

Is variety the spice of life? It all depends on the rate of consumption

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Abstract

Is variety of the spice of life? The present research suggests that the answer depends on the rate of consumption. In three experiments, we find that, whereas a variety of stimuli is preferred to repetition of even a better-liked single stimulus when consumption is continuous, this preference reverses when the satiation associated with repetition is reduced by slowing down the rate of consumption. Decision makers, however, seem to under-appreciate the influence of consumption rate on preference for (and satisfaction with) variety. At high rates of consumption, they correctly anticipate their own, high, desire for variety, but at low rates of consumption people tend to overestimate their own desire for variety. These results complicate the picture presented by prior research on the “diversification bias”, suggesting that people overestimate their own desire for variety only when consumption is spaced out over time.

Keywords: diversification bias, variety, consumption,

1 Introduction

The dictum “variety is the spice of life” notwithstanding, people seem to show a surprising tolerance, even preference, for repetition. Whether a favorite snack, pop song, or piece of art, people routinely expose themselves to the same liked stimulus repeatedly. Indeed, prior work has shown that people even surprise *themselves* with this preference; research on the “diversification bias” has consistently shown that people predict a greater preference for variety (and aversion to repetition) than they show in their online, immediate preferences (Read, Antonides, van den Ouden & Trienekens, 2001; Read & Loewenstein, 1995; Simonson, 1990). For example, when shopping for the week’s supply of yogurt a person might supplement his or her favorite flavor (say, strawberry) with one or more less preferred alternatives (say, vanilla) ... only to find a surplus of the less preferred flavor at the end of the week (Simonson, 1990).

This apparent tolerance for repetition conflicts not only with people’s own intuitions, but with (on the surface, at least) existing models of taste and satiation. A central tenet of most psychological and economic theories of taste is that enjoyment of enjoyable stimuli declines with repetition (Helson, 1947; 1964; Mas-Colell, Whinston & Green, 1995; although see Zajonc, 1968 for an impor-

tant exception). If people repeatedly consume a product, it is thought, they become satiated—and enjoyment decreases. Indeed, in one illustrative study, participants listened to a 45-second sample of a favorite song 15 times in quick succession, rating their enjoyment of the experience along the way. What began as an enjoyable experience became decidedly less so after only the 6th iteration (Ratner, Kahn & Kahneman, 1999, Experiment 1).

How can these seeming inconsistencies—the revealed preference for repetition shown in studies on the diversification bias and the aversion to repetition shown in studies like the above—be reconciled? One key to the discrepancy may lie in the inter-consumption interval (the time between acts of consumption). Whereas studies that demonstrate a preference for repetition tend to involve brief episodes of consumption with a relatively long (day or week) inter-consumption interval, the song study just described involved a more prolonged consumption experience with no breaks between individual acts of consumption.

This difference is likely to be of critical importance in light of the inherently fleeting nature of satiation. Although people can and do satiate to a given stimulus, such satiation tends to be relatively short-lived (Hardie, Johnson, & Fader, 1993; Lattin & McAlister, 1985; McAlister, 1982; McSweeney & Swindell, 1999; Read & Loewenstein, 1995; though see Inman, 2001 for an alternative account). With time, people’s preferences typically return to their pre-consumption level. Just as a muscle (or willpower, according to Baumeister and colleagues—e.g., Baumeister & Vohs, 2002) weakens in the short-term through repeated use, but replenishes over time, satiation seems to have the same property. Whereas the same snack or pop song grows tiresome if repeated in

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quick succession, the drop-off in enjoyment may be much smaller, or even non-existent, if there is a sufficient gap between consumption intervals. And if rate of consumption influences the desirability of repetition, it logically follows that it should influence the desirability of its logical complement—variety—as well.

Are people aware of the influence of rate of consumption on satiation? Informal observation suggests that they are. Most of us realize that the same favorite food would quickly grow tiresome if served as an appetizer, entrée, and dessert at the same sitting—whereas those same three servings would be perfectly palatable if spread out over a month. And yet, research seems to show that people consistently underestimate their liking for repetition (and overestimate their liking for its complement, variety), at least when consumption is spaced (Simonson, 1990). Why? One reason is “time contraction” (Read & Loewenstein, 1995). People tend to underweight the importance of time when predicting their preferences for novelty (and liking for repetition), imagining lengthy intervals as if they were short ones. When predicting their snack preferences over the course of a week, for instance, people think about how unappetizing the same food item would be if consumed in rapid succession, forgetting that time tends to reset one’s preferences. Consistent with time contraction, Read and Loewenstein (1995) showed that merely drawing people’s attention to the otherwise neglected inter-consumption interval decreased the predicted (and, in this instance, inaccurate) preference for variety.

Note, however, that the time contraction explanation for this unwarranted preference applies only to lengthy inter-consumption intervals. To the extent that people underestimate their liking for repetition because they imagine a short inter-consumption interval, those predictions should be more calibrated when the inter-consumption interval is in fact short. In other words, as the inter-consumption interval decreases, predicted preference for variety should align with in-experience (and thus actual) preferences.

A straightforward prediction naturally follows from this hypothesis concerning people’s satisfaction with the choices they make in advance. As already mentioned, prior work on the diversification bias has consistently shown that people choose greater variety when deciding for future consumption than when deciding in the moment. It should come as no surprise, then, that people are sometimes dissatisfied with the degree of variety they select prospectively (Read et al., 2001). However, if our thesis is correct then this “miswanting” (Gilbert & Wilson, 2000) is also likely to vary as a function of the inter-consumption interval. Specifically, as the inter-consumption interval decreases, satisfaction with choices made in advance should increase.

The present research was designed to test these hypotheses. Experiment 1 explores whether enjoyment of repetition (and aversion to variety) increases as the inter-consumption interval increases. Experiment 2 examines whether the tendency to choose more variety in prospect than in the moment—the diversification bias—decreases as the inter-consumption interval decreases. Experiment 2 also examines whether this causes people to be more satisfied with the consumption choices they make in advance as the inter-consumption interval decreases. Experiment 3 extends these results by varying the length of the inter-consumption interval and observing the nature of the relationship between this interval, preference for variety, and subsequent enjoyment. We conclude with a discussion of the theoretical implications of the results.

2 Experiment 1

Experiment 1 was designed to examine whether enjoyment of repetition versus variety varies as a function of the inter-consumption interval. Participants listened to nine iterations of a single well-liked song or a variety of slightly less-preferred songs, either with or without a 1-minute delay between iterations. We predicted that, whereas participants would enjoy a variety of songs more than repetition of a single song when consumption was back-to-back, this tendency would be reduced when consumption was spaced.

2.1 Method

2.1.1 Subjects

One hundred and six participants (80 women, 25 men, 1 unidentified) from an online panel (median age = 35) completed the Experiment in exchange for entry into a lottery for \$100. All instructions, manipulations, and dependent measures were administered via computer.

2.1.2 Materials and procedures

Participants were informed that they would be listening to music during the experiment. They were then asked to pick their top three favorite songs from a list of 21 different songs from three different genres (pop, classic rock, and country). We included a variety of music to ensure that most participants could find music that they liked.

Next, participants were randomly assigned to condition. Participants in the no-variety condition listened to their top-rated song 9 times throughout the course of the Experiment, indicating their enjoyment of the song after each trial on a 101-point unmarked slider scale anchored with “I hated it” and “I loved it”. Participants in

the variety condition followed a similar procedure, except that they listened to a randomized “playlist” of their three highest rated songs.

Orthogonal to this manipulation, some participants listened to the songs back-to-back, whereas for others there was a 1-minute delay between songs.¹ The design of the study was thus a 2 (variety: no-variety, variety) x 2 (consumption rate: back-to-back, spaced) fully between-subject factorial. After listening to all of the songs, participants indicated how much they enjoyed the entire listening experience on a scale from 1 (*I hated it*) to 9 (*I loved it*). Finally, they were debriefed and thanked.

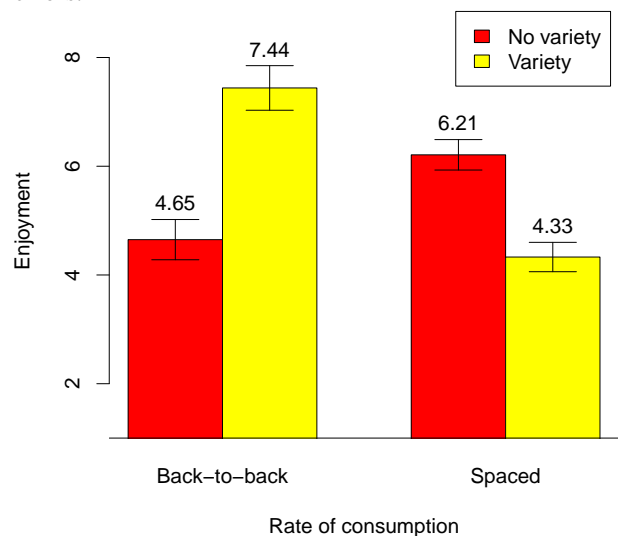
2.2 Results and discussion

Our primary prediction was that, whereas participants would enjoy a variety of songs more than repetition of a favorite song when consumption was back-to-back, this tendency would attenuate when consumption was spaced. A 2 (variety: no-variety, variety) x 2 (consumption rate: back-to-back, spaced) ANOVA on the enjoyment measures suggested that this was the case. In addition to a main effect of rate (participants in the back-to-back condition enjoyed the listening experience more than participants in the spaced condition ($F(1, 102) = 5.22, p < .05, p_{rep} = .94, \eta_p^2 = .05$), we also observed a significant 2-way interaction ($F(1, 102) = 47.29, p < .001, p_{rep} = .99, \eta_p^2 = .32$). As Figure 1 shows, when consumption was back-to-back, participants preferred listening to a variety of songs more than listening only to their favorite song ($F(1, 102) = 25.52, p < .001, p_{rep} = .99, \eta_p^2 = .20$). However, the opposite was true when the songs were separated with a 1-minute delay ($F(1, 102) = 22.65, p < .001, p_{rep} = .99, \eta_p^2 = .18$).

Next, we report participants’ in-experience ratings with a 2 (variety: no-variety, variety; between subjects) x 2 (consumption rate: back-to-back, spaced; between subjects) x 9 (iteration; within subjects) mixed ANOVA. We observed a main effect of consumption rate ($F(1, 102) = 4.18, p < .05, p_{rep} = .93, \eta_p^2 = .04$), a marginal main effect of variety ($F(1, 102) = 3.39, p = .06, p_{rep} = .90, \eta_p^2 = .03$), a 2-way interaction between consumption rate and variety ($F(1, 102) = 9.77, p < .01, p_{rep} = .99, \eta_p^2 = .09$), and, most importantly, a 3-way interaction ($F(8, 816) = 4.49, p < .01, p_{rep} = .99, \eta_p^2 = .04$). To unpack these re-

¹The content of the inter-consumption delay varied. For some participants, the computer simply displayed a “now loading” progress bar for the duration of the delay, whereas other participants completed challenging anagrams. Although not central to our thesis, we included this variation to see whether time is sufficient to reset adaptation (our contention), or if it is necessary for time to be coupled with distraction. Because responses to the dependant measures in the two spaced conditions did not differ in any meaningful way and for the sake of simplicity, we collapse across these conditions. All analyses that treat these conditions as independent yield no meaningful differences.

Figure 1: Enjoyment as a function of consumption rate and variety, Experiment 1. (Error bars represent standard errors.



sults, we followed up with a series of regressions—one for each participant—predicting enjoyment as a function of iteration. The resulting standardized betas provide an index of the change in enjoyment over the course of the consumption experience, with a positive beta indicating an increase in enjoyment and a negative beta indicating a decrease in enjoyment. Consistent with the retrospective evaluations, we found that enjoyment in the no-variety condition decreased at a faster rate when consumption was back-to-back than when consumption was spaced, $F(1,102) = 5.23, p < .05, p_{rep} = .95, \eta_p^2 = .05$. Indeed, follow-up t-tests against a null of zero revealed that although enjoyment decreased significantly and substantially in the back-to-back condition ($M_{beta} = -3.00$, one-sample $t(19) = 3.53, p < .01, p_{rep} = .99, d = 1.62$), this was not the case when consumption was spaced ($M_{beta} = -.58, t < 1, ns$). Importantly, this was not the case in the variety condition, as evidenced by a significant 2 (variety: no-variety, variety) x 2 (consumption rate: back-to-back, spaced) ANOVA interaction performed on these betas, $F(1, 102) = 10.33, p < .005, p_{rep} = .98, \eta_p^2 = .09$.

Across both retrospective and in-experience ratings of enjoyment we observed that variety was preferred when consumption was back to back, but repetition was preferred when consumption was spaced out.

3 Experiment 2

As already mentioned, prior work has found that people tend to choose greater variety when choosing for future consumption than when choosing for immediate con-

sumption. To the extent that this bias occurs at least in part because of “time contraction” (Read & Loewenstein, 1995), the results of Experiment 1 suggest a moderator. If people choose more variety in prospect than they do in the moment when the inter-consumption interval is large because they invoke a theory of satiation that only applies to short or non-existent inter-consumption intervals, then that tendency should decrease or disappear when the interval is in fact short. This also suggests that people are likely to be less satisfied with choices made in advance when the inter-consumption interval is long than when the inter-consumption interval is short.

Experiment 2 was designed to test these predictions. Participants were given a choice of several pieces of classical music to be listened to throughout the course of the experiment. Some made all of their choices simultaneously in advance, others sequentially one piece of music at a time. As well, for some participants the pieces were played back-to-back, while for others they were played with a 2-minute inter-consumption delay. We predicted that participants would tend to select a greater variety of music when choosing in advance than when choosing in the moment due to their incorrect belief that repetition would be aversive (consistent with the diversification bias and Read et al., 2001, Study 1 in particular), but that this bias would be attenuated in the back-to-back condition. As a result, we expected participants in the back-to-back condition to be happier with their advance choices than participants in the spaced condition.

3.1 Method

3.1.1 Subjects

Seventy undergraduate students (54 women, 16 men) enrolled at a large US university completed the Experiment in exchange for \$10. All instructions, manipulations, and dependent measures were administered via computer in groups of four to six.

3.1.2 Materials and procedures

Participants created a “playlist” of ten pieces of classical music (from a library of nine unique pieces) to listen to over the course of the Experiment. Some participants were informed that the pieces would be played consecutively without interruption (back-to-back condition), whereas others were informed that they would be played with a 2-minute delay between each iteration during which they would complete an unrelated filler task (spaced condition). The filler task simply served as a place holder to keep the participants occupied. After listening to short fragments of each piece of music in order to familiarize them with the choice set, participants in the

advance choice condition created their playlists at the beginning of the experiment, whereas participants in the on-line choice condition chose each piece sequentially (one at a time) before each trial. The design of the experiment was thus a 2 (choice: advance, on-line) x 2 (consumption rate: back-to-back, spaced) fully between-subject design.

After completing all of the trials participants indicated how much they enjoyed the songs that they just heard on a scale from -4 (*I did not enjoy them at all*) to $+4$ (*I enjoyed them a lot*). They were then debriefed and thanked.

3.2 Results and discussion

Our first question was whether participants would tend to choose a greater variety of music when choosing in advance than when choosing for the moment (the diversification bias), and whether that tendency would depend on the rate of consumption. We examined this question in a 2 (choice: advance, on-line) x 2 (consumption timing: back-to-back, spaced) ANOVA with the number of unique pieces chosen (from one to nine) as the dependent variable. As expected, in addition to a main effect of consumption timing (overall, participants chose greater variety in the back-to-back condition than in the spaced condition ($F(1, 65) = 11.94, p < .001, p_{rep} = .99, \eta_p^2 = .16$), we also observed a main effect of the choice condition ($F(1, 65) = 4.34, p < .05, p_{rep} = .93, \eta_p^2 = .06$). On average, participants chose more variety when choosing all 10 pieces simultaneously in advance ($M = 7.24$) than when choosing sequentially each piece one at a time ($M = 6.67$), a replication of the diversification bias. However, that tendency was qualified by a significant 2-way interaction ($F(1, 65) = 12.68, p < .001, p_{rep} = .99, \eta_p^2 = .16$). As Figure 2 shows, whereas participants showed a diversification bias when consumption was spaced ($F(1, 65) = 15.26, p < .005, p_{rep} = .99, \eta_p^2 = .19$), that bias disappeared when consumption was back-to-back ($F < 1$).

Did participants’ seeming insensitivity to the rate of consumption in their advance consumption choices translate into differences in their satisfaction with those choices? A 2 (choice: advance, on-line) x 2 (consumption timing: back-to-back, spaced) ANOVA performed on the enjoyment measure revealed only a significant interaction, suggesting that it did ($F(1, 65) = 4.26, p < .05, p_{rep} = .93, \eta_p^2 = .06$). As Figure 3 shows, participants who made their choices in advance were generally less satisfied with their playlist than those who made them in the moment ($F(1, 65) = 6.83, p < .05, p_{rep} = .97, \eta_p^2 = .09$)—but only when there was a delay between trials.

Figure 2: Variety seeking behavior as a function of consumption rate and choice condition, Experiment 2. (Error bars represent standard errors.

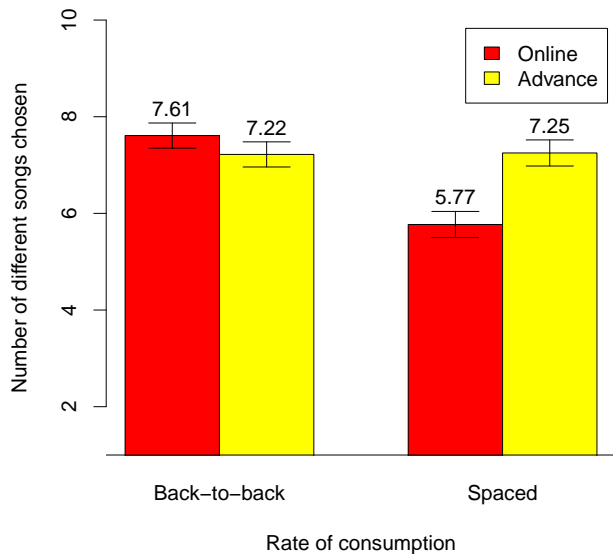
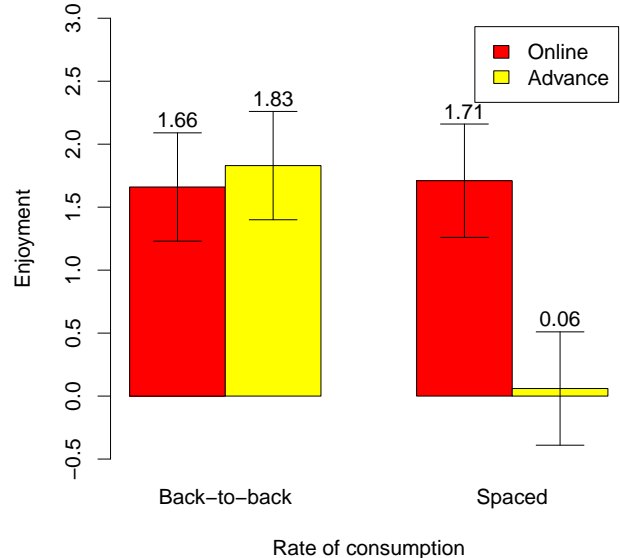


Figure 3: Enjoyment as a function of consumption rate and choice condition, Experiment 2. (Error bars represent standard errors.



4 Experiment 3

Experiment 3 had two goals. First, we sought to replicate the findings of Experiment 2 with a different hedonic stimulus, photographs. Second, we sought to investigate the relationship between the duration of the inter-consumption interval and its effect on preference for variety and subsequent enjoyment. Accordingly, we systematically varied the length of the inter-consumption interval from 0-seconds (back-to-back consumption) to 90-seconds, in 30-seconds increments. By doing so, we are able to assess whether the diversification bias manifests across a range of inter-consumption intervals and, the nature of this relationship. Though we do not have an a priori hypothesis as to whether the diversification bias will grow linearly as the inter-consumption interval increases, or whether there is a specific minimum amount of time required for the bias to manifest, this experiment serves as a first pass in understanding this relationship.

4.1 Method

4.1.1 Subjects

One hundred and fifty undergraduate students (91 women, 59 men) enrolled at a large US university completed the Experiment in exchange for partial course credit. Twelve participants (five in the on-line choice condition, and seven in the advance choice condition) took an excessively long amount of time to complete the experiment (more than 2.5 standard deviations above the mean completion time) suggesting that they did not com-

plete the experiment in one session, but rather left their computers at some point before completing the experiment. Accordingly, they were omitted from all analyses, resulting in usable data from 138 participants². All instructions, manipulations, and dependent measures were administered via computer and were completed via the Internet at the participants’ leisure.

4.1.2 Materials and procedures

Participants created a custom “slideshow” of 16 photographs (from a library of 12 unique beach photographs; see Appendix) to view over the course of the experiment. Some participants were informed that the photographs would be displayed consecutively without interruption (back-to-back condition), whereas others were informed that they would be displayed with either a 30, 60, or 90-second delay between each iteration during which they would complete an unrelated task. The task simply served as a place holder to keep the participants occupied. After briefly viewing each photograph to familiarize themselves with the choice set, participants in the advance choice condition created their slideshow at the beginning of the experiment, whereas participants in the on-line choice condition chose each photograph sequentially before each trial. The experiment was thus a 2 (choice: advance, on-line) x 4 (consumption rate: back-to-back, 30-seconds, 60-seconds, 90-seconds) fully between-subject design.

²Including all participants does not meaningfully change any of our conclusions.

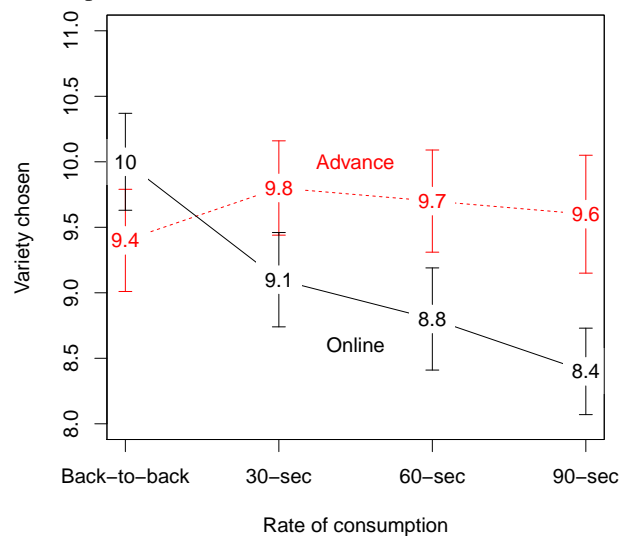
After completing all of the trials, participants indicated how much they enjoyed the photographs that they just saw on a scale from -4 (*I did not enjoy them at all*) to $+4$ (*I enjoyed them a lot*). They were then debriefed and thanked.

4.2 Results and Discussion

We first examine the amount of variety chosen as a function of choice setting and inter-consumption interval with a 2 (choice: advance, on-line) \times 4 (consumption timing: back-to-back, 30-seconds, 60-seconds, 90-seconds) between subjects ANOVA with the number of unique photographs chosen (from one to twelve) as the dependent variable. We observed a main effect of choice ($F(1, 130) = 4.74, p < .05, p_{rep} = .94, \eta_p^2 = .04$) such that participants who created their slideshow in advance chose more variety ($M = 9.63$) than those who chose which photograph to view immediately before it was displayed ($M = 9.06$). More importantly, we observed a marginal 2-way interaction ($F(3, 130) = 2.15, p = .098, p_{rep} = .88, \eta_p^2 = .05$). As can be seen in Figure 4, whereas participants who created their slideshow in advance chose the same amount of variety irrespective of the inter-consumption interval (all pair-wise comparisons, $t < 1$), participants who created their slideshow online one photograph at a time chose less variety as the inter-consumption interval increased in a linear fashion (*linear contrast*: $F(1, 71) = 2.92, p < .05$). Subsequent planned contrasts revealed that, whereas participants chose the same amount of variety regardless of the choice condition when the inter-consumption interval was back-to-back ($F(1, 130) = 1.11, p > .29, p_{rep} = .77, \eta_p^2 = .01$), they chose more variety when choosing in advance when the inter-consumption interval was either 30-seconds ($F(1, 130) = 2.14, p = .14, p_{rep} = .85, \eta_p^2 = .02$), 60-seconds ($F(1, 130) = 2.92, p = .09, p_{rep} = .88, \eta_p^2 = .02$), or 90-seconds ($F(1, 130) = 4.80, p < .05, p_{rep} = .94, \eta_p^2 = .04$). Taken together, these results demonstrate that, at least in this context, a very small inter-consumption interval is sufficient to cause the diversification bias. They further demonstrate that, like with the previous experiment, when there is no inter-consumption interval, the diversification bias disappears.

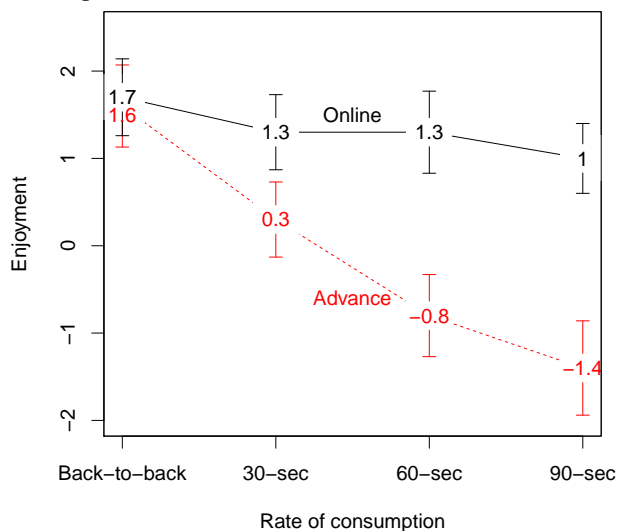
Next, we again ask: did participants' insensitivity to the rate of consumption in their advance consumption choices translate into differences in their satisfaction with those choices? A 2 (choice: advance, on-line) \times 4 (consumption timing: back-to-back, 30-seconds, 60-seconds, 90-seconds) between subjects ANOVA on the enjoyment measure revealed, first, a main effect of choice ($F(1, 130) = 18.47, p < .001, p_{rep} = .99, \eta_p^2 = .12$) such that participants choosing online ($M = 1.34$) enjoyed the photos more than those who created their slideshow in advance

Figure 4: Variety seeking behavior as a function of consumption rate and choice condition, Experiment 3. (Error bars represent standard errors.



($M = -.06$). Second, we observed a main effect of the inter-consumption interval ($F(3, 130) = 5.90, p < .001, p_{rep} = .99, \eta_p^2 = .12$) such that enjoyment decreased as the inter-consumption interval increased ($M_{back-to-back} = 1.67, M_{30} = .79, M_{60} = .28, M_{90} = -.19$). Finally, and most importantly, we observed a significant 2-way interaction ($F(3, 130) = 2.70, p < .05, p_{rep} = .92, \eta_p^2 = .06$). As can be seen in Figure 5, participants who created their slideshow in advance enjoyed the slideshow less than those who chose each photograph one at a time, a difference that was exacerbated by the inter-consumption interval (*linear contrast*: $F(1, 59) = 18.79, p < .001$). Subsequent planned contrast revealed that, whereas participants enjoyed the slideshow similarly regardless of the choice condition when the inter-consumption interval was back-to-back ($F < 1$), they enjoyed it more when choosing online when the inter-consumption interval was either 30-seconds ($F(1, 130) = 2.42, p = .12, p_{rep} = .86, \eta_p^2 = .02$), 60-seconds ($F(1, 130) = 9.67, p < .01, p_{rep} = .99, \eta_p^2 = .07$), or 90-seconds ($F(1, 130) = 13.38, p < .001, p_{rep} = .99, \eta_p^2 = .09$). Again, these results suggest that, when choosing in advance, participants fail to take into account the benefit of spaced consumption and their enjoyment suffers accordingly. Moreover, participants who chose their variety level immediately before viewing each photograph seem to be able to choose the optimal level of variety for any of the four inter-consumption intervals.

Figure 5: Variety seeking behavior as a function of consumption rate and choice condition, Experiment 3. (Error bars represent standard errors.



5 General discussion

Is variety of the spice of life? The present research suggests that the answer depends on the rate of consumption. In Experiment 1, we found that whereas a variety of songs was preferred to repetition of even a better-liked single song when consumption was continuous, that preference reversed when consumption was spaced with a delay of a mere 60 seconds. This was true whether the ratings were provided retrospectively or during the experience.

Importantly, we also found that the moderating influence of rate on preferences for (and satisfaction with) variety was underappreciated. In Experiment 2, participants chose a greater variety of songs when choosing for the future than their online preferences suggested was optimal (the “diversification bias”)—but only when consumption was spaced. Finally, in Experiment 3, participants chose the same variety of photographs to view when choosing in advance, regardless of whether they were viewing them back-to-back or with 30-, 60-, or 90-second inter-consumption intervals. In contrast, participants who chose which photograph to view immediately before viewing each photograph, chose less variety as the inter-consumption interval increased. Importantly, these choices translated into decreased enjoyment for participants choosing in advance as the inter-consumption interval increased, and optimal enjoyment for those choosing throughout the experience.

That said, it would be misleading to suggest that people are completely unaware of the impact of the rate of consumption influences satiation. Although participants in Experiments 2 and 3 seem to have underestimated

the role that an inter-consumption delay would have on their experience of satiation and preference for variety, note that the design of those experiments was between-subject. Although this was done partly to avoid the potential demand characteristic that a within-subject design might engender, it is likely that a study manipulating rate within-subject would have drawn greater attention to the impact of rate, in which case the interactions depicted in Figures 2, 4 and 5 could have been attenuated or even eliminated. Indeed, when Read and Loewenstein (1995) employed just such a salience manipulation, the diversification bias decreased. Thus, it appears that people are aware that rate influences both satiation and the benefits of variety, but tend to under-apply those intuitions when rate is not salient (see Wang, Novemsky, & Dhar, 2008 for a similar analysis of people’s failure to anticipate adaptation to consumer goods such as big screen TVs). However, although we can only offer speculation at this point, we would not be surprised if the intuitions people do have (whether they are or are not applied in a particular situation) underestimate the impact of time on satiation. For one thing, it should be noted that although Read and Loewenstein (1995) successfully reduced the diversification bias by drawing participants’ attention to the inter-consumption delay, they were unable to eradicate it completely.

We also do not mean to suggest that our results would extend to all situations and all stimuli. Although our focus has been on stimuli that tend to grow more aversive with repetition, this is not the only pattern associated with repetition. Work by Zajonc (1980) and others (Bornstein & D’Agostino 1992; Bornstein, Leone, & Galley 1987) on the “mere exposure effect” has shown that repetition can sometimes *increase* liking. As an example of this dichotomy within the same research, Kahneman and Snell (1992) found that, although repetition decreased liking of a liked song (as we replicated in Experiment 1), it increased liking of an initially disliked flavor of yogurt. Although the precise conditions that engender decreased liking (satiation) versus increased liking (sensitization) have long been debated (e.g., Berlyne 1970), we suspect that, whatever the direction, the rate of consumption is likely to moderate it. That is, just as a delay between consumption can decrease the experience of satiation, so too can a delay decrease the experience of sensitization. Future work would be necessary to test this speculation.

Similar to, and in fact in part due to, the likelihood that not all stimuli will lead to satiation, it is likely that not all stimuli will display a diversification bias. For instance, if a person consumes a product with some degree of regularity (i.e., habitual consumption), then he or she may never choose to diversify with respect to that product category and thus never succumb to the bias. As an example, imagine that a person who routinely has coffee for

breakfast is asked to decide whether to have coffee, tea, or juice on each of the next four Mondays. Given that this person has coffee for breakfast every day, it is unlikely that he or she will be interested in diversifying this well-established habit. Even if there is some satiation for coffee, in this situation the individual's taste for morning coffee, as well as the strength of his or her habit, can easily overwhelm any desire for variety. This exception to the diversification bias is likely in any situation where a very strong preference exists. Even when the stimulus is not habitually consumed, if a person prefers the stimulus substantially over all other alternatives, then that person is again unlikely to choose to diversify for the sake of avoiding satiation.

One unanswered question is just how much of an interval is necessary in order to slow satiation. We attempt to address this question with Experiment 3 by demonstrating that an inter-consumption interval as short as 30-seconds is sufficient to cause the diversification bias. However, there clearly must be a lower bound to this contention. That bound, though, is likely to be stimulus specific. In our experiments, 30 to 60 seconds seems to be enough to cause the diversification bias, but it is possible that for other, more involved stimuli, a greater inter-consumption interval may be necessary. Indeed, when Zandstra, de Graff and van Trijp (2000) gave pasta with curry meat sauce to a group of Dutch participants once a week for 10 weeks, they saw considerable evidence of satiation despite the fact that a full week had passed between each consumption instance. Accordingly, a much longer inter-consumption interval may be necessary to observe the diversification bias. That said, Experiment 3 seems to suggest that the relationship between the inter-consumption interval and the diversification bias is not dichotomous. Instead, regardless of the stimulus, Experiment 3 suggests that the larger the inter-consumption interval, the larger the size of the diversification bias.

Finally, and perhaps most importantly, our results have an implication for consumers. As already mentioned, prior work has shown that people who make advance choices tend to choose greater variety than they actually end up wanting (Read, Antonides, van den Ouden & Trienekens 2001; Read & Loewenstein 1995; Simonson 1990).³ The present research suggests a caveat. Although participants did tend to select too much variety when consumption was spaced, this tendency was reduced—indeed, eliminated altogether—when consumption was back-to-back. Although variety may be the spice of life, the present research suggests that breaks can make monotony a little sweeter.

³Ironically, people do not seem to remember it that way. Ratner, Kahn and Kahneman (1999) found that although participants in their studies enjoyed repetition of a preferred option over variety, participants' memories for those experiences suggested the opposite.

References

- Baumeister, R., & Vohs, K. D. (2003). Willpower, choice, and self-control. In G. Loewenstein, D. Read & R. Baumeister (Eds.), *Time and decision: Economic and psychological perspectives on intertemporal choice* (pp. 13–86). New York: Russell Sage Foundation Press.
- Berlyne, D. E. (1970). Novelty, complexity, and hedonic value. *Perception & Psychophysics*, *8*, 279–286.
- Bornstein, R. F., & D'Agostino, P. R. (1992). Stimulus recognition and the mere exposure effect. *Journal of Personality and Social Psychology*, *63*, 545–552.
- Bornstein, R. F., Leone, D. R., & Galley, D. J. (1987). The generalizability of subliminal mere exposure effects: Influence of stimuli perceived without awareness on social behavior. *Journal of Personality and Social Psychology*, *53*, 1070–1079.
- Gilbert, D. T., & Wilson, T. D. (2000). Miswanting: Some problems in the forecasting of future affective states. In J. P. Forgas (Ed.), *Thinking and Feeling: The Role of Affect in Social Cognition* (pp. 178–198). Cambridge: Cambridge University Press.
- Hardie, G. S., Johnson, E. J., & Fader, S. (1993). Modeling loss aversion and reference dependence effects on brand choice. *Marketing Science*, *12*, 378–394.
- Helson, H. (1947). Adaptation-level as frame of reference for prediction of psychophysical data. *American Journal of Psychology*, *60*, 1–29.
- Helson, H. (1964). *Adaptation-Level theory: An experimental and systematic approach to behavior*. New York: Harper & Row.
- Inman, J. J. (2001). The role of sensory-specific satiety in attribute-level variety seeking. *Journal of Consumer Research*, *28*, 105–120.
- Kahneman, D., & Snell, J. S. (1992). Predicting a changing taste: Do people know what they will like? *Journal of Behavioral Decision Making*, *5*, 187–200.
- Lattin, J. M., & McAlister, L. (1985). Using a variety-seeking model to identify substitute and complementary relationships among competing products. *Journal of Marketing Research*, *22*, 330–339.
- Mas-Colell, A., Whinston, M. D., & Green, J. R. (1995). *Microeconomic theory*. Oxford: Oxford University Press.
- McAlister, L. (1982). A dynamic attribute satiation model of variety-seeking behavior. *Journal of Consumer Research*, *9*, 141–150.
- McSweeney, F. K., & Swindell, S. (1999). General process theories of motivation revisited: The role of habituation. *Psychological Bulletin*, *125*, 437–457.
- Ratner, R. K., Kahn, B. E., & Kahneman, D. (1999). Choosing less-preferred experiences for the sake of variety. *Journal of Consumer Research*, *26*, 1–15.

Read, D., Antonides, G., van den Ouden, L., & Trienekens, H. (2001). Which is better: Simultaneous or sequential choice? *Organizational Behavior and Human Decision Processes*, 84, 54–70.

Read, D., & Loewenstein, G. (1995). Diversification bias: Explaining the discrepancy in variety seeking between combined and separated choices. *Journal of Experimental Psychology: Applied*, 1, 34–49.

Simonson, I. (1990). The effect of purchase quantity and timing on variety-seeking behavior. *Journal of Marketing Research*, 27, 150–162.

Wang, J., Novemsky, N., Dhar, R., & Simmons, J. (2008). Antecedents and consequences of consumer predictions of adaptation to products. Unpublished Manuscript: Yale University.

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, 9, 1–27.

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist*, 35, 151–175.

Zandstra, E. H., de Graaf, C., & Van Trijp, H. C. M. (2000). Effects of variety and repeated in-home consumption on product acceptance. *Appetite*, 35, 113–119.

Appendix: Photographs used in Experiment 3

