors differentially impact RSAs. Novelty also differs from other sources of distinctive processing, such as incongruity. The experiences tested in the present set of studies lacked scripts or schemas in the form of cover stories or expectations. This characteristic allowed novel aspects to be included in experiences without imposing surprise or incongruity. That novel aspects influenced delayed RSAs contradicts the predicted effect of incongruous aspects, which past research has shown to be disregarded in delayed memory-based judgments.

Taken together, these contributions have many implications for marketers. Understanding the role of novelty and delay in consumers' evaluations will aid marketers in their own market research, which in turn they may use to optimally design consumption experiences. The present investigation highlights the importance of delayed satisfaction surveys and other marketing research instruments. In terms of optimal design, if consumers are likely to base their repeat purchase decisions on immediately-formed RSAs, resources may be allocated to improving any aspects of experiences regardless of their novelty. In contrast, if consumers' decisions are based on RSAs formed after a delay, marketers may focus on enhancing novel aspects, which matter more for delayed judgments. Alternatively, marketers may shift their focus to improving category and brand perceptions, which may also drive delayed decisions.

Future directions

Prior investigations on RSAs have concluded with clarion calls for further research on affective experiences, including work on different experiential domains and methodologies. I second their encouragement for future research in this area. Rather than re-iterating directions proposed in the past, I offer a few ideas which would be useful for understanding the phenomena emphasized in the present investigation.

Methodology. One methodological consideration in research on RSAs is how to capture on-line affect. I employed three approaches: measuring on-line affect during a repeated presentation of the experience (Study 1), manipulating on-line affect (Study 2), and measuring on-line affect during the experience itself (Study 3). The repeated presentation method from Study 1 offers a new option for future studies on affective integration. As I addressed in the discussion of Study 1, there is a need for further work on how a repeated presentation of an affective experience differs from the actual experience. Such research will provide better guidelines on when this technique would be justified.

Measuring on-line affect during the experience may have influenced the results of Study 3. Consistent with past work, Study 3 demonstrated that the experience's trend had little impact on RSAs, and this may have occurred because on-line affect was measured (Ariely and Zauberman 2000). However, the decision to directly measure on-line affect was centered on the cohesiveness of the affective experience and how likely it would be to invoke momentary evaluations (see Ariely and Carmon 2000). Whereas studies 1 and 2 involved continuous experiences (annoying sounds), Study 3 involved an experience with discrete elements (fractal images), which provided greater justification for on-line measurement. Nonetheless, further work is needed to help decide whether on-line measurement of affect is appropriate in a given context. In particular, there is limited literature on what evaluative thoughts are naturally evoked during

affective experiences. I also believe methodology would improve substantially through research on how on-line measures of affect correspond with less intrusive physiological measures.

How RSAs are measured will be an additional avenue for future research. In this paper, I found that RSAs were not always spontaneously constructed, but future research may provide insight on when RSAs arise for different experiential contexts. Some factors that may influence whether people will spontaneously construct an RSA include prevailing norms in the consumption domain, how coherent the affective experience is, and whether the RSA is perceived to be a useful input for future decisions. Further, as I suggested in the discussion of Study 2, future research could examine when delay-repeated RSAs would differ from immediate RSAs through different ways of measuring RSAs.

The effect of delay on RSAs found in this paper raises the issue of how long of a delay is necessary to demonstrate differences in RSAs over time, driven by novelty. In Study 2 approximately 35 minutes was a sufficient delay, whereas in Study 3 only 5 minutes was necessary. Although different delay intervals were not tested in any one study, I believe that the delay interval will depend on the nature of the affective experience as well as the delay. The annoying sounds task was both longer and more intrusive than the fractal image viewing task. The former experience may have had more sensory information than the latter. As such, Study 2 required a longer delay to show impaired memory for the experience. On the other hand, the fractal image viewing task from Study 3 was followed by experiences that would more directly interfere with retrieval of previously experienced affect; after participants viewed the fractals they engaged in other aesthetic experiences, including listening to a classical music piece and reading poems. This richer delay interval may have accelerated memory interference in Study 3. Further research assigning different delays—both in time and in kind—in the same study may provide a more precise understanding of the time course of novelty's effect on RSAs.

Measuring novelty may be more nuanced in future research. I asked participants for a general measure of familiarity, but future researchers may be interested in the perceived familiarity or novelty of specific features of affective experiences. For more complex experiences, including experiences of mixed valence or mixed sensory modality, novelty may have differential impact on RSAs depending on which characteristics are perceived to be novel. This greater complexity may require future research on novelty to have more comprehensive pre-tests of stimuli.

A final methodological issue concerns how to investigate the process behind novelty's influence on RSAs. I manipulated novelty by basing stimuli on pre-tests of novelty (studies 1 and 2) or by varying prior exposure to related stimuli (Study 3). Another approach for manipulating novelty, which I did not test, is to vary subsequent exposure to stimuli—i.e., after the focal experience but before the RSA measure. This procedure may be useful as another way to control for affective intensity differences by novelty condition. As well, post-experience exposure clearly impacts memory interference, which I argue is a possible mechanism behind the temporal interaction demonstrated in this paper. Retrieval cues could also be manipulated to enhance the accessibility of earlier episodes in a direct test of interference.

Diagnosticity. I focused on how novelty influences accessiblity, but another line of inquiry could examine the relationship between novelty and diagnosticity in RSAs. Past research has argued that people also evaluate experiences by their meaningful aspects and not just by the aspects that they bring to mind (Frederickson 2000). Because the experiences tested in the present studies were not self-relevant for participants, diagnosticity likely had little bearing on the impact of novelty on RSAs. Yet, I can offer some conjectures on why novel aspects may be perceived as more diagnostic for RSAs in other contexts.

One way in which novel aspects may be more diagnostic for RSAs is when experiences are pursued for their novelty. If the motivation for engaging in an experience is to try something new, consumers may focus on novel aspects, which are connected to their goals. Alternatively, novel aspects may be more diagnostic due to conversational norms. According to Gricean maxims, the pragmatics of natural language require people to be informative and relevant (Grice 1957). When asked to evaluate an experience in retrospect, considering novel aspects may be particularly informative to others, who may be inquiring about experiences for vicarious learning or curiosity. As such, if RSAs will be used to communicate value to others, as occurs with word-of-mouth recommendations, conversational norms may aggravate the extent to which RSAs depend on novel aspects. Future research can examine how RSAs differ when they are communicated to others versus when they are used for one's own purposes.

A different way of approaching diagnosticity is by examining how diagnostic RSAs are to decisions, and whether the impact of RSAs on decisions depends on the novelty of the experience. For instance, when deciding whether to repeat an experience in a familiar domain, consumers may rely on their perception of the overall category of experiences rather than their RSA for a particular episode. In contrast, in novel domains, which have fewer past episodes and more unstable category perceptions, consumers may rely on their RSA for a recent past episode. Novelty may also be regarded as an orthogonal evaluative dimension for decisions. In research on aesthetic judgments, novelty is a valued trait which concerns the amount of perceived innovativeness (Hart and Jacoby 1973; Hekkert, Sneiders, and van Wieringen 2003; Sood and Dreze 2006; Cho and Schwarz 2006). Consumers may balance their goal of maximizing utility (i.e., by engaging in experiences with superior RSAs) with their goal of experiencing novelty. Thus, the novelty of an experience can mitigate the impact of RSAs on decisions.

Information integration. Lastly, research on RSAs concerns how hedonic experiences are integrated, but few connections have been made to the large body of literature that discusses how information is integrated (for an exception see Zauberman et al. 2006). Past research on information integration has also examined the role of novelty. This research argues that experts, those with greater knowledge in a domain, have superior memory for consumption experiences than novices (Alba and Hutchinson 1987; Shapiro and Spence 2002). Lay consumers are also better able to recall information for familiar brands than new brands (Kent and Allen 1994). On first blush, these results seem to contradict the findings of the present investigation. However, these seemingly opposing results can be reconciled by considering the nature of the memory tasks. In information integration tasks, people's memories are examined for their depth of knowledge. In contrast, in affective integration tasks, when people are asked to form an RSA, they recall the experience and simply access their earlier affective response. These tasks draw on different characteristics of memory, yielding different effects of novelty on judgments. Nonetheless, future research should examine how novelty influences judgments that require the integration of both affective and informational components.

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FIGURE 1

Figure 1: Schematic depicting Study 1.

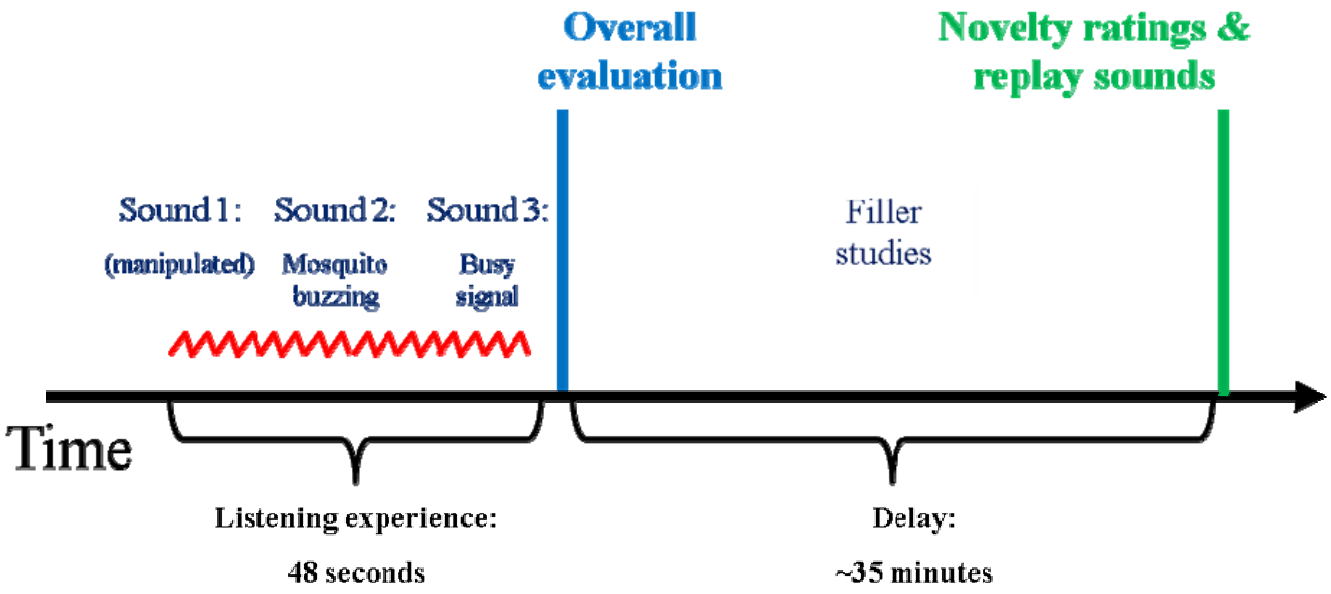

FIGURE 2

Figure 2: Mean RSA of annoying sounds experience in study 1 as a function of aversiveness and novelty of the first sound. Error bars represent standard errors of the mean.

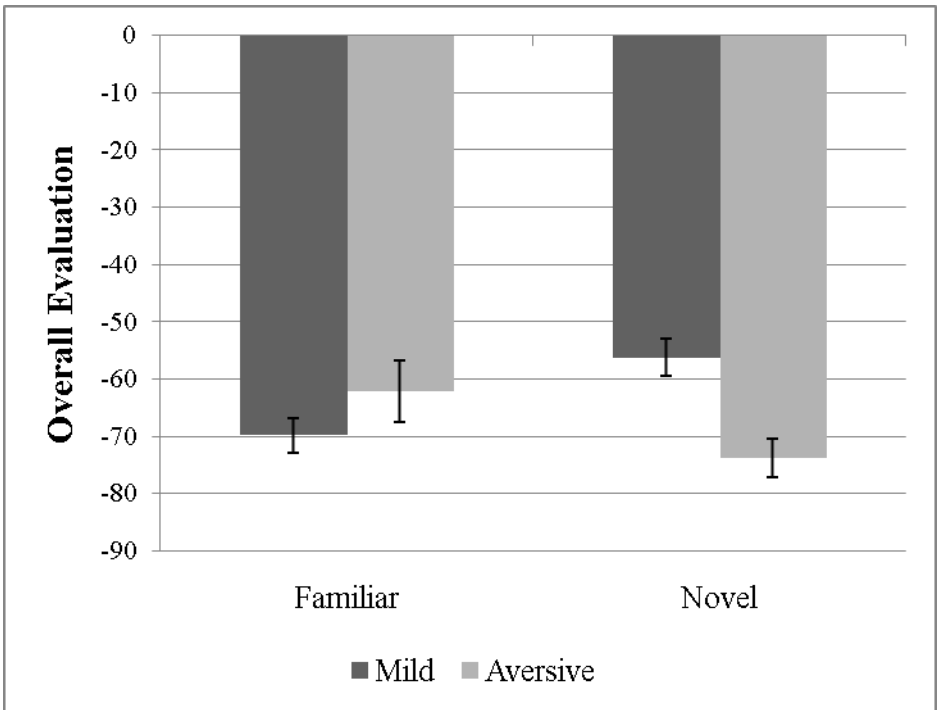

FIGURE 3

Figure 3: Schematic depicting Study 2.

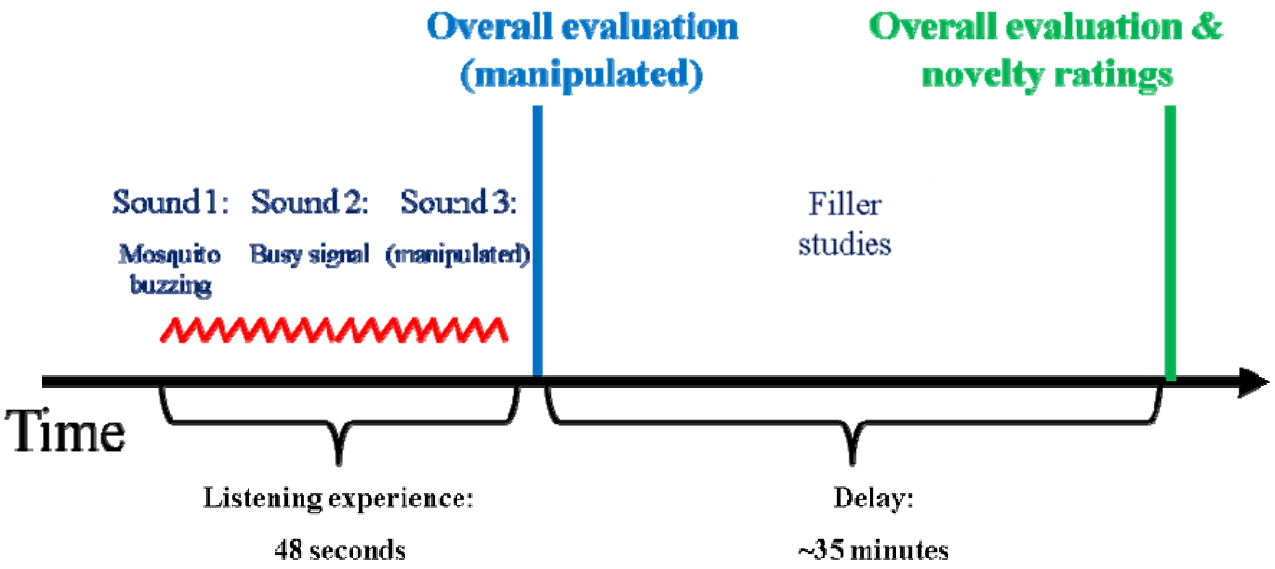

FIGURE 4

Study 2: Between-subject, Immediate vs. Delay-Only Comparison

Figure 4: Mean RSA of annoying sounds experience in study 2 as a function of aversiveness and novelty of the final sound and timing of the RSA. The left hand panel depicts RSAs measured immediately after the end of the experience, and the right hand panel depicts RSAs measured only after a delay. Error bars represent standard errors of the mean.

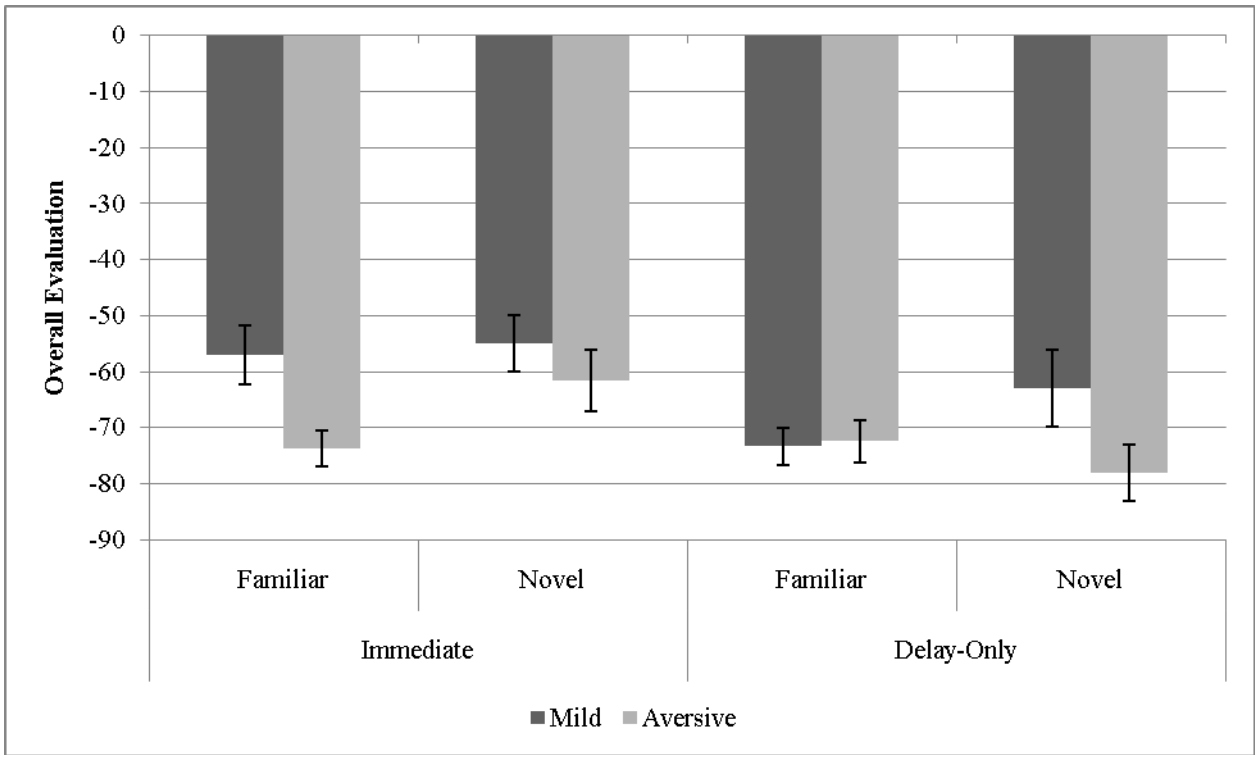

FIGURE 5

Study 2: Within-subject, Immediate vs. Delay-Repeated Comparison

Figure 5: Mean RSA of annoying sounds experience in study 2 as a function of aversiveness and novelty of the final sound and timing of the RSA. The left hand panel depicts RSAs measured immediately after the end of the experience, and the right hand panel depicts repeated RSAs measured after a delay. Error bars represent standard errors of the mean.

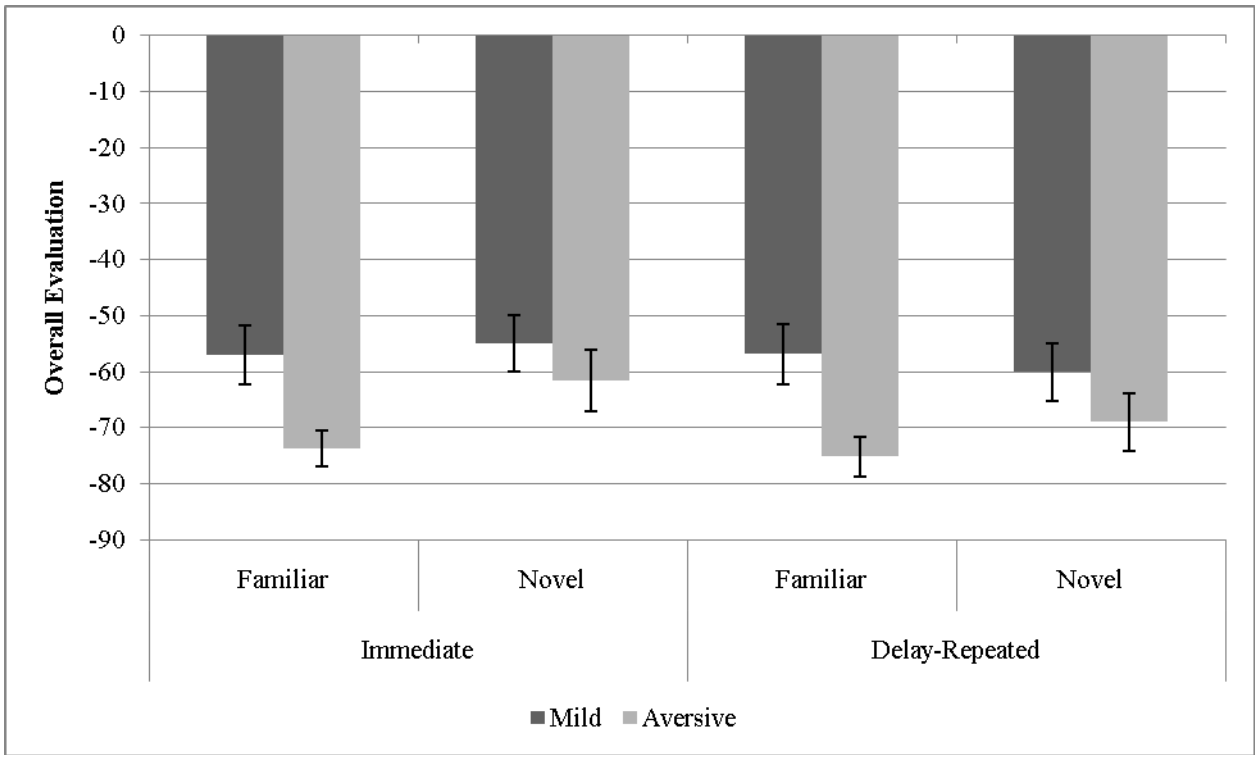

FIGURE 6

Figure 6: Example of a fractal image displayed in the focal experience for Study 3.

FIGURE 7

Figure 7: Schematic depicting the three stages of study 3.

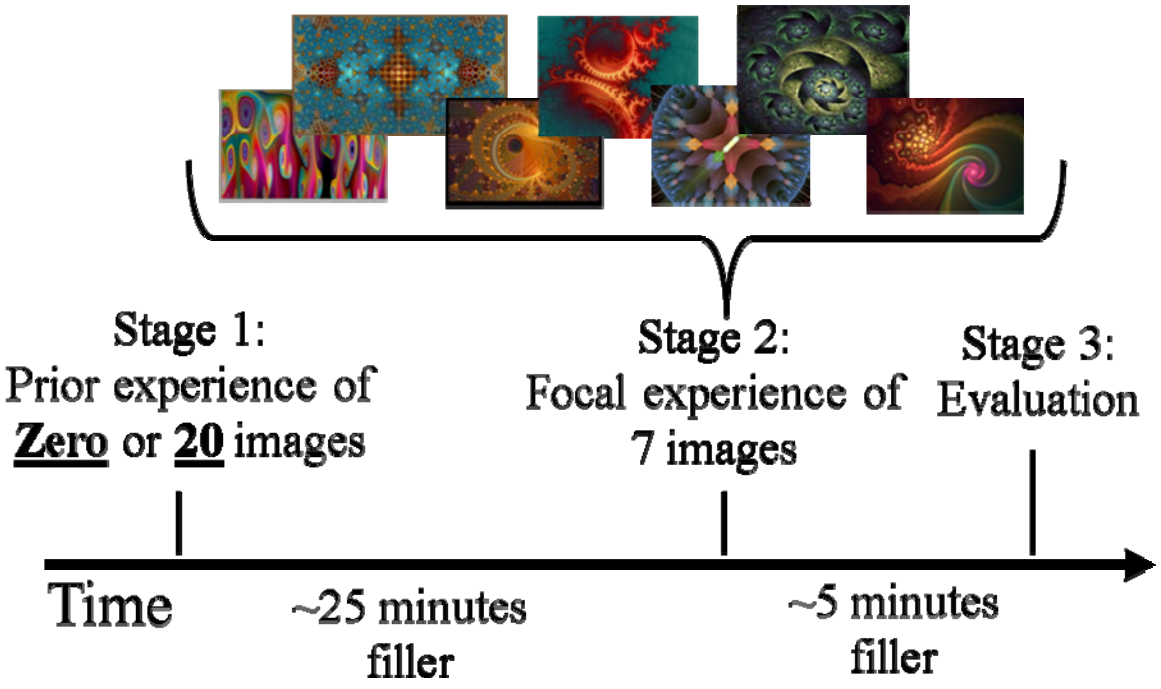

TABLE 1

Table 1: Study 1 overall evaluations of unpleasantness were regressed on to peak intensity, end intensity, a dummy variable for novelty condition, a parameter representing the on-line evaluation of the first sound, and an interaction between this parameter and novelty condition. T-test values, listed below, test the significance of the interaction between the parameter and novelty condition. If the interaction is positive, the parameter had a larger influence on overall evaluations when the first sound was novel than when it was familiar.

	Parameter based on first sound on-line ratings	**t**	***p* value**
All participants (n= 111)	Mean	2.44	.0162
	Median	2.68	.0086
	Mode	2.67	.0088
	Peak+End	2.23	.0279
Participants who did not experience their peak during the first sound (n= 83)	Mean	2.19	.0317
	Median	2.58	.0118
	Mode	2.47	.0155
	Peak+End	3.00	.0037

TABLE 2

Table 2: Study 1 overall evaluations were regressed on to on-line measures of affect. The baseline model includes peak and end intensity as predictors of RSAs. The larger, three-parameter models add one parameter representing on-line affect derived from the first sound. R^2 values for these models are listed below by novelty condition. P-values are based on an R^2 change analysis, comparing the larger model to the baseline model.

		R^2 of model	
	REGRESSION MODEL:	**Familiar**	**Novel**
All participants (n= 111)	BASELINE: Peak and end intensity of sequence	48.92%	24.78%
	Peak and end intensity of sequence +		
	Mean rating of first sound	49.15%	54.95%***
	Median rating of first sound	49.00%	55.06%***
	Modal rating of first sound	49.09%	55.89%***
	Peak+End rating of first sound	48.95%	57.11%***
Participants who did not experience their peak during the first sound (n= 83)	BASELINE: Peak and end intensity of sequence	27.35%	17.79%
	Peak and end intensity of sequence +		
	Mean rating of first sound	27.36%	39.43%*
	Median rating of first sound	27.49%	42.62%**
	Modal rating of first sound	27.36%	43.96%**
	Peak+End rating of first sound	28.16%	48.85%***

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 3

Table 3: Predictors of overall enjoyment of the fractal viewing experience in study 3. RSAs were regressed on to each predictor in separate regression models. Beta coefficients for each predictor are provided for the combined analysis as well as the separate analyses for each condition.

	Combined analysis N = 64	**Familiar condition N = 34**	**Novel condition N = 30**
Mean	0.72***	0.59***	0.82***
Trend	-0.01	0.11	-0.09
Peak	0.55***	0.33*	0.71***
Low	0.59***	0.56***	0.62***
Image 1	0.65***	0.5**	0.77***
Image 2	0.56***	0.38*	0.72***
Image 3	0.44***	0.24	0.65***
Image 4	0.55***	0.43**	0.67***
Image 5	0.55***	0.47**	0.64***
Image 6	0.66***	0.57***	0.74***
Image 7	0.62***	0.51**	0.69***

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 4

Table 4: Study 3 T-test values for the interaction between each predictor of overall enjoyment and novelty condition. RSAs were regressed on to each predictor in separate regression models. Each model also included a dummy variable for novelty condition and the interaction of the predictor by novelty condition.

	t	***p* value**
Mean	1.7	.09
Mean excluding peak	1.79	.08
Trend	-0.77	.44
Peak	2.27	.03
Peak controlling for:		
Mean of non-peak on-line measures	1.98	.05
Range of on-line measures	2.35	.02
Kurtosis of distribution for on-line measures	2.27	.03
Number of peaks	2.09	.04
Image 1	1.83	.07
Image 2	2.45	.01
Image 3	2.77	.01
Image 4	1.96	.05
Image 5	1.62	.11
Image 6	1.61	.11
Image 7	1.14	.26