Reducing Satiation: The Role of Categorization Level

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People usually like experiences less as they repeat them: they satiate. This research finds that people satiate less if they categorize the consumption episodes at lower levels. For instance, as people ate more jelly beans, their enjoyment declined less quickly when the candy was categorized specifically (e.g., cherry, orange) rather than generally (e.g., jelly bean). Three studies demonstrate this "specificity effect" for people's ratings of enjoyment both during and immediately after consumption. Process evidence shows that subcategorization focuses people's attention on differentiating aspects, making the episodes seem less repetitive and consequently less satiating.

Good things satiate (Coombs and Avrunin 1977). These three words describe a common barrier to happiness, namely, that pleasure often declines with greater consumption. Satiation causes our favorites to lose their special status, makes it hard to follow a diet, and pushes us to escalate our spending on increasingly expensive products. Life has even been compared to an unending "hedonic treadmill" where we must keep finding better experiences just to maintain our current happiness level (Brickman and Campbell 1971). Although the hedonic treadmill was discussed as a problem over 35 years ago, we still know little about how people can reduce satiation. This research demonstrates a way to counter satiation—breaking the hedonic treadmill into many treadmills by subcategorizing the episodes. This could help people enjoy themselves more and find greater happiness with what they already have.

Consumers typically react to satiation by switching among alternatives (Herrnstein and Prelec 1991; McAlister 1982). Variety can reduce satiation by introducing substantive changes like the flavor of a yogurt (Rolls, Van Duijvenvoorde, and Rolls 1984) as well as nonsubstantive changes like the cosmetic features of an ad (Schumann, Petty, and Clemons 1990). However, increasing variety does not solve the problem of satiation. Past consumption still leaves people unable to enjoy their favorites as much as before. Further, people may not even have any good alternatives or control over what they consume (e.g., a concert playlist, a toddler's diet). Given these limitations of variety, this research focuses on how people can enjoy a given set of episodes more.

People satiate primarily on individual aspects of an experience (McAlister 1982; Rolls et al. 1981). For example, eating a food lowers the liking only for similar foods rather than all foods (Rolls, Rowe, and Rolls 1982). People especially satiate on the sensory features of an experience like flavor or color rather than on nonsensory features like caloric content or brand name (Inman 2001; Johnson and Vickers 1993). The current work shows that this "sensory-specific satiety" also depends on how much people's attention makes apparent the repetition of an aspect.

If satiation depends on which features people attend to, then the level of categorization could systematically affect satiation. Although people enjoy a single episode less when it follows better experiences, prior work has shown that this hedonic contrast diminishes as they consider the episodes to be in different categories (Raghunathan and Irwin 2001). Surprisingly little research has explored whether such subcategorization also has a systematic effect on satiation. The present work fills this research void by demonstrating that differentiating episodes into more categories lowers satiation. Subcategorization first focuses people's attention on the aspects that differentiate the episodes. This increased attention to the details subsequently lowers perceived repetition, resulting in less satiation and greater enjoyment.

The proposed mechanism reflects the converse of perceived variety in many ways. As episodes seem less similar to each other, assortments appear to offer greater variety (Hoch, Bradlow, and Wansink 1999). Hence, making differences in the episodes salient can increase perceived variety. For example, Kahn and Wansink (2004) found that sorting a tray of candy by color made people think it had

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more variety. This led people subsequently to eat more candy just because they expected to enjoy it more, even before consuming the first piece. However, these authors did not find any effects on actual enjoyment (see study 5 in Kahn and Wansink 2004). This article complements their work by examining the underlying mechanisms of attention and perceived repetition and focusing on enjoyment rather than consumption quantity.

This work also differs from other approaches to examining satiation. Studies of variety typically focus on how people make a series of choices from multiple options (Herrnstein and Prelec 1991; Ratner, Kahn, and Kahneman 1999; Simonson 1990) or how people preselect an assortment of items for later consumption (Kahn and Wansink 2004; Simonson 1990). The current studies do not let people choose what to consume when. By controlling for actual variety and order effects, this setup better tests whether people really enjoy a given set of episodes more. The results show that subcategorization lowers satiation and makes an experience more enjoyable.

THEORETICAL BACKGROUND

Liking Depends on Categorization

Psychophysics has shown that people perceive things relative to an adaptation level (Helson 1964). For example, if a person first places their right hand into 40° C water and their left hand into 20° C water, then they will report that 30° C water simultaneously feels cool to the right hand yet warm to the left hand. This concept of an adaptation level also applies to enjoyment (Frederick and Loewenstein 1999; Parducci 1995). People like things less when they have had better things in the past, and vice versa. Past experiences apparently affect current enjoyment.

Liking does not depend on how the current episode contrasts with every experience from the past. People instead compare the current episode largely with past experiences recruited from the same category (Brown 1953; Kahneman and Miller 1986). For example, people like a product more after viewing other less desirable products, but only if the products are in the same category (Raghunathan and Irwin 2001). If all of the past products are in an unrelated category, such hedonic contrasts disappear and enjoyment may even assimilate to the mood created by past products. Raghunathan and Irwin (2001) did not examine the case where only a portion of the past episodes match, but their arguments for why mood-based assimilation does not occur when all of the episodes match should also apply when only some of them match. Generally speaking, past experiences affect enjoyment more when they are in the same category as the current episode.

Although subcategorization affects liking by restricting the basis for comparison, the effect of this on the enjoyment of a sequence is unclear. Subcategorization makes bad options seem better, but it also makes good options seem worse. These two effects should cancel out for little net effect on satiation and overall enjoyment. However, subcategorization could still affect satiation simply because fewer past episodes enter the context for current enjoyment. The next section will discuss how satiation depends on how much episodes seem to repeat each other.

Satiation as Repetition of an Aspect

People often attribute satiation to the body exceeding a physiological limit (e.g., feeling full). However, physiological limits have difficulty accounting for several findings. First, satiation appears too quickly for physiological absorption (Rolls et al. 1981) and occurs for noningested stimuli (McSweeney and Swindell 1999). Second, changing a single aspect can instantly restore responsiveness to a previously repeated stimulus. For example, people salivate less from a taste of lemon after 10 trials, but a novel taste can make their salivation increase in subsequent lemon tastes (Epstein et al. 1993). Third, satiation depends on the caloric and nutritional content of food less than the flavor (Johnson and Vickers 1993). Fourth, amnesiacs unable to recall prior meals will eat multiple lunches in rapid succession despite presumably being full (Rozin et al. 1998). Based on these findings, many researchers assume that psychological mechanisms also contribute to satiation. This view does not rule out physiological feedback as a cause of satiation; rather, it suggests that psychological mechanisms also produce satiation.

The psychological nature of satiation has been studied mostly as a phenomenon called "sensory-specific satiety." Sensory-specific satiety refers to a drop in liking for a food after eating it, with little change in liking for foods not eaten (Rolls et al. 1981). This drop in liking also extends to other foods with the same color, shape, or flavor as the eaten food (Rolls et al. 1982). Satiation primarily occurs on specific attributes (e.g., the entrée but not dessert) that people can notice (e.g., flavors rather than calories). These effects can appear within 2 minutes of ingestion and diminish little over 60 minutes (Hetherington, Rolls, and Burley 1989) and can even span purchase occasions (Inman 2001). People act as if they maintain a running inventory for each attribute that gets replenished during consumption and depleted with time (McAlister 1982).

Several researchers have explained sensory-specific satiety using the idea of habituation (McSweeney and Murphy 2000; Raynor and Epstein 2001). Habituation is a psychological process whereby people respond less to a stimulus as they get exposed to it more (for a review, see McSweeney and Swindell [1999]). Note that while habituation differs from adaptation and acclimation, the terms are often used interchangeably simply to reflect that people get used to experiences as they repeat them. For example, we may no longer notice loud construction outside our home after a few minutes. However, the noise will again become obvious if a visitor points it out or the noise abruptly changes. Repeated experiences affect people less over time, presumably because it is more critical to react only to changes in the environment.

Even though satiation likely results from a combination of mechanisms, habituation may contribute to satiation in

most settings. Habituation has been used to explain satiation across a wide range of phenomena such as the enjoyment of art (Berlyne 1971), the amount of food eaten (McSweeney and Murphy 2000), and boredom with a task (O'Hanlon 1981). The ubiquity of habituation suggests that the core notion of sensory-specific satiety generalizes to nonfood stimuli and nonsensory aspects. The reason we get bored with watching TV may be related to the reason we find that eating the same cereal becomes less tasty each morning. We habituate and subsequently satiate on particular aspects as we repeat them.

Since repetition causes satiation, even seemingly trivial changes can have an effect. For example, people find copying text more enjoyable if they use different handwriting styles (Sansone et al. 1992). People also like a brand more if its ads vary cosmetic features like the endorser and argument wording (Schumann et al. 1990). In fact, even the mere perception of more variety has an effect similar to that of actually having more variety. For instance, people expect to enjoy candy more when the different types are simply made more apparent (Kahn and Wansink 2004). It is proposed that satiation also depends largely on how much repetition people perceive. The next section explores how the level of categorization might affect this perception.

Categorization Level and Satiation

It is perhaps surprising that prior research has not explored whether the level of categorization systematically affects satiation. Categorization plays a vital role in helping people simplify the infinite complexities of subjective experience. By categorizing a stimulus, people can focus their attention on only the most critical aspects. The influence of category-level perception can be readily seen in the phenomenon of "change blindness," whereby a person fails to detect seemingly obvious changes in an experience. In a dramatic example, only 33% of people noticed when the sole actor in a movie scene transformed into another person during a cut to a different camera angle (Levin and Simons 1997). However, nearly everyone immediately noticed this change if they were forewarned about a possible change or the actor was well known. People apparently do not always track all of the detailed nuances of an experience over time. They instead focus their attention on the critical aspects or gist of a situation that categorization captures.

People typically categorize things at a basic level that maximizes the similarity of items within each category, yet minimizes the similarity of items across each category (Mervis and Rosch 1981). For instance, bird tends to be the basic level rather than animal or robin. People recognize objects more quickly at the basic level and describe objects more often using the basic level. The use of more detailed categorizations becomes common with expertise (Johnson and Mervis 1997; Tanaka and Taylor 1991) or identifying labels (Vallacher and Wegner 1987). The current studies focus on using labels to make people categorize episodes at more detailed levels.

If people satiate on specific and noticeable aspects, then the level of categorization may affect satiation. When subcategorizing episodes, people pay more attention to the aspects that differentiate a set of generally similar episodes. The increased salience of the distinctive rather than the common features makes the episodes seem less similar to each other. This results in perceptions of less repetition over the course of many episodes. Since repetition leads to satiation, subcategorization reduces satiation (the "specificity effect"). Conceptually, subcategorization causes fewer episodes to fall into each category. Although the specificity effect might appear intuitive at first glance, it is not clear that a change in a categorization scheme should make a physically identical assortment more enjoyable. The argument is that more specific categorization generates additional utility "out of thin air."

Although subcategorization lowers satiation, it may not do so equally for all aspects. For example, imagine an art expert and an art novice who have just seen the same exhibit of Greek and Roman artifacts. The specificity effect implies that the expert will want to continue viewing artifacts more than the novice. Even so, the expert may still have less interest in viewing more Greek or Roman artifacts relative to other types since he recognizes what he has already seen. Subcategorization highlights the presence of the specific aspects and makes each episode seem more like its specific subcategory. This increase in typicality leads to greater satiation on the specific aspect (Heath and Soll 1996). The prediction is that subcategorization will reduce satiation for the general activity more than the specific activities serving as the subcategories.

Empirical Studies

Three experiments support the predictions and proposed mechanism. Study 1 shows that encouraging people to subcategorize episodes reduces satiation across a range of common scenarios. Study 2 replicates this specificity effect for the viewing of animal and nature photos, even when using well-known category labels and a large number of episodes. Study 3 provides process evidence linking the specificity effect to the proposed mechanism for people eating candy. Subcategorization reduces satiation because it makes episodes seem less repetitive by focusing people's attention on the differentiating aspects.

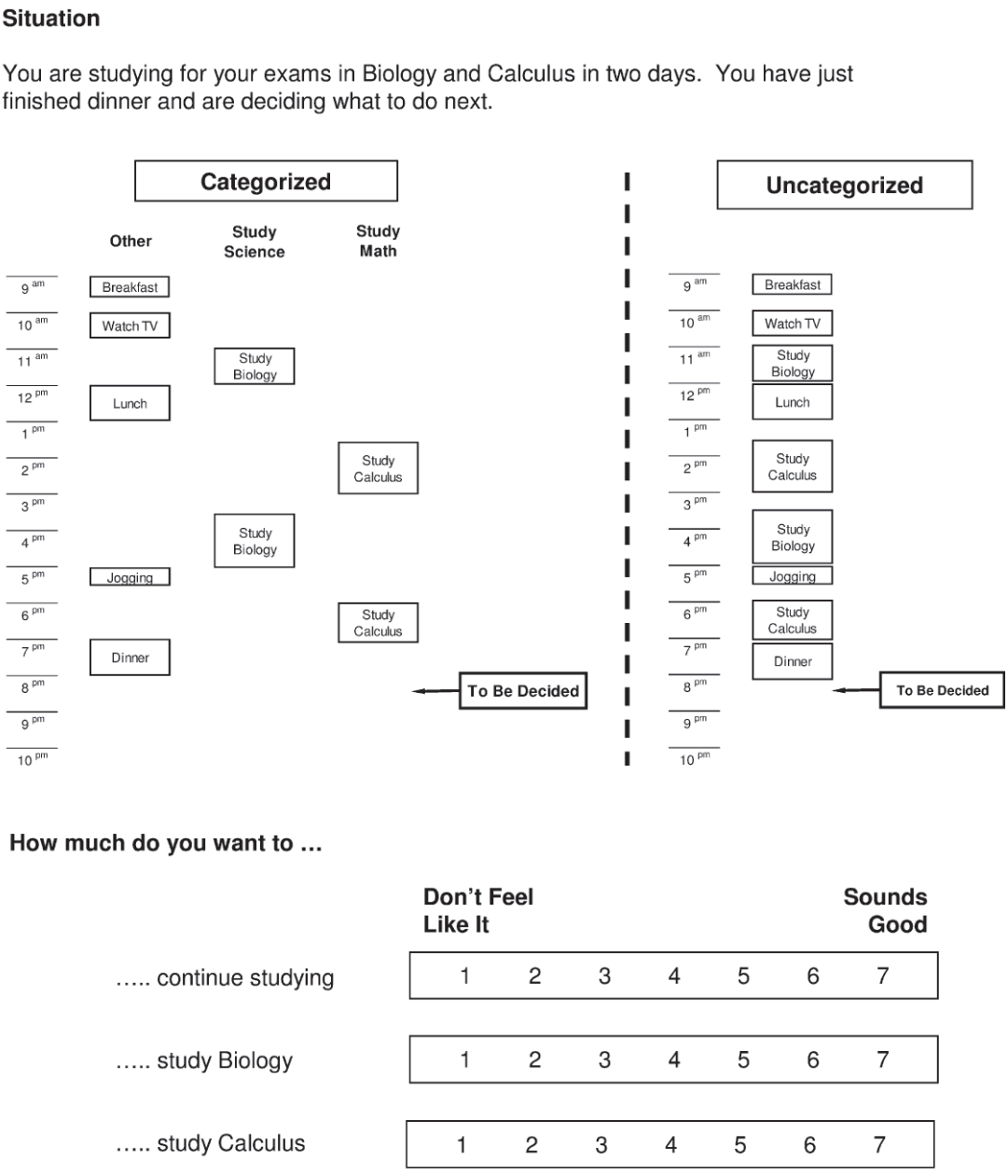
STUDY 1

Method

One hundred and five participants completed the experiment in exchange for course credit or $5 of compensation. Participants were told that the study involved testing people's ability to imagine different experiences. Participants started by listing up to six different ways to categorize activities in a given domain (e.g., "studying for an exam"). This listing task was included to force participants to exert mental effort and to facilitate subsequent categorizations of activities. Participants next read a description of a scenario

FIGURE 1

SAMPLE SCENARIO FOR STUDY 1



in the given domain and a table listing recent related episodes (see fig. 1 for an example). Participants then rated their desire to continue engaging in the general activity (e.g., "continue studying") and more specific activities (e.g., "study biology" and "study calculus") using seven-point rating scales anchored on "don't feel like it" and "sounds good." Participants should rate an activity as less desirable as they expect more satiation. Everyone repeated this sequence of tasks for each of eight scenarios in a random order: vacationing at a beach resort, going out at night, eating snacks, watching TV, dining out, browsing a museum, shopping for a gift, and studying for an exam. After finishing the last scenario, participants separately rated their general preference for each of the general and specific activities on a seven-point rating scale anchored on "greatly dislike" and "greatly enjoy."

This study employed a 2 × 2 × 8 mixed design with the categorization specificity of past episodes as a between-subjects variable and both the measurement specificity of satiation and the scenario as within-subject variables. Cat-

egorization specificity was manipulated by listing the past episodes under separate specific columns or in a single general list (both shown in fig. 1). For high categorization specificity, the column headings were beach-exercise, entertainment-athletic, sweet-natural, comedy-movie, meat-seafood, art-antiquities, online-offline, or science-math. Measurement specificity of satiation was captured by separately measuring the desire to continue the general activity and the specific activities. The latter measure included a question for each of the two possible column headings in that scenario. The specificity effect predicts that categorizing past episodes at more specific levels will reduce satiation. However, this effect will attenuate when measuring satiation for the specific activities used as the subcategories.

Results

A repeated-measures ANOVA was performed on the desire to continue ratings with categorization specificity as a between-subjects factor and measurement specificity and scenario as within-subject factors. As predicted, measurement specificity moderated the effect of categorization specificity ($F(1, 103) = 8.47$, $p < .01$). People had a greater desire to continue the general activity when the past episodes had been specifically categorized ($M = 3.7$) versus not categorized ($M = 3.2$). A contrast verified that these two means differ ($F(1, 103) = 10.35$, $p < .001$). However, whether the episodes were specifically categorized ($M = 3.7$) or not categorized ($M = 3.6$) did not affect the desire to continue the specific activities ($F(1, 103) = 0.65$, $p > .42$). The specificity effect appears for the general activity but not for the specific activities.

This pattern of results did not depend on the scenario. There was no three-way interaction with the scenario ($F(7, 97) = 1.17$, $p > .32$). As well, in an analysis of the desire ratings for only the general activity, categorization specificity did not interact with the scenario ($F(7, 97) = 1.83$, $p > .09$). The current findings do not appear to be particular to the scenario used. Subcategorizing the episodes affected satiation nearly the same amount across the eight different domains.

The results also did not change when using the general preference ratings taken at the end of the study as a covariate. The effect of categorization specificity depended on the measurement specificity ($F(1, 103) = 7.74$, $p < .01$). Specifically categorizing the episodes reduced satiation for the general activity ($F(1, 103) = 15.68$, $p < .001$) but not the specific activities ($F(1, 103) = 1.12$, $p > .29$). The scenario did not participate in any higher-order interactions (all $p > .05$).

Discussion

This study finds evidence for the proposed specificity effect across a diverse set of hypothetical scenarios. People felt less satiated with a general activity when labels subcategorized prior episodes for them. Specific category labels presumably raise the salience of the aspects that differentiate the episodes. This makes the episodes seem like less of the same thing and reduces satiation for the general activity. However, subcategorizing prior episodes does not produce a general feeling of less fatigue that extends to all activities. The specificity effect attenuates for satiation with the specific activities themselves. Specific labels presumably focus people's attention on the repetition of the detailed aspects that a few episodes share.

The findings are notably consistent across the different scenarios used. Subcategorization reduced satiation for experiences that were more cognitive (e.g., studying) as well as more sensory (e.g., eating snacks). The mechanism underlying the specificity effect appears to be quite general in nature. It is proposed that the general perception of repetition contributes to satiation across all of these scenarios.

Since this study did not involve actual experiences, the current results could be driven by the visual formatting of the information. In many ways, the difference in the visual appearance of the two conditions captures the essence of the specificity effect. When prior episodes appear as a single large block, people perceive them to be much of the same thing. When prior episodes appear instead as multiple smaller blocks, people still perceive some repetition within each block yet less repetition in the overall sequence. Hence, subcategorizing episodes reduces satiation for only the general activity. The next study further tests the specificity effect when viewing photos. This will extend the specificity effect to an actual experience and rule out the visual format as an explanation. The next study will also explore potential boundary conditions by using well-known and obvious category labels, a larger number of episodes, and individually distinct stimuli.

STUDY 2

Method

Sixty-six people participated in exchange for course credit or $5 of compensation. Participants rated their enjoyment of 100 animal and nature photos gathered from the Internet. The animal photos were from the arctic wildlife, bird, farm animal, fish, pet, and safari big game genres. The nature photos were from the beach, canyon, desert, jungle, mountain, and river genres. Eight to nine photos from each genre were used for a total of 100 unique photos. Participants first viewed each of the 100 photos exactly once in a randomly determined order, and then viewed each photo a second time with the order rerandomized.

While each photo was on a computer screen, people rated their enjoyment by answering "How much did you enjoy this picture at this moment?" on an 11-point rating scale anchored on "not at all" and "very much." After the last photo, people rated their overall enjoyment using the same scale, and their desire to view more photos on a seven-point scale anchored on "greatly dislike" and "greatly like." The desire to view more photos was separately assessed for each general category (animal, nature) and each specific category (arctic wildlife, canyons, etc.).

The categorization specificity of the photos was manipulated between subjects using labels. To control for any effects from the mere presence of a label, everyone saw a label with each photo. Some participants saw only general category labels (e.g., animal) and others saw only more specific category labels (e.g., bird). The category labels appeared in the task instructions on a screen that preceded each photo, and below the photo. The specificity effect predicts that specific category labels should result in less satiation than general category labels.

Results

A model of the photo ratings included the level of categorization specificity, an indicator of whether the image duplicated an earlier image, and the cumulative number of photos previously seen from the current photo's genre. The model also contained all interactions among the three terms, individual-level intercepts to account for differences in liking across people, and fixed effects for each individual photo since some were generally more liked. A repeated measure with a first-order autoregressive error structure was also used since people gave multiple responses.

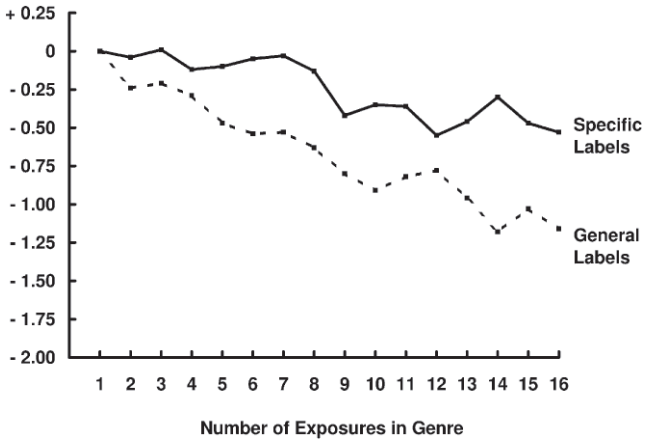
The two treatment groups did not differ in their enjoyment of the first exposures from the genres ($t(64) = 0.64$, $p > .52$). However, as predicted, enjoyment declined more slowly for people given specific labels versus general labels. Figure 2 shows the decline in average enjoyment ratings for both groups (adjusting for the mean rating of each unique image). A planned contrast between the rates of satiation (slopes) in the two treatment groups confirmed the specificity effect ($t(64) = 3.43$, $p < .01$). Further analysis of the simple effects indicated that people seeing general category labels became satiated with more exposures from the same genre ($t(64) = -5.97$, $p < .0001$), but people seeing specific category labels did not ($t(64) = -1.14$, $p > .25$).

The exact duplication of stimuli also affected satiation. After adjusting for any increase in satiation from more exposures, people rated a photo as less enjoyable when viewing it a second time ($t(64) = 2.14$, $p < .04$). Exact replication apparently increases satiation more than a new episode from the same category, presumably because exact replication increases the perception of repetition. The duplication of photos did not influence satiation beyond this main effect (both interactions have $p > .05$). As well, the specificity effect still appeared when limiting the analysis to just the first 100 photos without duplication ($t(64) = 3.05$, $p < .01$).

The various retrospective measures also provided some support for the specificity effect. People seeing specific category labels had a greater desire to view more photos from the general animal and nature categories ($M = 4.0$ vs. $M = 3.0$; $t(64) = 2.31$, $p < .03$). A similar increase in ratings of the overall experience failed to reach statistical significance ($M = 4.6$ vs. $M = 3.4$; $t(64) = 1.73$, $p < .09$). Finally, as expected, the two treatment groups differed little in their desire for more photos from the specific subcategories themselves ($M = 3.5$ vs. $M = 3.0$; $t(64) = 1.56$, $p > .12$).

FIGURE 2

CHANGE IN PHOTO ENJOYMENT RATINGS IN STUDY 2 ADJUSTING FOR MEAN RATINGS OF EACH UNIQUE IMAGE



Although only marginally significant, specific category labels reduced satiation for the general categories somewhat more than for the specific subcategories ($t(64) = 1.87$, $p < .07$).

Further analysis indicated that the three retrospective measures could be averaged into a single index of satiation (Cronbach's alpha = .83). As predicted by the specificity effect, people seeing specific category labels had a greater retrospective index ($M = 3.5$ vs. $M = 2.7$; $t(64) = 2.19$, $p < .04$). This retrospective index also correlated with the last photo rating ($r = .25$, $t(64) = 2.07$, $p < .05$) and estimated coefficients for the rate of decline from individual regressions of photo ratings ($r = .36$, $t(64) = 2.84$, $p < .01$). These last two correlations hint that a single mechanism underlies both real-time and retrospective measures of satiation.

Discussion

This study shows the predicted specificity effect for the experience of viewing animal and nature photos. Providing more specific category labels slowed satiation, even though the labels were well known and obvious. Specific labels can presumably focus people's attention on a particular aspect in each photo. This detailed focus results in the perception of less repetition and subsequently reduces people's satiation over the course of viewing many photos.

The categorization level has several effects on enjoyment. First, more specific labels do not change the liking of the initial episodes (i.e., no intercept difference). Second, more specific labels reduce the rate of satiation over a long series of episodes (i.e., a slope interaction). Third, subcategorizing episodes increases the desire to continue the general activity but not the specific activities. An explanation for the specificity effect must fully account for this pattern of findings.

The proposed mechanism explains these findings. During the first few episodes, there is little satiation to reduce. After several episodes, subcategorization focuses people's attention on the differentiating aspects such that only a small

portion of the past episodes seem like the current episode. This subsequently leads to the perception of less repetition and correspondingly results in less satiation. As the episodes continue accumulating, this small portion becomes increasingly fewer than the total number of episodes and results in an even greater reduction in satiation. Simultaneously, subcategorization also makes each episode more satiating on the specific aspect by highlighting it. This makes the specificity effect attenuate when measuring satiation on the more specific category of activities. Although the proposed process predicts these nuances of the data and parsimoniously explains the results, the next study provides more direct process evidence that the proposed mechanism mediates the specificity effect.

STUDY 3

Method

One hundred and thirty-five people participated for $5 of compensation. Participants first ate three pieces of Hershey's chocolate and then ate 22 fruit-flavored jelly beans (5 cherry, 4 orange, 4 peach, 4 strawberry, and 5 tangerine). Although this initial step of eating chocolate may be unnecessary, there was a concern that the general jelly bean label would not be used if jelly beans were the only type in the assortment. Participants next ate one jelly bean from each flavor followed by the remaining 17 jelly beans in a random order. The jelly beans were dispensed one at a time through an 11-inch plastic tube to control the order of consumption and to prevent participants from seeing the full assortment.

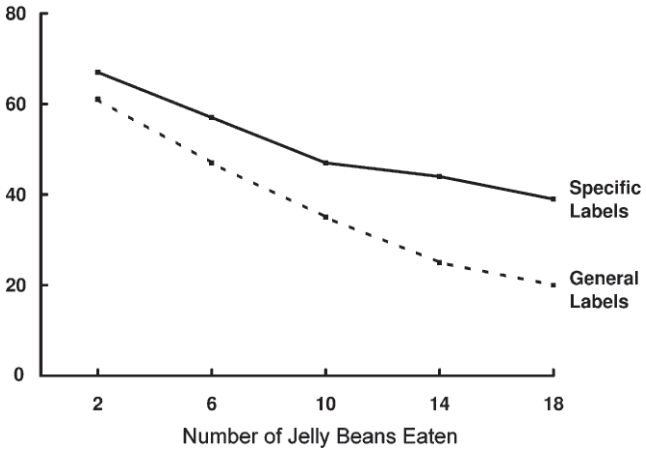
While eating the jelly beans, participants answered "How much are you enjoying these candies?" by clicking on a 101-point rating meter anchored on "not at all" and "very much." In order to reduce response fatigue and carryover effects, participants rated their enjoyment after the second jelly bean and every fourth jelly bean thereafter for a total of five ratings. After consuming the last jelly bean, participants rated their overall enjoyment using an 11-point scale anchored on "not at all" and "very much" and their desire to eat more jelly beans on an 11-point scale anchored on "greatly dislike" and "greatly like."

The study manipulated categorization specificity between subjects by framing the jelly bean candies into either a single general category or specific flavor-based subcategories. As people ate each piece of candy, a computer screen showed the number of candies eaten so far either at the general jelly bean level (e.g., jelly bean #7) or within each individual flavor (e.g., cherry #4). To reduce suspicion about the counter, participants were told that it was necessary to track the number of candies eaten and the time taken to eat each piece.

The specificity effect predicts that people seeing specific flavor-based category labels will get less satiated while eating the jelly beans. Mediation of this specificity effect was examined by having participants rate their agreement with several statements using seven-point scales anchored on "disagree" and "agree." As the proposed proximal mediator, attention to the flavor was captured by asking about flavor discriminability ("I could identify the specific flavor of each jelly bean," "The flavor of each jelly bean was obvious") and flavor salience ("I really noticed the specific flavor of each jelly bean," "I did not pay much attention to the different flavors of the jelly beans [reverse coded]," "I really noticed the color of each jelly bean"). As the proposed distal mediator, perceptions of repetition were measured by asking about redundancy ("Eating the jelly beans felt like the same thing over and over," "Eating the jelly beans was very boring") and similarity ("The jelly beans were very similar to each other," "Each jelly bean had aspects that made it different [reverse coded]"). Finally, the scale included two questions about retrospective judgments of variety ("There were many different types of jelly beans," "There was a lot of variety in the jelly beans"). These general measures of perceived variety have proven adequate in prior work (Broniarczyk, Hoyer, and McAlister 1998; Hoch et al. 1999).

FIGURE 3

INTERIM ENJOYMENT RATINGS OF JELLY BEANS IN STUDY 3



Results

The data were removed for the 16 participants whose first interim rating was less than 10 on the 101-point scale as they had little potential for satiation. Figure 3 presents the average interim enjoyment ratings for the two treatment groups. People seeing the jelly beans framed into flavor-based subcategories became less satiated. The final interim rating for this group was nearly 20 points higher than for the other group seeing the jelly beans framed as a single general category ($M = 39$ vs. $M = 20$; $t(117) = 3.49$, $p < .001$). However, the first interim rating taken after eating just two jelly beans did not differ between the two groups ($M = 67$ vs. $M = 61$; $t(117) = 1.55$, $p > .12$).

A repeated-measures ANOVA was performed on the interim enjoyment ratings with categorization specificity as a between-subjects factor and the number of interim ratings previously made as a within-subject factor. A test of the linear

trend indicated that people found the experience less enjoyable as they consumed more jelly beans ($F(1, 117) = 192.59$, $p < .0001$). As predicted, this linear trend interacted with categorization specificity ($F(1, 117) = 7.41$, $p < .01$). People seeing the specific flavor labels satiated less quickly. Statistical analyses on retrospective ratings of the jelly bean experience found similar results. Participants seeing the specific flavor labels enjoyed the experience more ($M = 2.2$ vs. $M = 1.2$; $t(117) = 2.25$, $p < .03$) and indicated a greater desire to continue eating jelly beans ($M = 4.4$ vs. $M = 3.0$; $t(117) = 2.68$, $p < .01$). These results replicate the specificity effect found in the previous studies.

Mediation Analysis

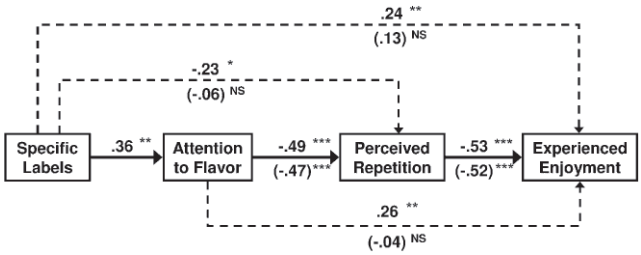
A two-stage mechanism has been proposed for the specificity effect: (1) subcategorization increases people's attention on the aspects differentiating a set of episodes, and (2) focusing on the detailed aspects makes the episodes seem less repetitive. To capture this detail, separate indexes were created for attention to the flavor and perceptions of repetition by averaging the associated measures detailed in the Method section. An index was also created for the related concept of perceived variety. All three indexes displayed an acceptable level of consistency as the Cronbach's alphas ranged from .77 to .85. The intraindex correlations indicated three separate constructs ($r = -.49$ for attention to flavor and perceptions of repetition, $r = .22$ for attention to flavor and perceived variety, and $r = -.34$ for perceptions of variety and repetition). A factor analysis with a varimax rotation validated the presence of only these three factors (using eigenvalue >1 criterion) and found that every individual question loaded most highly onto the intended factor. The three indexes seem to capture the intended constructs effectively.

For testing mediation of the specificity effect, an enjoyment index was created as the average of the overall rating and the desire to continue eating jelly beans (Cronbach's alpha = .87). The process shown in figure 4 best accounted for the effect of specific labels on this index of enjoyment. Enjoyment correlated with perceptions of repetition ($r = -.53$, $t(117) = -6.69$, $p < .0001$) and attention to the flavor ($r = .26$, $t(117) = 2.93$, $p < .01$). When enjoyment ratings were regressed onto label specificity, including perceptions of repetition and attention to the flavor decreased the beta weight for specific labels from .24 ($t(117) = 2.63$, $p < .01$) to .13 ($t(115) = 1.57$, $p > .11$). The proposed process mediated the specificity effect (Sobel test = 2.36, $p < .02$).

To fully demonstrate the proposed two-stage process, further analysis showed that increased attention to the flavor drove subsequent perceptions of less repetition. Attention to the flavor positively correlated with specific labels ($r = .36$, $t(117) = 4.22$, $p < .0001$) and negatively correlated with perceptions of repetition ($r = -.49$, $t(117) = -6.08$, $p < .0001$). When a regression analysis for perceptions of repetition on specific labels included attention to the flavor, the beta weight for specific labels decreased from $-.23$ ($t(117) = -2.55$, $p < .02$) to $-.06$ ($t(116) = -0.68$, $p > .49$). Attention to the flavor mediated the effect of specific labels on perceptions of repetition (Sobel test = 3.33, $p < .001$). Furthermore, attention to the flavor mediated the specificity effect only through its influence on perceptions of repetition. After adjusting for the other factors in figure 4, perceptions of repetition still influenced enjoyment ($b = -.52$, $t(115) = -5.71$, $p < .0001$) and attention to the flavor did not ($b = -.04$, $t(115) = -0.42$, $p > .67$). Additional analyses also found that attention to the flavor somewhat mediated the effect of specific labels on enjoyment (Sobel test = 1.90, $p < .06$), but perceptions of repetition completely mediated any effect of attention to the flavor on enjoyment (Sobel test = 4.19, $p < .0001$). The pattern of results across these analyses indicates that attention to the flavor served as the proximal mediator and perceptions of repetition served as the distal mediator of the specificity effect.

FIGURE 4

MEDIATION ANALYSIS IN STUDY 3



NOTE.—Simple bivariate correlations are shown above each line. Standardized regression coefficients are shown in parentheses below each line. * = $p < .05$, ** = $p < .01$, *** = $p < .0001$, NS = nonsignificant.

These mediation analyses show that the proposed two-stage mechanism underlies the specificity effect. Although not reported here, mediation analyses using the final interim rating as the dependent variable supported the same process. In contrast, general perceptions of variety could not account for the specificity effect nearly as well as the proposed process. Specific labels did not increase perceived variety ($M = 4.1$ vs. $M = 3.9$; $t(117) = 1.02$, $p > .30$), and perceived variety did not mediate the specificity effect when added to the regression analysis (Sobel test = -0.95, $p > .34$).

Discussion

This study accomplishes two objectives. First, it demonstrates that subcategorization via simple labels can reduce people's satiation from ingested stimuli. Second, this study provides process evidence directly linking the specificity effect to the proposed mechanism. It appears that subcategorizing episodes focuses people's attention on differentiating aspects, making a set of episodes seem less repetitive and consequently less satiating.

The proposed mechanism explained the specificity effect, but perceptions of variety did not. People seeing specific

flavor labels did not even perceive greater variety. The lack of this finding may reflect an inadequate measure of perceived variety that fails to fully capture the construct. However, prior work has also found that making the different types more apparent does not increase perceived variety if there are only a few different types (e.g., six colors in Kahn and Wansink [2004]). In the current study, highlighting the specific candy types reduced people's perceptions of repetition even with only five different types. These contrary findings suggest that repetition and variety may not be simple converses of each other. The current study finds that satiation depends on perceptions of repetition more than variety, but this may not hold in all settings. Future work should delineate these two constructs, especially as they relate to satiation.

GENERAL DISCUSSION

Many people see satiation as an unavoidable, physiological consequence of consumption. This research shows that satiation, or the decline in enjoyment, depends on how much repetition people perceive. This psychological account of satiation leads to three significant insights. First, people satiate more on the aspects they use to categorize an episode. Attention apparently plays a critical role in whether people satiate on a particular aspect. Second, people enjoy a consumption sequence more if they subcategorize the episodes (the "specificity effect"). This finding makes an important contribution to the satiation and well-being literature by demonstrating a way to slow satiation. Third, the specificity effect occurs because people perceive less repetition when they focus their attention more on the details that differentiate the episodes. This process evidence complements prior work on hedonic contrasts and perceived variety by identifying the mechanisms that underlie satiation.

This article opened by posing the problem of how people can reduce satiation. Three studies show a simple solution: subcategorize the episodes. Prior work has shown that categorization can reduce the extent to which past enjoyment affects enjoyment of a future episode (Raghunathan and Irwin 2001). The current findings extend this notion to satiation and provide further insight into how subcategorization makes a consumption sequence more enjoyable. Although the current studies fixed the consumption sequence, subcategorization should still reduce satiation when people have choice. Variety may reduce satiation precisely because it inherently lowers perceived repetition by ensuring episodes come from different categories. Greater variety may have little effect on satiation if people fail to place the episodes into multiple categories. Future work should test this prediction.

The current findings have several implications for consumers. Notably, consumers can enjoy themselves more by focusing on the details during their experiences. This should prove useful for consumers facing few options, novices developing expertise, or people following a repetitive regimen. However, subcategorization could also lead to mindless overconsumption by reducing satiation. Subcategorization likely increases the quantity consumed in a sitting, but it is not clear whether future consumption would decrease to compensate for this binge. Exploring how categorization affects long-term consumption quantities and frequency offers a promising area for future research, especially with regard to obesity and dieting.

The current findings also have relevance for expertise. Experts have more developed category schemas that let them better identify and process the variety in a set (Morales et al. 2005). As people gain experience in a domain, they may start categorizing episodes in a refined manner and (unknowingly) reduce satiation. Consuming several glasses of merlot may leave a novice not wanting any wine for days, yet an expert craving a shiraz the next day. I similarly find that watching tennis does not affect my desire to watch basketball. My wife unfortunately finds "more sports on TV" satiating. These examples show that experts find subtle, yet rich, distinctions among the many shades of gray experienced by the novice. The current studies use labels to encourage these finer distinctions, but one can imagine that experts get the same effect without the assistance of labels. This may partially explain why experts spend so much time in their chosen domains, seemingly doing the same repetitive thing without losing interest.

Marketers should recognize specific categorization as a potential tool to grow revenues of existing products with existing customers. If consumers subcategorize their products and get less satiated, then product demand should increase. Marketers can encourage such detailed categorizations in several ways. They can use more specific labels like those employed in this study. They could also train consumers through information sessions or demonstration booths (e.g., wine tastings) or work with retailers to create narrowly defined groupings on the shelves. A promising topic for future work is how marketers can best encourage detailed categorizations.

The current studies have demonstrated the specificity effect, but limitations of the laboratory setting could affect the generality of the findings. First, these studies examined satiation only over brief time frames. Future research could explore how subcategorization affects satiation over longer time periods. Second, participants had explicit labels for each episode. Consumers may often categorize things at more general levels, as evidenced by the ubiquity of satiation. Third, these studies measure satiation as the decline in liking rather than the desire for or amount of subsequent consumption. However, people should also keep consuming an item more when subcategorization makes it appear less similar to the past episodes. For example, when choosing a potato chip flavor to eat, people select flavors with less similarity to recently consumed flavors because there is less crossover of the sensory-specific satiety (Maier, Vickers, and Inman 2007). Finally, the specificity effect may not hold in all domains. The rate of satiation can vary widely across different types of experiences (Frederick and Loewenstein 1999). In domains where people satiate little, the specificity effect may be minimal. Likewise, in some domains people

may satiate rapidly regardless of whether they subcategorize the episodes.

There may also be boundaries on what types of categorizations can produce a specificity effect. For example, subcategorizing episodes using more abstract aspects (e.g., health benefits) may prove less effective if it fails to change the experience and the episodes still feel like the same thing. On the other hand, focusing attention on an abstract aspect may lower the perceived repetition more if the person would otherwise not notice that aspect. Other examples of potentially limiting conditions include when people naturally categorize at more specific levels, when people cannot discriminate the different aspects even with labels, or when people do not believe the label has any relevance to the experience. Future research could identify the types of categorization schemes that foster the specificity effect, as well as those that diminish it.

This work adds to our understanding of satiation. People make decisions every day that depend on how satiated they feel. These decisions often occur within a larger cycle that includes consumption, satiation, and spontaneous recovery. Although beyond the scope of this research, categorization may also affect how fast people recover from satiation. Much about satiation remains to be understood. If researchers want to help consumers cope with satiation, they cannot forget categorization effects.

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