

When Promoting Similarity Slows Satiation:
The Relationship of Variety, Categorization, Similarity, and Satiation

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Satiation is an ongoing marketing challenge as it continually reduces a consumer's ability to enjoy a favored experience. The prevailing notion is that satiation increases with similarity; hence, consumers can best slow satiation by consuming stimuli that are as different as possible. We challenge this traditional (and intuitive) view, and instead propose that stimuli can be so inherently different that consumers no longer spontaneously consider them together as part of the same experience. In such cases, promoting the similarity of the stimuli can counterintuitively slow satiation. We propose that this reversal happens because finding similarities leads the consumer to place these episodes into a single ad-hoc category for the ongoing experience, thereby helping to fully realize the overall variety inherent across all stimuli. Five studies establish this finding across multiple domains (music, art, food), and provide process evidence that an ad-hoc categorization for the overall experience underlies our effect. Our theory and findings provide insight into how and when similarity can help or hinder satiation, and the role of ad-hoc categorization in this relationship.

Keywords: Satiation, Similarity, Categorization, Variety, Hedonic Consumption

People seek variety for good reason. People satiate and get bored with practically every experience (Coombs and Avrunin 1977). Although a favored stimulus may be quite enjoyable at first, it typically becomes less enjoyable with repeated consumption. Previous research suggests that one way to combat such satiation is simply consuming something different (Hetherington et al. 1989; Rolls, van Duijvenvoorde, and Rolls 1984). For example, an iPad user could stay entertained by alternatively checking e-mails, browsing a news site, updating Instagram, or listening to a podcast. The logic here is quite intuitive: an effective way to combat satiation is consuming a wide array of experiences as varied and dissimilar as possible.

We propose that this logic does not always hold. Imagine our iPad user writing e-mails over the course of an hour with brief intermittent breaks to work on a crossword puzzle. Will this seem like a single integrated experience with a variety of two activities that presumably slows satiation, or instead just a single extended e-mail session with practically no variety and faster satiation? We believe that the answer (and ultimate degree of satiation) depends on if the consumer views the inherently different stimuli as part of a single ad-hoc category to broadly encompass the overall experience.

When consumption experiences are so inherently different, consumers do not naturally categorize them together (e.g., viewing art after listening to the radio, eating ice cream while watching animals at the zoo). As a result, we posit that consumers may not simultaneously appreciate all the variety at hand, and thus will not fully benefit from its potential to slow satiation. In such cases, we propose instead that promoting perceived similarity among stimuli leads consumers to consider all of them as a single ad-hoc category for the overall experience. Counter to conventional wisdom, this increases perceptions of variety and hence slows satiation. For managers, our work can guide product assortment and positioning decisions (e.g.,

introducing a “very different” vs. “moderately different” product), and strategies aimed at prolonging consumer engagement (e.g., keeping consumers on freemium sites, increasing museum traffic for permanent exhibitions). For consumers and policy makers, our work provides ways to ward off boredom, and foster health and well-being goals (e.g., sticking to a healthy diet).

Our notion that increased perceptions of similarity can slow satiation runs directly counter to existing theories of variety whereby increased similarity unilaterally accelerates satiation. We attribute this to the fact that past work largely examined stimuli people naturally categorize together (see Table 1). However, when stimuli inherently differ so much that people naturally categorize them apart, we then propose that perceptions of increased similarity instead slow satiation. To be clear, we are not suggesting that the widely-held view that similarity hastens satiation is invalid; rather, we are stating that it is incomplete as it applies only for stimuli from the same natural category and not the full endless range of potential combinations.

The present research contributes to the literature in many ways. First, contrary to existing theories, we introduce the notion that extreme variety (i.e., stimuli as different as possible) may prove counterproductive in reducing satiation. Second, we establish conditions under which perceiving stimuli as more similar slows satiation (i.e., when stimuli are not spontaneously categorized together). In particular, our theory highlights the importance of the separate notions of whether stimuli are spontaneously categorized into a single ad-hoc experience (likely based on natural baseline similarities), or whether similarities between the stimuli are contextually salient (e.g., through framing or category labels). Third, our findings enrich past conceptualizations of perceived variety by showing that it is not simply the inverse of similarity. We show that when consumption episodes are so inherently dissimilar that they are not naturally categorized together

into a single overall experience, people no longer fully benefit from the variety that could counter satiation. As a result, we establish that the effect of perceived similarity on satiation depends on this ad-hoc categorization, and that similarity and variety do not always move in opposing directions. The result is a richer understanding of the complex relationship among variety, categorization, similarity, and satiation that better captures the consumer experience.

THEORETICAL BACKGROUND

Variety as a Means to Slow Satiation

People experience satiation, the drop in enjoyment with repeated consumption (Coombs and Avrunin 1977; Redden 2008), with virtually any stimulus such as yogurt (Rolls et al. 1984), music (Ratner, Kahn, and Kahneman 1999), or art (Berlyne 1971). Given satiation's ubiquity, researchers have identified remedies for satiation as critical for improving satisfaction and well-being (e.g., Frederick and Loewenstein 1999), making it relevant to both consumers and firms. One effective answer to satiation is simply increasing the variety of what one consumes (see Table 1). For instance, people ate more yogurt when they had very different flavors versus similar flavors (Rolls, et al. 1984). Although greater variety can slow satiation, its effect depends on one's subjective perception of the variety (Broniarczyk, Hoyer, and McAlister 1998, Kahn and Wansink 2004). That is, the effects of variety depend on how much one notices it.

A core assumption common to all of this work is that variety reduces satiation to the extent stimuli are viewed as more dissimilar (Berlyne 1971; Kahn and Lehmann 1991; Pessemer and Handelsman 1984). We challenge this notion, and posit instead that the relationship between these two constructs is not so simple. We propose that when an experience has stimuli so inherently different that they are not spontaneously categorized together (e.g., reading a book and eating chocolate), people may not fully notice the overall variety across the disparate stimuli.

Creating perceived similarities between the stimuli can then increase perceived variety by encouraging people to consider and appreciate, rather than ignore and neglect, the diversity in the assorted stimuli of the current ad-hoc experience.

Categorization of Experiences

People naturally categorize stimuli at a basic level that maximizes similarity within the category while minimizing similarity across categories (Mervis and Rosch 1981). For instance, people are more likely to label a beagle as a dog, than as an animal (a superordinate category), or as a beagle (a subordinate category). Beyond basic levels, people also create ad-hoc categories based on the current context (Barsalou 1983). For instance, a cartoon and tricycle do not share obvious features, yet both may be forms of entertainment currently available to a child. In other words, ad-hoc categorization allows items typically thought of as unrelated to be combined into a single cohesive set. Thus, in addition to the stable and similarity-based basic categories shared by all, people also employ contextual ad-hoc categories to reflect their current experience. Past work has shown that the categorization of stimuli can affect the rate of adaptation and satiation (Raghunathan and Irwin 2001, Redden 2008). We propose an important categorization for satiation is also the ad-hoc category of what stimuli constitute the current ongoing experience.

Ad-hoc Categorization, Perceived Similarity, and Satiation

Our theory argues that the ad-hoc categorization of an ongoing experience is critical to understanding how the similarity of stimuli affects satiation. For experiences naturally belonging to the same category (e.g., listening to the songs on an album), we expect that increasing perceived similarity hastens satiation. This follows from past theories of variety whereby similarity decreases perceived variety in a monotonic fashion. However, if the consumption episodes are inherently quite different and not spontaneously viewed as belonging to a single

category (e.g., listening to music and viewing art), our theory predicts the opposite pattern. Here, consumers may consider each stimulus in isolation, rather than reflecting on the overall set. As such, we propose that increasing perceived similarity encourages viewing the varied stimuli as part of a single ad-hoc category for the overall experience. This subsequently encourages them to appreciate the broad assortment of stimuli that offers greater variety, and hence slows satiation.

We tested our theory and predictions across five studies. We focused on stimuli that naturally reside in different categories, as this is the novel result and the key test that differentiates our theory from prevailing theories of variety. Study 1 confirmed that framing two such stimuli as similar slowed satiation when listening to a song clip interspersed with nature sounds. Study 2 replicated our effect using food (chocolate candies, oyster crackers), as well as a different similarity manipulation. Study 3 expanded the range of our effects across modalities using a song clip and a painting, and also included a lone-stimulus condition to test the nature of our effect and address alternative accounts. Study 4 provided evidence for our proposed process of ad-hoc categorization, whereby a prior categorization task muted the effect of similarity framing on satiation (i.e., moderation). Study 5 expanded the results to a wholly visual experience, and included a condition with stimuli naturally belonging to a single category to show the full relationship pattern between similarity framing and satiation. This demonstrates the expanded range of our theory by showing when the traditional view does and does not explain the effects of increased similarity on satiation. Our studies demonstrate a robust effect, showing when and why increasing perceived similarity can slow satiation.

STUDY 1

Study 1 tested our core prediction that increasing perceived similarity decreases satiation for stimuli not naturally placed together in a category. Participants listened to a classical musical

clip with nature sounds interspersed at regular intervals. These two clips were chosen because we expected that these types of sounds are from different categories (which testing confirmed, see Web Appendix A). Based on our theory, we predicted participants would satiate slower if they first thought and wrote about how the two clips were similar to each other (versus dissimilar). Our rationale was that participants would consider both sounds as part of a single overall consumption experience primarily when framed as similar, and that this would make listening to both seem more varied and hence less satiating.

Method

One hundred forty-six mTurk panelists completed the study in exchange for \$1.10. Participants were told that the study involved listening to two clips, which were then each played. The first was a 40-second classical music clip from Haydn's "Symphony in G Major, Second Movement." The second clip was a 40-second nature sounds clip entitled "Lake Sounds" from the *Nature Sounds to Help Sleep and Meditate* album.

We next framed the two sound clips between-subjects to be either more similar or more dissimilar. Participants in the similar condition were instructed to notice how the two clips were alike, and told "Past research has found that nature sounds follow patterns and rhythms often found in classical music." Participants in the dissimilar condition were instructed to notice how the two clips were different, and told "Past research has found that nature sounds do not follow the patterns and rhythms often found in classical music." All participants then heard the classical music clip followed by the nature sounds clip. Participants in the similar (dissimilar) condition then wrote how the two clips were similar (different). This framing follows the view of similarity as the number of shared features relative to the number of unique features (Tversky 1977).

All participants were then told that they would now listen to this classical music clip 12 times, and that the nature sounds would be played periodically. Participants then listened to the classical music with the nature sounds being played after every third play. To gauge satiation, participants reported enjoyment after every play of the classical music clip on an unmarked 101-point slider scale anchored on “Hated It” and “Loved It”. Participants never rated the nature sounds to limit how much they were forced to consider these as part of the same experience.

Results and Discussion

We created a mixed linear model to analyze the interim enjoyment ratings with similarity framing (similar or dissimilar) as a between-subjects factor, the number of music clips heard as a continuous within-subjects factor, and the interaction of these factors. We also included random effects for the intercept and the number of clips heard (i.e., slope) to reflect the repeated nature of the data. The analysis found a main effect of number of clips as enjoyment decreased with each play ($F(1, 143) = 196.46, p < .01$). There was no main effect of similarity framing ($F < 1, ns$). More importantly, similarity framing interacted with the number of trials ($F(1, 143) = 6.47, p < .02$). As predicted by our theory, enjoyment declined more slowly in the similar condition ($\beta = -2.41$) than in the dissimilar condition ($\beta = -3.37; t(144) = 2.54, p < .02$; see Figure 1)¹.

Insert Figure 1 about here

Study 1 confirmed our core prediction that when two stimuli are spontaneously seen as belonging to separate categories (like music and nature sounds), then framing them as more similar slows satiation. This simple result runs exactly counter to the traditional notion that

¹ For Study 1 and all subsequent studies, we conducted independent samples t-tests on initial and final enjoyment ratings to show the interaction is driven by different rates of satiation, and not initial differences in enjoyment (see Web Appendix B).

increasing perceived similarity inexorably leads to faster satiation (i.e., they move together). By showing that the opposite can also hold true, we confirm a key aspect of our theory and establish that a more complex relationship exists between these constructs.

STUDY 2

Study 2 tested the robustness of our theory and its predictions in two ways. First, we changed our task from listening to music to eating food. Specifically, we used chocolate as the focal food and oyster crackers (a type of soup condiment) as the other food. Testing confirmed that people generally perceive these two foods as belonging to different categories (see Web Appendix A). Given this natural tendency for separate categorization, we predicted that increasing the perceived similarity of the two foods would reduce satiation when consumed sequentially. Second, we changed our manipulation of similarity to remove the explicit reflection and writing task. This ensured that our effects were not peculiar to some aspect of the previous task, and that we were tapping primarily into the intended construct of perceived similarity.

Method

Eighty-four Midwestern university research pool participants completed the study for \$6. Participants learned the study involved tasting chocolate candy and rating their enjoyment. We included three types of chocolate (Hershey Kisses, Reese's Peanut Butter Cups, or Rolos) to ensure that each participant could choose one they liked. Participants were also told that from time to time they would be asked to eat bite-sized oyster crackers.

Next, participants were given seven pieces of their chosen candy and four oyster crackers on a plate. They were told to eat a single piece of candy and rate their enjoyment by marking an "X" on a 145 mm visual analogue scale anchored on "Not At All" and "Very Much." They were then told to eat one oyster cracker. Participants then ate the remaining six candies, one at a time.

After every other candy (pieces 3, 5, and 7) participants rated their enjoyment on the same scale, always before they ate another cracker. Participants never rated the oyster crackers during the trials, again to keep participants from perceiving the crackers as more related to the chocolate.

We manipulated the framing of the crackers in a between-subjects fashion to be either more similar or more dissimilar to the chocolate candies. We reasoned that simply labeling both crackers and candies as types of snack foods would encourage participants to perceive similarities between them, and then subsequently place them both into the given ad-hoc category. As such, participants in the similar condition were told, “We often use bits of crackers in our taste tests as another common snack food.” Those in the dissimilar condition were simply told, “We often use bits of crackers in our taste tests as fillers in between the candies.” Based on our theory, because the two snacks would naturally be placed into separate categories, we predicted participants would satiate slower in the similar versus dissimilar condition.

Results and Discussion

We created a mixed linear model to analyze the interim enjoyment ratings with similarity framing (similar or dissimilar) as a between-subjects factor, the number of chocolates eaten as a continuous within-subjects factor, and the interaction of these factors. We also included random effects for the intercept and the number of chocolates eaten to capture the repeated nature of the data. The analysis revealed a main effect of number of chocolates eaten as enjoyment decreased with greater consumption ($F(1, 81) = 136.68, p < .01$). There was no main effect of similarity framing ($F < 1, ns$), but there was the predicted interaction of the two factors ($F(1, 81) = 5.00, p < .03$). As predicted, participants in the similar condition ($\beta = -11.93$) satiated slower than those in the dissimilar condition ($\beta = -17.58; t(82) = 2.24, p < .03$; see Figure 2).

Insert Figure 2 about here

This study demonstrates the generality of our theory in two ways. First, it extended our findings from the aural to the gustatory domain as participants encouraged to view the crackers as more similar to the candies satiated less. Second, it demonstrated the generality of our similarity manipulation. In Study 1, participants wrote about how similar or dissimilar two sound clips were. Here, we induced similarity by telling participants that crackers were another type of snack food (similar condition), or a filler between candy tastings (dissimilar condition). This simple manipulation suggests our findings do not require extensive elaboration or directed introspection. As well, the use of multiple manipulation methods gives us more confidence that changes to perceived similarity underlie our effects.

STUDY 3

Study 3 further clarified the nature of our effect, and tested several alternative explanations against our theory. We tested the robustness of our effect by examining our predictions across modalities. It is possible that listening to two music clips or eating two things in the same experiment already somewhat places them in the same ad-hoc category. A cross-modality study introduces stimuli that more obviously belong to different categories. Here, we used music as the focal stimulus and visual art as the intermittent stimulus.

This study also added a control condition without a second stimulus (i.e., no variety) to accomplish several goals. First, our theory posits that people neglect to fully benefit from the variety at hand when the stimuli naturally belong to separate categories. If true, then enjoyment for the focal item in the dissimilar condition should resemble that for just one stimulus. Second, the lone stimulus condition also tests for potential demand effects. It could be that participants in the dissimilar (vs. similar) condition thought that referring to a stimulus as a filler was intended to make the overall experience worse, therefore rating it lower. If true, we should observe faster

satiation in the dissimilar versus lone stimulus condition. Third, the lone stimulus condition lets us examine the nature of our effect by testing if those in the dissimilar condition satiate faster, or if those in the similar condition satiate slower. Our theory predicts that when two stimuli are not spontaneously categorized together, promoting the similarity of stimuli helps people categorize them into a single ad-hoc category for the overall experience. This then helps people appreciate the variety, which will slow satiation relative to both the dissimilar and lone stimulus conditions.

This study also tested several alternative accounts rooted in the types of comparisons potentially arising from the similarity manipulation. In structure mapping (e.g., Gentner and Markman 1994), comparing objects is based on commonalities (features that share the same level across alternatives; e.g., a truck and a car both have 4 wheels); alignable differences (features that differ in value or degree across alternatives; e.g., a truck has 2 seats, a car has 4); and nonalignable differences (features without a corresponding value in the other object across alternatives; e.g., a truck has a cargo bed, a car does not). Past work has shown that as similarities increase between stimuli so does the ease of detecting differences, especially alignable ones (Gentner and Markman 1994). Therefore, if structural mapping accounts for our results, then people asked to find similarities between stimuli should identify more alignable differences than otherwise. Work on construal level theory (Liberman and Trope 1998) suggests that finding similarities for objectively dissimilar (versus similar) items shifts focus on higher-level features and more abstract (versus concrete) thoughts. In this case, an abstract mindset would instead increase attention to nonalignable differences (Malkoc, Zauberaman, and Ulu 2005). Thus, in this study with stimuli from naturally different categories, the construal level account would predict that the similarity framing would lead to a focus on more abstract, nonalignable features.

We tested for each of these alternative accounts. If alignability drives our results, then participants in the similar condition should not only list more alignable differences, but also report that they were easier to generate. If construal level underlies our results, then participants in the similar condition should list more abstract and nonalignable differences, and report higher scores in an action identification scale (Vallacher and Wegner 1989). Alternatively, our theory rooted in similarity promoting the ad-hoc categorization of two disparate stimuli does not rely on any change in the level of detail or specific features used to process each stimulus.

Method

One hundred seventy-two Prolific Academic panelists (103 males, $M_{\text{age}} = 28.28$, £1.50 payment) were assigned to one of three conditions: similar framing, dissimilar framing, or lone stimulus. Participants learned about and listened to the music clip that would be played for them: a 30-second clip from U2's "Where the Streets Have No Name." They were then told they would listen to and rate this clip nine times. Next, participants in the similar and dissimilar conditions learned that they would periodically view Gustav Klimt's *The Kiss*. Testing revealed that people generally categorize these two stimuli into separate categories (see Web Appendix A).

Participants in the similar condition were then told "Research studies have found that music and art paintings share many characteristics and are in fact similar." Participants in the dissimilar condition were told "Research studies have found that music and art paintings do not share many characteristics and are in fact very different." Participants in the lone stimulus control condition did not view or receive any information about the painting.

All participants then listened to the U2 music clip 9 times and rated how much they enjoyed it on an unmarked 101-point slider scale anchored on "Hated It" and "Loved It" after each listen. Those in the similar and dissimilar conditions also viewed *The Kiss* for 30 seconds

after every third play of the clip, but never rated *The Kiss* painting to prevent biasing them to perceive the music clip and image as part of the same experience. After the final enjoyment rating, those in the lone stimulus condition were shown *The Kiss* painting a single time for 20 seconds and asked to examine it so they could also complete the painting related post-measures.²

Next, all participants were asked to list as many differences as possible between the song and the painting in 90 seconds. These detailed responses allowed us to code for alignability and construal level. Participants also directly rated “How difficult was it to think of differences between *The Kiss* and “Where the Streets Have No Name?” (1 = “Not Difficult At All”; 11 = “Extremely Difficult”), and completed the 25-item Behavioral Identification Form (BIF; Vallacher and Wegner 1989) as other measures of alignability and construal level, respectively.

Results and Discussion

We analyzed the enjoyment ratings using a mixed linear model with similarity framing (similar, dissimilar, or lone stimulus) as a between-subjects factor, the number of clips heard as a continuous within-subjects factor, and the interaction of the two factors. The model also included random effects for the intercept and the number of clips heard to reflect the repeated measurements. There was a main effect for number of clips heard as enjoyment dropped with each play ($F(1, 168) = 117.21, p < .01$), no main effect for similarity framing ($F < 1, ns$), and a marginal interaction across the three framing levels ($F(2, 168) = 2.60, p < .08$; Figure 3). Most important, as specifically predicted by our theory, satiation was less in the similar condition than the other two conditions ($t(169) = 2.23, p < .03$), and the rate of satiation did not differ for the dissimilarity and lone stimulus conditions ($t < 1, ns$). Planned contrasts confirmed that enjoyment

² We did not expect any effects for this group as the painting was not even part of their consumption experience.

declined slower in the similar condition ($\beta = -1.76$) versus the dissimilar ($\beta = -2.82$; $t(169) = 2.02$, $p < .05$), and lone stimulus conditions ($\beta = -3.12$; $t(169) = 1.92$, $p < .06$).

Insert Figure 3 about here

We also tested both the coded and scale measures for alignability and construal level as alternative accounts. We found no evidence for either account underlying our effects cases (all F s nonsignificant, see Web Appendix C for detailed analyses).

Study 3 furthered the development of our theory in several important ways. First, we extended our findings to a cross-modal setting, demonstrating our findings are not limited to stimuli from within the same sensory domain. Second, this study found no evidence for construal level or structural alignment as alternative explanations for our effect. Third, by adding a control condition with just one stimulus, we ruled out several alternative accounts. We found no satiation differences between the dissimilar and lone stimulus conditions, casting doubt on the following alternative accounts: stimuli contrast effects, demand effects from the presence of a second stimulus, and any hedonic effects from adding a potentially less-liked second stimulus (see Web Appendix C for detailed discussion). Fourth, the pattern of results indicated that similarity framing slowed satiation, rather than the dissimilar framing hastening it (as the latter did not differ from the lone stimulus condition). This pattern of results accords with our theory that two inherently different stimuli would not be spontaneously categorized as part of the same ongoing experience, and hence having a second one may do little to increase perceived variety and slow satiation. Instead, in such cases, people need assistance (such as framing them as similar) to consider both stimuli as part of a single overall experience.

STUDY 4

Study 4's primary goal was testing whether the underlying process was rooted in ad-hoc categorization of the experience. Using the same U2 music clip and Klimt painting image from Study 3, we tested for this aspect of our theory in two ways. First, we added a post-measure for whether the stimuli were combined into a single ad-hoc category. We expected this process measure to mediate the effects of similarity framing on satiation, as predicted by our theory. Second, we also tested whether a prior task in which the stimuli were categorized together could mute the effect of similarity on satiation. If so, this would provide moderation evidence to support our theory. If similarity slows satiation because it leads one to categorize inherently different stimuli together, this effect should attenuate if the consumer already considers them both to be part of a single ad-hoc category.

Method

Three hundred fifty-seven undergraduates (172 males, $M_{\text{age}} = 20.64$) completed the study in exchange for course credit. The study followed a 2 (initial categorization task: neutral or art) x 2 (framing: similar or dissimilar) between-subjects design. Participants first completed a categorization task in which they assigned twelve randomly presented words to two groups. All participants were given six sports activities (e.g., football, running). Participants in the neutral task condition also got six household activities (e.g., laundry, dusting), while those in the art task condition instead also got six arts activities (e.g., music, painting). We asked participants to simply "categorize these words into two groups", and importantly we never suggested any basis for categorization. We expected that those in the arts task condition would be primed to subsequently consider both the music and painting image they would next experience to be part of a single ad-hoc category, while those in the neutral task condition would not.

Participants in the similar and dissimilar conditions completed the same manipulation (reading that art and music were similar or dissimilar), and consumption experience (listening to music and viewing art) as in Study 3. After the final play, participants rated “How much do *The Kiss* and *Where the Streets Have No Name* have in common?” (1 = “Not Much in Common at All” to 11 = “A lot in Common”) to check each experimental condition’s ability to alter the basis for categorization. They concluded by rating “Do you think of *The Kiss* and “Where the Streets Have No Name” more as belonging to one or two types of categories?” (1 = “More as Belonging to One Category” to 11 = “More as Belonging to Two Categories”) as a possible mediator.

Results and Discussion

Manipulation Check. We first tested if our mediator and manipulation check items measured separate constructs. Results revealed they were related ($r = -.46, p < .01$), so we created a composite manipulation check item (reversing mediation item scores so higher numbers reflect greater perceptions of commonalities³). A 2 (initial categorization task: neutral or art) x 2 (framing: similar or dissimilar) between-subjects ANOVA on this composite revealed a main effect of categorization task ($F(1, 353) = 7.92, p < .01$), a nonsignificant effect of similarity framing ($F(1, 353) = 2.38, p = .12$), and a categorization by framing interaction ($F(1, 353) = 6.25, p < .02$). Given the significant interaction, we performed specific pairwise comparisons. As intended, participants who completed the neutral categorization task perceived the two stimuli as having more in common in the similar ($M = 5.20$) versus dissimilar framing condition (vs. $M = 4.20, F(1, 353) = 8.02, p < .01$). Yet, for participants who first completed the art categorization task (and presumably already saw the commonalities), there was no effect of

³ Though related to the manipulation check, we still tested for mediation with the categorization measure, and confirmed ad-hoc categorization contributed to our effects (See Web Appendix D).

the similarity framing ($M_{\text{ArtSimilar}} = 5.25$ vs. $M_{\text{ArtDissimilar}} = 5.48$, $F < 1$, ns). Consistent with our theory, the similarity framing affected the ability to find a basis for an overall categorization (much like the explicit categorization task also did).

Satiation. We analyzed the interim enjoyment ratings using a mixed linear model with initial categorization task (neutral or art) and similarity framing (similar or dissimilar) as between-subjects factors, the number of times the musical clip had been heard as a within-subjects continuous factor, and all of the interactions between the factors. We also included random effects for the intercept and the number of clips heard to capture the repeated measures. The model revealed an unsurprising main effect of number of clips heard ($F(1, 352) = 344.05$, $p < .01$), no main effect of similarity framing ($F < 1$, ns), and a marginal main effect of categorization task ($F(1, 352) = 3.23$, $p = .07$). The two-way interactions were nonsignificant (all $ps > .08$). Most importantly, there was the predicted three-way interaction among initial categorization task, similarity framing, and number of times heard ($F(1, 352) = 6.32$, $p < .02$).

Given the three-way interaction, we conducted planned contrasts on the individual-level regression slopes to verify that the pattern supported our theory. As predicted, participants who completed the neutral initial categorization task satiated slower when the music clip and art image were framed as similar ($\beta = -2.82$) versus dissimilar (vs. $\beta = -4.29$; $t(173) = 2.80$, $p < .01$). This finding replicates all of our other studies. For those who categorized music and art together in the initial categorization task, there was no longer any difference in satiation between the similar ($\beta = -3.88$) and dissimilar conditions (vs. $\beta = -3.06$; $t < 1$, ns). If anything, framing the stimuli as similar increased satiation for this group, presumably because they already included both stimuli as part of the experience (like past work showing that increased similarity hastens satiation in this case). This pattern (see Figure 4) suggests that the similarity framing and initial

categorization were both triggering the same underlying process. Our theory posits that this involves creating a single ad-hoc category for the two stimuli, which the evidence supported.

Insert Figure 4 about here

Across the analyses, this study confirmed the key predictions of our theory. Importantly, it provided direct evidence for our proposed process of ad-hoc categorization. When an initial categorization task primed people to categorize the two inherently different stimuli together, then similarity framing no longer affected satiation. We propose this happened because the initial categorization task and similarity framing both led people to adopt a single ad-hoc category for the experience. Thus, similarity framing reduces satiation when it leads to the use of a single ad-hoc category, confirming a core aspect of our theory and proposed process.

STUDY 5

Our prior studies showed that increased similarity slows satiation when the varied stimuli are not naturally categorized together. This runs directly counter to leading variety theories that argue increased similarity always hastens satiation, which we posit is only true for the contexts they have examined in which the stimuli naturally belong to a single natural category. Given these differing predictions based on the context, Study 5 verified the complete range of our theory by simultaneously demonstrating both potential effects. We used two stimuli that naturally belonged to either the same category (as in previous work), or to separate ones (as our theory focuses on). This let us test the conditions under which our theory and the traditional theory of similarity on satiation both hold true, and the conditions where only our new expanded theory holds. This full design also tested for an interaction that would eliminate any concerns that our similarity framing manipulation had an unintended direct effect (i.e., main effect) on the

satiation rate. Only our theory predicts that the exact same similarity framing manipulation increases satiation in one context yet decreases it in another.

Method

Two hundred seventy-seven participants completed the study from mTurk's online panel for \$0.80 or a marketing class for undergraduate course credit (149 males, $M_{age} = 33.36$). Participants were told the study involved thinking and writing about images, before rating how much they enjoyed viewing them. The study used a 2 x 2 between-subjects design on image type (natural categorization: same or different) and similarity framing (similar or neutral). Each participant had Monet's *Soleil Levant* as the focal image. The other image was either another impressionist style painting (van Gogh's *Wheatfields*), or a cartoon character (Homer Simpson). We used these two images because each, relative to the Monet painting, would be perceived more or less as belonging to a single category (which pretesting confirmed; Web Appendix A).

Participants in the similar framing condition were first presented both images (based on the assigned image type) at the same time, and instructed to take a moment to think about and then list two ways the images were similar. Participants in the neutral framing condition were asked only to first take a moment to examine the focal image (*Soleil Levant*) to ensure everyone had first paused to view the focal image. Next, everyone was told they would now view and rate their enjoyment of *Soleil Levant*, and that from time to time they would see another image (*Wheatfields* or Homer Simpson) to refresh their eyes.

All participants next viewed Monet's *Soleil Levant* for 15 seconds, and then rated their enjoyment on an unmarked 101-point slider scale anchored on "Hated It" and "Loved It". They repeated this 5 more times (6 trials total). After every third showing of the Monet image they saw the non-focal image for 15 seconds without ever rating it. We predicted that when the image type

made it likely both images would be spontaneously categorized together into a single category (both impressionist paintings), satiation would hasten with the similar versus the neutral framing. This finding would be consistent with both traditional theories of similarity and our theory. In contrast, only our theory predicts the exact opposite pattern when the two stimuli would naturally be categorized separately (non-focal image is cartoon character). This would again replicate our previous findings whereby encouraging similarity slows satiation.

Results and Discussion

We analyzed the interim enjoyment ratings using a mixed linear model with similarity framing (similar or neutral) and image type (natural categorization: same or different) as between-subjects factors, the number of times the focal image had been viewed as a within-subjects continuous factor, and all of the interactions between the factors. We also included random effects for the intercept and the number of times viewed to capture the repeated measures. The model revealed an unsurprising main effect of number of times viewed ($F(1, 272) = 241.60, p < .01$), and no main effect of similarity framing ($F(1, 272) = 1.17, p > .27$), or image type ($F < 1, ns$). The two-way interactions were also all nonsignificant (all $F < 1, ns$). Most importantly, there was the predicted three-way interaction between image type, similarity framing, and number viewed ($F(1, 272) = 11.43, p < .01$).

Given the three-way interaction, planned contrasts verified whether the pattern supported our theory. When images naturally belonged to separate categories (non-focal image is cartoon character), participants satiated slower when the images were framed as similar ($\beta = -3.41$) versus not ($\beta = -5.61; t(132) = 2.72, p < .01$). This conceptually replicated our previous studies' results. When the images already naturally belonged to a single category (non-focal image is also an impressionist painting), participants instead satiated faster when framing the images as similar

($\beta = -4.77$) versus not ($\beta = -3.25$; $t(141) = 2.03$, $p < .05$). Therefore, as our theory predicted, the effect (and direction) of similarity framing on the satiation rate depended on whether the two stimuli were naturally categorized together. This pattern of reversal is shown in Figure 5.

Insert Figure 5 about here

Study 5 extended our empirical evidence in an important way, beyond replicating the effect in the visual domain. We used stimuli pairs that naturally belonged to either a single category or separate ones to demonstrate the full relationship between similarity framing and satiation. When the stimuli belonged to a single obvious category (both impressionist paintings), then framing them as more similar accelerated satiation. This finding conforms to the traditional view that increasing perceived similarity universally leads to greater satiation. In contrast, when the two stimuli were inherently different and less likely to be categorized together (impressionist painting and cartoon character), the exact opposite pattern emerged. Framing the two stimuli as similar now slowed the rate of satiation, which replicated our previous studies and supported our theory. More importantly, the full set of results in this study show that the relationship between similarity and satiation is not the simple linear relationship proposed by existing theories.

Any account for these findings must explain this full pattern of results, especially why framing two stimuli as similar has exactly the opposite effect on satiation (from our other studies) when the stimuli naturally shared a single categorization. Our proposed theory accounts for this complex relationship by proposing that similarity can have two effects on the rate of satiation. First, greater similarity has a direct effect of reducing the objective variety offered by an experience for stimuli naturally belonging to the same category. We see this effect when both images were impressionist paintings such that increasing perceived similarity made the experience more satiating. All of the prevailing theories readily account for this result. Second,

as only our theory proposes, increasing perceived similarity can have a separate effect of helping one better appreciate the variety of the experience for stimuli naturally belonging to separate categories. Here, we see that encouraging participants to see the impressionist painting and a cartoon character as more similar indeed helped slow their satiation. This presumably happened because they noticed and appreciated the cartoon image as part of a single ad-hoc category that is the overall experience, which offered greater variety and hence slowed satiation.

GENERAL DISCUSSION

Satiation is an ongoing problem as it continually reduces one's ability to enjoy a favorite experience. A common prescription is consuming a wider variety of stimuli. The prevailing notion is that satiation increases with similarity; hence, consumers can best slow satiation by consuming stimuli that are as different as possible. We challenge this traditional and intuitive view, and instead propose that stimuli can be so inherently different that consumers no longer spontaneously consider them together as part of the same experience. In such cases, we showed that promoting the similarity of the stimuli can counterintuitively slow satiation. We posited that this happens because consumers then include all stimuli in a single ad-hoc category that fully captures the variety of the ongoing experience. Thus, the present work identifies the important role this ad-hoc categorization plays for satiation (and broader enjoyment), and employs it to understand the interplay between variety and similarity perceptions on satiation.

We tested our theory by examining the effect of highlighting similarities on satiation with stimuli not naturally categorized together. Study 1 verified our key prediction in that framing nature sounds as similar reduced satiation with classical music, and Study 2 generalized this result to food. Study 3 used a control condition with only a single stimulus (music) to show that adding an inherently different stimulus (art) had little effect on satiation, and that the driving

force of our effects was slowed satiation from increased similarity perceptions (vs. dissimilarity or neutral framings speeding satiation). Study 4 provided moderation evidence that placing stimuli into a single ad-hoc category was the process underlying our findings. Study 5 concluded by showing the full range (and reversal) of similarity framing effects on satiation. Highlighting similarity hastened satiation for stimuli naturally sharing a single categorization, but slowed it for stimuli naturally from different categories. Across the studies, we found consistent support for our theory of ad-hoc categorization that accounted for the complex relationship we found between variety, similarity, and satiation (see Table 2 for summary of key results).

Simultaneously, our studies also cast doubt on several alternative explanations that included structural alignment, construal level, demand effects, and contrast effects (see Web Appendix E).

Contributions

Our theory and findings contribute to the literature in several ways. Prevailing theories on variety (and lay intuition) all generally prescribe that more variety and less similarity will always help counter satiation. There is plenty of evidence to support this belief, but there is a critical limitation to this past work. Past research on variety has largely examined satiation only for stimuli sharing an obvious category (see Table 1). We argue that this is an important distinction precisely because the simple monotonic relationships between variety, similarity, and satiation break down when this is not true. We show that cuing similarities can slow satiation when the stimuli would otherwise not be categorized together as part of the same ongoing experience. As a result, we provide deeper insight into the effects of perceived similarity on satiation.

Our theory also identifies ad-hoc categorization as a critical construct for theories of variety and similarity and their effects on satiation. Past researchers (and likely firms and consumers) have presumed that consumers incorporate all the stimuli they have as part of a

single consumption occasion. However, our present work shows this is clearly not always true. Here, although participants had an easily-discerned mix of stimuli (e.g., music and art), they did not always spontaneously combine them into a single “mental account” for the experience. In such cases, highlighting the similarity of the stimuli helped consumers view the full variety as part of a single ad-hoc category. This then produced results that run counter to existing theories and intuition: increasing perceptions of similarity slowed the rate of satiation. More generally, it points to the importance of considering how consumers create their own ad-hoc category for the current “experience”, and how this affects enjoyment.

Relationship to Previous Work and Future Research

It is also worth noting other ways our findings relate to past work. Our research resembles findings on “variety amnesia” whereby consumers do not recall all of the past variety when recovering from satiation (Galak et al. 2009). However, whereas variety amnesia focuses on the salience of past consumption, the stimuli in our studies were all salient, always at the fore, and recently consumed. As well, we examined satiation during an ongoing experience, versus the spontaneous recovery from satiation in the distant past. Furthermore, the theoretical frameworks used in their (and others’) prior work neither explain why increasing perceived similarity could ever slow satiation, nor why ad-hoc categorization of the stimuli matters for satiation.

Our work can also be related to how consumers construct consideration sets and group choice alternatives. Consumers are more likely to include a wider variety of stimuli when they have a goal-derived category (Ratneshwar, Pechmann and Shocker 1996), or a stronger need to optimize (Chakravarti and Janiszewski 2003). As well, past work on choice bracketing shows people jointly consider choice alternatives more when cognitive resources are available, no pre-existing heuristics exist, and there is an overarching goal (Read, Loewenstein, and Rabin 1999).

This past work has focused on consideration sets and choice, so it necessarily remains silent on actual enjoyment and satiation. However, given our focus on incorporating inherently different stimuli into a single ad-hoc category, this past work does suggest some potential moderators within our theory. Future research could explore how satiation depends on having a defined goal (e.g., losing weight), optimizing an outcome (e.g., enjoyment), or available cognitive resources. Generally speaking, we expect any factor that leads one to categorize together inherently different stimuli is a potential moderator of satiation, and hence enjoyment.

Our findings suggest an optimal level along this common similarity dimension. While people may not get overwhelmed by having too much variety, as with an optimal level of stimulation (Berlyne 1971), it seems like they do not perceive enough variety when the stimuli are either too inherently dissimilar or already obviously similar (i.e., a “U” shape akin to our Study 5). Future work could precisely trace the shape of satiation across the full spectrum of degrees of similarity. For instance, stimuli could be so dissimilar that they may never be categorized together, and similarity framing might be unable to induce the ad-hoc categorization needed to slow satiation. Future research may also explore how our findings could apply to broader contexts. This could include the effects of ad-hoc categorization of the experience on the enjoyment of non-focal stimuli, future consumption of either stimulus in isolation, or future consumption from other categories. We highlighted the importance of the general notion of the ad-hoc categorization construct, and believe future work will find numerous ways it can apply.

Practical Implications

Our theory provides some insight into past findings, and offers prescriptive suggestions. Inserting an empty break into a repeated activity can reduce hedonic adaptation, but consumers generally do not appreciate this (Nelson and Meyvis 2008). We suggest this happens because

breaks are not naturally categorized as part of the experience, and expect that experiencing something else that is slightly related may be more beneficial than an empty break in countering boredom. Our theory also provides insights into why Galak et al. (2009) found that recalling highly dissimilar episodes from the past (TV shows) had little influence on the recovery rate from satiation of subsequent music consumption. We expect that if the TV shows had been framed as more similar to the music episodes, recalling TV shows could have been beneficial for reducing satiation during the subsequent music consumption. Thus, “variety amnesia” effects may be due to a lack of an ad-hoc categorization as well as memory recall.

Our findings can be used to enhance consumer well-being. Feelings of boredom resulting from satiation are a common complaint, yet so are feelings of being overwhelmed by having so many things to choose from (Markus and Schwartz 2010). We offer a potential explanation for this paradox – people naturally categorize much of the vast variety available as separated experiences; hence it does little to help with satiation for any one experience. A familiar example of this for any parent is the child who complains “I’m bored and have nothing to do” while being surrounded amid toys, books, pets, etc. Our theory suggests that a solution may be taking the time to highlight how the different options may be part of the same extended consumption experience. This could then help reduce the scourge of satiation and boredom, which has been linked to depression, hostility, and anxiety (Vodanovich, Verner, and Gilbride 1991). Consumers can also use our findings to aid in their health and well-being goals as encouraging a dieter to incorporate food consumed during a cheat day may prolong enjoyment of the overall diet regimen. Likewise, including walks to work or the grocery store into a daily exercise routine could make regularly scheduled cardio sessions less boring.

One obvious way firms may benefit from our findings is through using a single brand to bring unrelated offerings together into a single ad-hoc category. Examples include a TV network making its ads less off-putting by linking them tightly with the content, such as with the SuperBowl or rolling up multiple fast food offerings into a food court to create a salient varied offering over the course of a week. For institutions such as museums, our work suggests highlighting similarities among temporary and permanent exhibits may prolong enjoyment for the permanent exhibits (especially for members), and encourage more time spent there.

More generally, any firm could potentially apply our results to reduce satiation with their offerings. This creates the possibility of increasing demand, which marketers currently have few ways to do, without incurring the significant investment of changing the product. Furthermore, any increase in the frequency of usage would be further amplified when directly translated into the lifetime value of each customer. Our findings also speak to the issue of cannibalization, which many brand managers struggle with in managing additions to their portfolio. Specifically, our findings suggest that adding a moderately similar product to a portfolio may cannibalize overall demand less than adding a dramatically different and unrelated product (e.g., Nature Valley adding a granola-based cookie versus a granola-based baking mix).

For content-based platforms, our work informs managers how to get consumers engaged for longer periods of time. Our findings suggest that offerings that seem too dissimilar may not slow satiation if consumers fail to place them into the same ad-hoc category of the experience, and that moderate dissimilarity may be best. For instance, *The New York Times* online section “Great Stories That Have Nothing to Do with Politics” might be more beneficial by renaming it as “Great Stories About the World — Beyond Politics” or “Great Stories About the Politics of

Everyday Life”. We expect that encouraging consumers to place the different types of stories in the same ad-hoc category could better fend off boredom and increase site activity.

Similarly, for streaming freemium platforms where firms choose which content to play (e.g., YouTube, Spotify), our work suggests that interrupting a sequence of quite similar content with something moderately dissimilar would best slow boredom (either by choosing content that is different but still from the same natural category, or that is quite different but framed as similar). For instance, interrupting a sequence of clips of *The Daily Show* with *Last Week Tonight* could lead to longer YouTube viewing and greater advertising opportunities than only playing *Daily Show* clips or interrupting with a *Planet Earth* clip. Though more objectively different, we expect that interrupting with a *Planet Earth* clip would not impact satiation for *The Daily Show* clips, as it may not be thought of as part of the same ad-hoc experience.

Another route for firms to explore is how to leverage our results to keep their employees more engaged (another type of satiation problem). For instance, a plant could include setup, maintenance, assembly, and quality control as part of the single comprehensive activity of manufacturing for its assembly line workers. The key to reducing satiation will be creating an ad-hoc sense that all of these aspects are part of a single overall experience. The potential result can increase job satisfaction, productivity, and quality control, benefiting both staff and employer.

CONCLUSION

Satiation is a ubiquitous challenge for consumer happiness. Existing theories offer a simple prescription for satiation – vary your consumption so it seems as different as possible. We instead demonstrate that this relationship is not quite so simple. When stimuli are not naturally categorized together, consumers tend to somewhat ignore the variety at hand with little change in satiation. In such cases, promoting the similarity of the stimuli can lead consumers to consider

them together as part of an ad-hoc category for the current experience, and this can lead to the counterintuitive result of increased similarity slowing satiation. As a result, our theory provides a richer understanding of the relationship among categorization, variety, similarity, and satiation. This enhanced understanding of these constructs should help researchers, consumers, and marketers alike find better ways to counter satiation and find lasting happiness.

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TABLE 1

REPRESENTATIVE STIMULI IN PAST WORK SHOWING GREATER VARIETY SLOWS SATIATION

Author	Key Finding	Study Stimuli	Key Measure
Rolls, van Duijvenvoorde, and Rolls (1984)	Increased variety among food increased consumption.	Eating a four-course lunch of the same or different food at each course	Weight of food eaten Ratings of pleasantness
Hetherington, Rolls, and Burley (1989)	Increased variety of food slowed subsequent decline in pleasantness.	Eating a two-course lunch of the same or different food at each course	Ratings of pleasantness
Ratner, Kahn, and Kahneman (1999)	Increasing variety of options in a set (e.g., songs) increased enjoyment, even if added options were not ranked as highly as in original set	Listening to liked and less preferred songs	Song choice for each listening trial Repeated ratings of enjoyment
Kahn and Wansink (2004)	Perceptions of variety increased when arranged by color to make the variety more noticeable People ate more M&Ms and jellybeans when arranged by color	Eating different colors of jellybeans Eating different colors of M&Ms	Amount of candy eaten
Redden (2008)	Satiation slowed when a fixed set of varied stimuli were merely categorized using specific versus general labels to create the perception of less repetition.	Viewing animal and nature photos Eating five flavors of jellybeans	Repeated ratings of enjoyment and desire to continue
Galak, Redden, and Kruger (2009)	Past variety has a greater ability to slow satiation when people are made to explicitly recall the past variety.	Spending time with different friends Listening to top 15 Billboard pop songs Eating four flavors of jellybeans	Repeated ratings of enjoyment and/or desire to continue

TABLE 2
EFFECT OF SIMILARITY ON SATIATION: STUDIES 1-5

Study	Purpose	Modality	Stimuli Consumed	Moderating Condition (Studies 4, 5)	Enjoyment x Trial Slope: Similar Condition β	Enjoyment x Trial Slope: Dissimilar Condition β	Planned Contrasts t
1: Music N = 146	Show basic effect that encouraging similarity can slow satiation	Auditory	“Symphony in G Major, Second Movement” music clip, Bird Sounds		-2.41	-3.37	2.54*
2: Candies N = 84	Replicate effect in different sensory modality	Gustatory	Chocolates, Crackers		-11.93	-17.58	2.24*
3: Music and Art N = 172	Replicate across-modalities; Add lone Stimulus control condition to show effect driven by similarity	Visual, Auditory	<i>The Kiss</i> painting, “Where the Streets Have No Name” music clip		-1.76	-2.82	2.23*
						(Dissimilar)	(Similar vs. Dissimilar)
						-3.12 (Lone)	1.92† (Similar vs. Lone)
							< 1 ^{ns} (Dissimilar vs. Lone)
4: Music and Art with Category Task	Show natural categorization is moderator	Visual, Auditory	<i>The Kiss</i> painting, “Where the Streets Have No Name” music clip	Neutral	-2.82	-3.88	2.89*
				Category Art Category	-3.88	-3.05	< 1 ^{ns}
5: Art Cross-Over N = 277	Demonstrate stimulus category is moderator; Show U-shaped pattern	Visual	<i>Soleil Levant</i> painting, Homer Simpson image or <i>Wheatfields</i> painting	Same	-4.77	-3.25	2.79**
				Category Different Category	-3.41	-5.61	1.98*

Note Study 4 contrasts done within Neutral and Art conditions, and Study 5 contrasts done within Same and Different Category Conditions.

* = values significantly different $p < .05$ level, ** = values significantly different $p < .01$ level, † = values significantly different $p < .06$ level

FIGURE 1

MEAN ENJOYMENT RATINGS IN STUDY 1

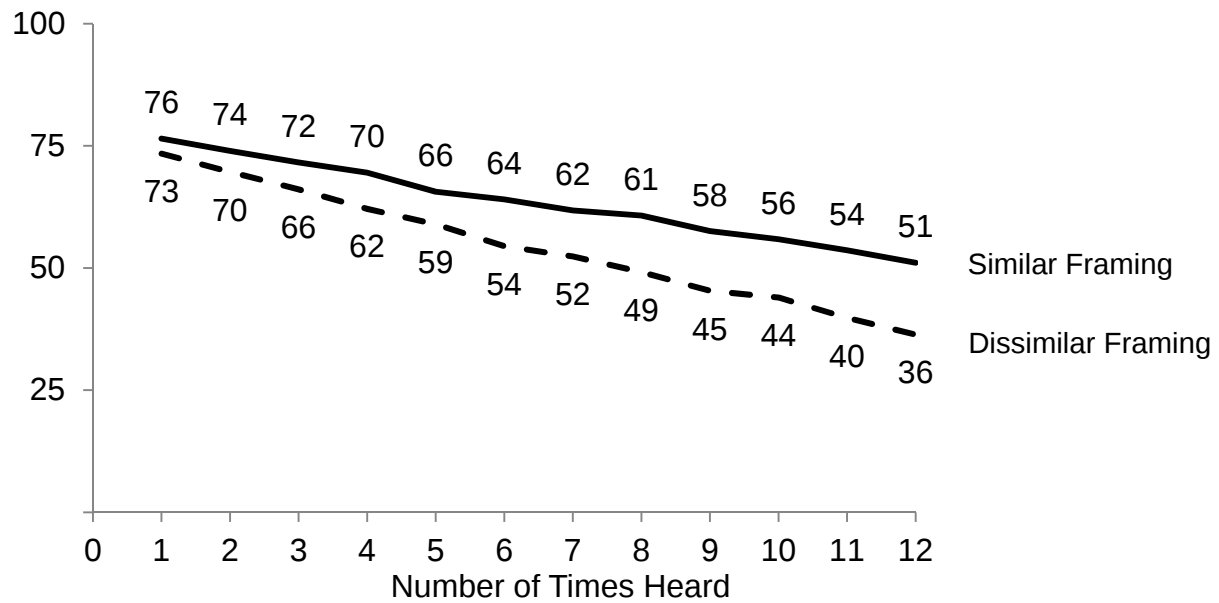


FIGURE 2

MEAN ENJOYMENT RATINGS IN STUDY 2

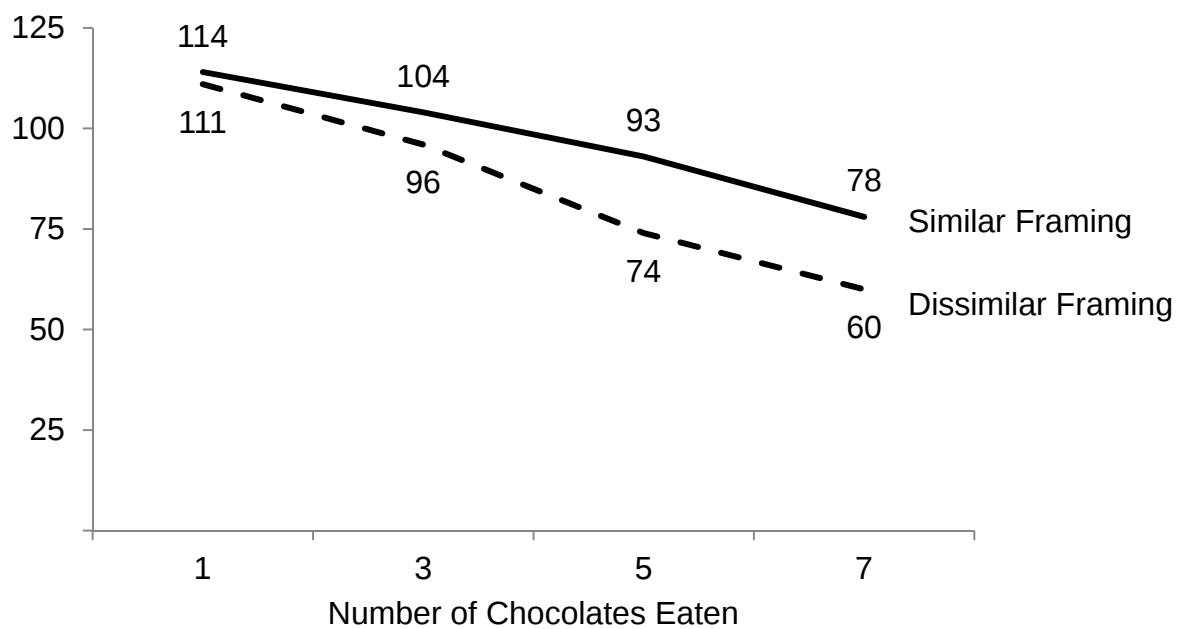


FIGURE 3
MEAN ENJOYMENT RATINGS IN STUDY 3

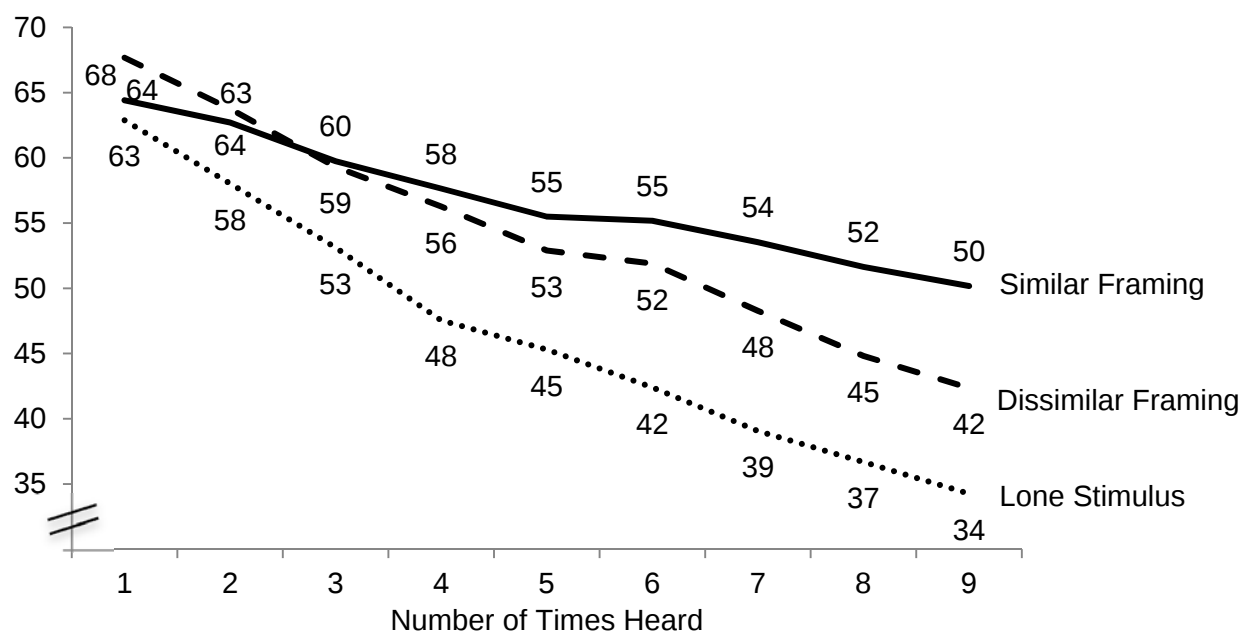
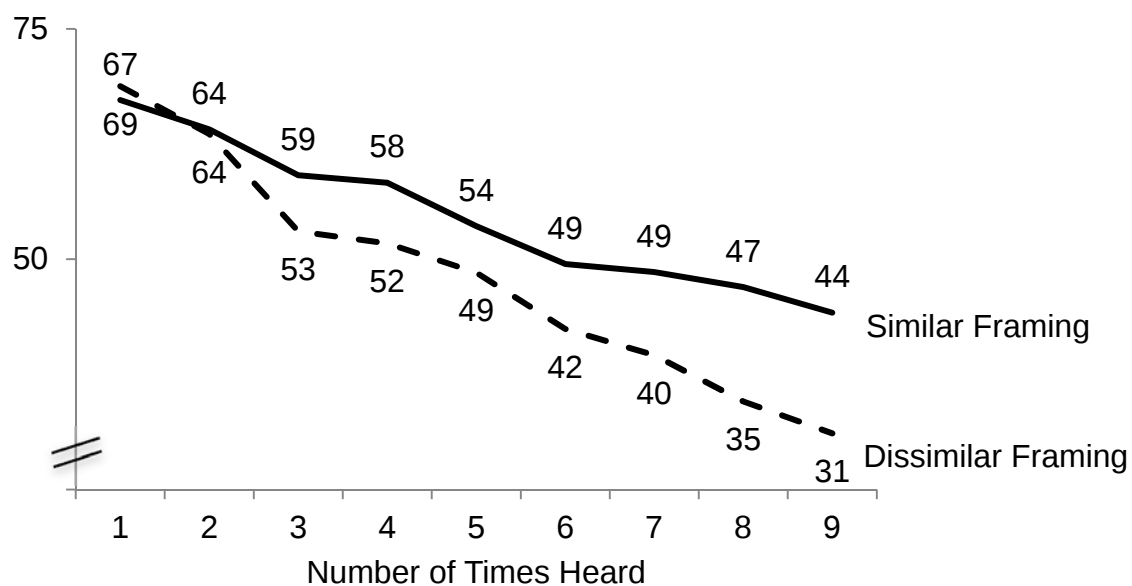


FIGURE 4

NEUTRAL INITIAL CATEGORIZATION



ART INITIAL CATEGORIZATION

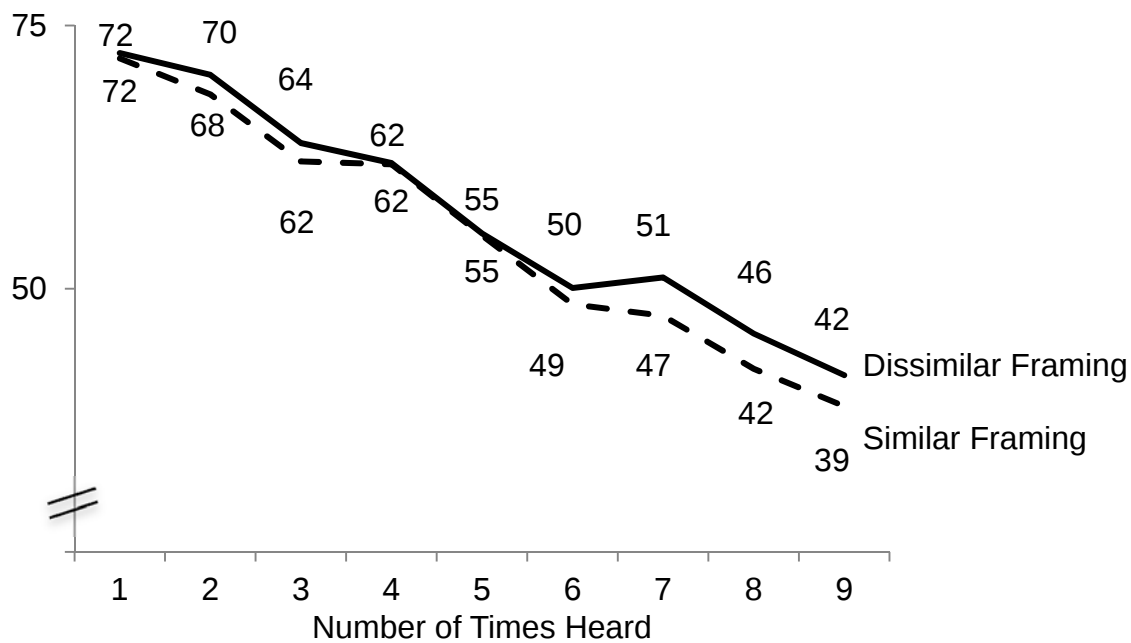


FIGURE 5
MEAN ENJOYMENT RATINGS IN STUDY 5

