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Consumers are often able to choose how often to consume the things they enjoy. The research presented here suggests that consumers tend to consume too rapidly, growing tired of initially well-liked stimuli such as a favorite snack (Experiments 1 and 4) or an enjoyable video game (Experiments 2 and 3) more quickly than they would if they slowed consumption. The results also suggest that this because of an underestimation of the extent to which breaks reset adaptation. The results present a paradox: Participants who chose their own rate of consumption enjoyed the stimulus less than participants who had a slower rate of consumption chosen for them.

Individuals often face decisions about how often to consume the things they enjoy. A person might decide how rapidly to consume a delicious dessert, how often to listen to a favorite song, or how frequently to play an enjoyable video game. To be sure, physiology, time, and other external factors occasionally constrain one's ability to realize one's desired consumption schedule. But it is also the case that rate of consumption is something people often have the freedom to select for themselves. How well do people choose schedules of consumption that maximize satisfaction? From the perspective of optimal decision making, the answer is straightforward. People ought to choose the consumption schedule that maximizes their total enjoyment over time (perhaps with some allowance for time discounting). There are reasons to suspect, however, that people often deviate from this optimal pattern of behavior. Specifically, we propose, people are prone to consume things that they enjoy too rapidly, growing tired of initially well-liked stimuli more quickly than they would if they slowed consumption.

THE EXPERIENCE AND REDUCTION OF SATIATION

The notion that people satiate – i.e., grow tired of repeatedly experienced stimuli -- is uncontroversial (Coombs and Avrunin 1977). People tire of repeatedly eating the same food (Rolls, van Duijvenvoorde, and Rolls 1984), listening to the same song (Ratner, Kahn, and Kahneman 1999), and even socializing with the same close friend (Galak, Redden, and Kruger 2009). Generally speaking, enjoyable experiences become less so with repeated or prolonged exposure. To avoid confusion, we will refer to this decrement in enjoyment solely as satiation. Others have applied different terminology to explain the process such as adaptation (Frederick and Loewenstein 1999; Helson 1964; Nelson and Meyvis 2008) and habituation (Harris 1943;

Thompson and Spencer 1966), but the basic pattern of results is the same: repeated or prolonged exposure to a stimulus leads to decreases in enjoyment (though see Zajonc 1968 for an exception).

To the extent that a stimulus engenders satiation, recent literature has demonstrated that disruptions to consumption tend to slow this satiation. These disruptions can come in the form of a simple delay (McSweeney and Swindell 1999) or in the form of a distraction (Epstein et al. 1993). Generally though, the longer this delay, the slower the rate of satiation (Thompson and Spencer 1966). The most compelling demonstration of this deceleration of satiation comes from recent research on the enjoyment of continuous pleasant experiences such as music, massage, and television programs (Nelson and Meyvis 2008; Nelson, Meyvis and Galak, 2009). These authors find that disrupting such experiences, in some cases even with not-so-pleasant interludes (such as television advertisements), results in a more enjoyable overall experience. Though informative, these findings do not speak to either the choices that consumers make regarding consumption schedules (e.g. listening to a song repeatedly or eating multiple chocolate candies), nor do they speak to the consequences of those choices. That is, whereas past research focuses on whether consumers are aware that mere breaks help slow satiation, we ask if consumers are aware that the *duration* of those breaks is also influential. We build upon previous research by examining both consumers' intuitions about the impact of consumption timing on hedonic experiences and, more importantly, demonstrate the consequences of mis-calibration of such intuitions on both enjoyment of an experience and propensity to continue experiencing it.

UNFORESEEN SATIATION

Perhaps more surprising than the intuitive idea that spreading consumption over time reduces satiation, we ask whether consumers will actually do so when faced with a decision about the pace of their consumption. That is, given that a slower pace of consumption reduces satiation, will consumers choose to engage in such a behavior, or will they instead consume too quickly, resulting in what we term, unforeseen satiation? There are two primary reasons why consumers may choose inter-consumption intervals that are too short and succumb to unforeseen satiation: 1) a failure to regulate self-control, 2) incorrect or misapplied beliefs about the benefits of longer inter-consumption intervals.

First, with respect to self-control failures, there is an extensive literature documenting consumer's difficulty in delaying immediate gratification at the expense of greater, prolonged gratification in the future (Ainsle 1975; Baumeister, Heatherton, & Tice 1994; Read, Loewenstein, and Kalyanaraman 1999). That is, when faced with a decision between a positive experience right now (e.g. an unhealthy snack), consumers will often choose to indulge, even when doing so will cause harm in the future (e.g. negative health outcomes). In part this decision is driven by a tradeoff between two forces: desire and willpower (Hoch and Loewenstein 1991). The former moves the consumer to indulge now, while the latter moves the consumer to delay gratification for a greater payoff in the future. Indeed, it is exactly this type of tradeoff that has become prevalent in the inter-temporal choice literature (Loewenstein and Thaler 1989; Loewenstein and Elster 1992; Thaler and Shefrin 1981). In the context of unforeseen satiation, consumers who choose to consume too quickly, may be doing so because their desire to consume more rapidly overpowers the willpower necessary to slow consumption in order to enjoy the stimulus for a longer period of time. One can imagine a situation where a consumer is perfectly aware that lengthening the inter-consumption interval between, say, chocolates, may lead to

prolonged enjoyment of those chocolates over time (due to slower satiation), but may fail to do so because he or she lacks the willpower to make such a foresighted decision.

Second, rather than failing to exert sufficient willpower to thwart their immediate desires, consumers faced with deciding on an inter-consumption interval may either hold incorrect beliefs about the benefits of longer inter-consumption intervals or may fail to apply generally correct belief about the benefits of longer inter-consumption intervals to the decision at hand. With regard to the former, past researcher has shown that consumers have difficulty predicting either the presence or the direction of satiation (Gilbert, Pinel, Wilson, Blumberg, & Wheatley 1998; Kahneman & Snell, 1992; Loewenstein, O'Donoghue & Rabin 2003). Whether winning (or losing) the big game (Wilson, Wheatley, Meyers, Gilbert, & Axsom 2000), getting a desired (or undesired) result on an HIV test (Sieff, Dawes & Loewenstein 1999), or being awarded (or denied) tenure (Gilbert et al. 1998), people tend to underestimate the extent to which time ameliorates the influence of hedonic experiences. This is one reason people tend to choose more variety when choosing for future consumption than when choosing in the moment, a phenomenon known as the “diversification bias” (Galak, Kruger, and Loewenstein 2011; Read et al. 2001; Read & Loewenstein 1995; Simonson 1990). When shopping for a week’s supply of yogurt, for example, people tend to choose a variety of flavors, but when choosing for the moment they are more likely to stick with their favorite. This occurs in part because people assume that they will get sick of their favorite, which, although true if consumed one right after the other, is unlikely when consumed only once every day or so. People seem to under appreciate, in other words, the extent to which an inter-consumption delay will reset one’s initial preference to their pre-adaptation levels and, in doing so, reduce satiation (Galak et al. 2011; Read and Loewenstein 1995; Read et al. 2001).

This is also the case with breaks in continuous pleasurable experiences (Nelson and Meyvis 2008, Nelson, Meyvis, and Galak 2009). Though the mere presence of a break (e.g. a television commercial) in a positive experience (e.g. a television show) helps reset satiation, consumers fail to appreciate this. The reason for this failure, however, is less clear. Nelson and Meyvis (2008) propose that the reason that consumers fail to appreciate the benefits of breaks in positive hedonic experiences is twofold. First, consistent with the literature described above, because consumers fail to accurately predict the direction and the magnitude of satiation, it follows that they will see no reason to attempt to reduce it, with a break or otherwise. Second, when faced with the specific decision about including a break in a positive experience, consumers apply a heuristic that says "stopping a good experience is bad" (Nelson and Meyvis 2008, p 655). In other words, consumers apply an incorrect belief that positive experiences should be experienced continuously and apply this belief, to their detriment, when faced with a decision about whether or not to include a break in a positive experience. More generally, in the case of simple breaks, consumers may hold an incorrect belief, rather than a correct one that they fail to apply. With respect to unforeseen satiation, it may also be the case that consumers lack the knowledge that longer inter-consumption intervals lead to slower rates of satiation. Specifically, whereas research has demonstrated that long inter-consumption intervals lead to slower rates of satiation (Thompson and Spencer 1966), it may be that consumers, in general, lack this appreciation.

In contrast, consumers may be fully aware that longer inter-consumption intervals lead to slower satiation, but fail to apply that general knowledge to specific decisions about inter-consumption timing. Indeed, it appears that, at least sometimes, for satiation, this is exactly the case (Wang, Novemsky and Dhar 2009). When asked, in general, whether enjoyment would

decrease, increase, or stay the same for a variety of consumer products, participants in one experiment, universally believed that enjoyment would decrease with time (Wang et al. 2009, Pilot Study). That is, they held the correct belief that satiation would occur. However, when a separate group of participants were asked to specifically predict their level of happiness with one of the same consumer products over the course of either one day or one week, they did not anticipate a significant drop in enjoyment over time, even though satiation did occur for another group of participants who actually interacted with the product over the same time period (Wang et al. 2009). This is similar to the distinction made by Kahneman and Tversky (1979) regarding "inside" and "outside" perspectives. With respect to unforeseen satiation, it may be the case that consumers are well aware, in general, that the longer the inter-consumption interval, the slower is the rate of satiation, but fail to apply that general knowledge when faced with a specific decision about how to space consumption. When asked to think about the benefits of longer inter-consumption intervals in an abstract manner, people may take an "outside" perspective and consider similar situations where longer intervals were beneficial. However, when actually tasked with making the decision about how quickly to consume a stimulus, they take an "inside" perspective and think only of the situation at hand, failing to realize that other instances where they spaced consumption made their experience more enjoyable. Said otherwise, if this is the mechanism that drives unforeseen satiation, people may fail to appreciate that the lessons learned from other, similar situations (those that are considered in an "outside" perspective), apply to the current one.

With regards to unforeseen satiation, a priori, it is impossible to know if consumers either hold incorrect beliefs or rather fail to apply correct ones. Indeed, the two literatures cited above seem to contradict one another. On the one hand, people underappreciated the presence of

satiation (Gilbert et al. 1998; Nelson and Meyvis 2008; Nelson, Meyvis, and Galak 2009) and on the other, they appreciate its presence but fail to apply that appreciation when needed (Wang et al. 2009). Though this contradiction is not one that we plan to directly address in this paper, it is necessary for us to understand which of these two mechanisms underlies unforeseen satiation. Specifically, is it the case that consumers consume too quickly because they fail to appreciate that longer inter-consumption intervals are beneficial or because they do appreciate this fact, but fail to apply it to the decision at hand. We contend, and our data will show that it is the former. However, it would be unreasonable to assume that consumers never appreciate the benefits of longer inter-consumption intervals. Indeed, simple introspection tells us that there is a clear difference between consuming, say, a favorite song several times once per minute as compared to once per week. Though, it is far less clear if listening to a favorite song several once every minute will be much different than listening to it once every, say, five minutes. That is, whereas consumers may be well aware that *much* slower consumption rates slow satiation, they may be unaware that only modestly slower consumption rates do the same.

To address this question, we conducted a pilot study where we asked 100 participants from an online panel to imagine eight different consumption scenarios and predict how their enjoyment of the described situation would evolve over time. Specifically, we asked participants to pick a favorite candy bar (e.g. Hershey Bar, 3 Musketeers) from a set of six popular candy bars. We then asked them to imagine that they would consume six bite sized versions of that candy bar with various inter-consumption intervals and indicate how they thought that their enjoyment of the candy bar would evolve over those six consumption instances on a 5-point scale labeled with (1) “I would enjoy them much less over time”, (2) “I would enjoy them slightly less over time”, (3), “I would enjoy them the same over time”, (4) “I would enjoy them

slightly more over time", and (5) "I would enjoy them much more over time." They did this for eight different inter-consumption intervals: back-to-back, 1 minute, 2 minutes, 5 minutes, 10 minutes, 60 minutes, 1 day, and 1 week. The order of presentation was randomized across participants allowing us to assess participants' intuitions about the effects of these various inter-consumption intervals on enjoyment. As can be seen in Table 1, for the shorter time periods (back-to-back, 1 minute, 2 minutes, 5 minutes, and 10 minutes) participants were, more or less, insensitive to the benefits of longer inter-consumption intervals. That is, they believe that they would experience the same level of satiation whether they ate the candy bar every minute or every 10 minutes, even though, we contend and will show, eating at the slower pace would lead to considerably less satiation. However, once the intervals became sufficiently long enough (60 minutes, 1 day, and 1 week), participants realized that satiation would be slowed down. That is, participants *did* appreciate that eating the candy bar every minute would lead to more satiation than eating it every day.

At least with respect to unforeseen satiation, it appears that consumers hold incorrect beliefs when the inter-consumption interval is relatively short, but correct ones when they are sufficiently long. For this paper, we only focus on the former and show that when inter-consumption intervals are relatively short, consumers do not appreciate the benefits of longer intervals and instead choose to consume too quickly, resulting in unforeseen satiation. We leave the investigation of unforeseen satiation with respect to longer inter-consumption intervals to future research. In those cases, if unforeseen satiation is observed, then it may be that it is multi-determined: when the intervals are short, consumers do not appreciate the benefits of longer inter-consumption intervals, but when they are long, they do appreciate the benefits, but fail to

apply that knowledge to the situation at hand. This, of course, is merely speculative and will need to be investigated more thoroughly in the future.

Contributions

This paper contributes to the consumer behavior literature in a number of substantive ways. First, we provide the first test of consumer's knowledge of the effects of inter-consumption intervals on satiation. Though, as aforementioned, there has been some research investigating consumer's knowledge of the effects of *breaks* on satiation (Nelson and Meyvis 2008, Nelson et al. 2009), our research goes a step further and asks: given that breaks are present, do consumers appreciate that longer inter-consumption intervals decrease satiation and thus increase enjoyment, at least for relatively short time periods. That is, in all of our Experiments, we observe that consumers do choose to take breaks from consumption, but we ask whether they take breaks that are sufficiently long enough to minimize the effects of satiation.

Second, we test three competing hypotheses that explain *why* consumers choose inter-consumption intervals that are too short. Specifically, we test whether consumers choose to consume too quickly because of a failure to regulate self-control, an inability to apply correct general beliefs about the benefits of longer of inter-consumption intervals, or lack correct beliefs about the ameliorating effects of time on satiation. Consistent with the pilot study described above, for relatively short inter-consumption intervals, we find that the primary reason is the final one, incorrect beliefs about the effects of inter-consumption intervals on satiation.

Finally, we ask the question of whether consumers learn from the decisions that they make regarding inter-consumption intervals. That is, once consumers either experience a drop in

enjoyment due to overly fast consumption or a prolonged positive experience due to slower consumption, will they learn that the length of inter-consumption intervals plays a role in shaping enjoyment over time. Unfortunately, we find that they do not. Regardless of whether they made poor decisions about the pace of consumption, where they could learn that consuming quickly was detrimental, or they were forced into a situation where their pace was slowed down, where they could learn that consuming slowly was advantageous, given a second chance to determine consumption speed, participants chose to consume too quickly.

EXPERIMENT 1A AND 1B

Experiments 1A and 1B were designed as initial demonstrations of unforeseen satiation. In both Experiments, participants were either asked to choose a rate of consumption of a candy that would maximize their enjoyment of it or were forced to consume at a pre-specified rate that maximized the inter-consumption interval based on the constraints of the experimental design. We predict that participants will choose an inter-consumption interval that is considerably faster than what would be optimal given the goal of maximizing the enjoyment of the candy. In Experiment 1A, we force participants to consume all of the candies and measure enjoyment. This allows us to determine the effect of their choice of rate of consumption on enjoyment of the candies. We predict that, compared to participants whose rate of consumption is spaced out maximally, participants who choose their own rate of consumption will not only choose to consume too quickly, but will also satiate more quickly and thus enjoy the candies less. In Experiment 1B, we allow participants to choose how many candies to consume, allowing us to determine the effect of their choices of rate of consumption on the quantity of candies consumed.

We predict that, compared to participants whose rate of consumption is spaced out maximally, participants who choose their own rate of consumption will not only choose to consume too quickly, but will also satiate more quickly and thus choose to consume fewer candies.

Experiment 1A

Method. Forty-five students (31 females; Average Age = 19.9) enrolled in an introductory marketing course at a large US university completed the experiment in exchange for partial course credit. Participants were told that, because of time constraints they would be participating in two experiments simultaneously: a “Video Study” and “Chocolate Taste Test.” The "Video Study" involved watching a 20-minute compilation of Bugs Bunny cartoons, served to keep participants occupied while they consumed the chocolates and informed them of the total allowable consumption time. Additionally, participants were correctly informed that, regardless of when they finished consuming the Hershey Kisses, they would still be required to watch the entire video. This was done to ensure that participants did not choose to consume quickly in order to complete their participation requirement sooner.

Participants were then randomly assigned to one of two conditions. Participants in the *forced rate* condition were told that the computer would prompt them when they were to eat each of six Hershey Kisses, which occurred at the maximum possible uniform inter-consumption interval of 200 seconds. Participants in the *self-paced* condition determined their own inter-consumption interval of the six candies on a sliding scale from 10 to 200 seconds with the instruction to “maximize your overall enjoyment of the Hershey Kisses”. As a first pass at minimizing the effects of self-control failures on the decision of how quickly to consume, this

decision occurred before the experiment took place and thus before the act of consumption or presentation of tempting stimuli.

Participants rated their enjoyment of the chocolates in two ways: on-line, following each consumption period on a scale from 1 (*I hated them*) to 9 (*I loved them*), and retrospectively, at the end of the entire experience (on the same 9-point scale).

Results and Discussion. Participants consumed the chocolates not only faster in the *self-paced* condition than in the *forced rate* condition, but over twice as fast (93.1 vs. 200.0 seconds, respectively). This was true despite the fact that all participants were told the duration of the film and knew that they would watch the film in its entirety. Thus, although participants did space consumption, they did not do so as much as they could have.

Nor did they appear to space consumption as much as they should have. Turning first to the single overall measure of enjoyment taken at the end of the experiment, participants in the *forced rate* condition enjoyed the candies more than participants in the *self-paced* condition (M = 6.96 vs. M = 5.77; $t(43) = 2.79$, $p < .01$, $d = .85$). Interestingly, we also observed a positive correlation between consumption time and enjoyment in the *self-paced* condition. That is, the longer participants took to consume the chocolates, the more they enjoyed them ($r = .41$, $p = .056$). This was true despite the fact that, all else equal, one might expect a negative correlation between consumption time and enjoyment in light of the fact that individuals especially fond of chocolate might be more likely to eat them rapidly.

Turning next to the online measures of enjoyment, which we analyzed with a 2 (rate: *self-paced*, *forced rate*) x 6 (Iteration) mixed-model ANOVA, three effects are evident. First, consistent with prior research (Coombs and Avrunin 1977), there was a main effect of iteration,

such that enjoyment tended to decrease with repetition ($F(5, 215) = 19.92$, $p < .001$, $\eta_p^2 = .32$). Second, there was a main effect of rate, such that, on average, participants enjoyed the chocolates more in the *forced delay* condition than in the *self-paced* condition ($M = 6.96$ vs. $M = 5.77$; $F(1, 43) = 4.87$, $p < .05$, $\eta_p^2 = .10$). Finally, and most important, we observed a significant 2-way interaction ($F(5, 215) = 6.31$, $p < .001$, $\eta_p^2 = .13$). To unpack these results, we computed a slope of enjoyment over time for each participant. As predicted, and as can be seen in Figure 1, thought participants in the *forced rate* condition experienced some satiation (*average-β* = -.16; one-sample t-test against 0: $t(22) = -2.88$, $p < .01$), participants in the self-paced condition experienced considerably more (*average-β* = -.55; one-sample t-test against 0: $t(21) = -5.73$, $p < .001$; paired-sample t-test: $t(43) = 3.63$, $p < .001$).

These results are a first demonstration of unforeseen satiation. Specifically, when given free reign over how quickly to consume, participants consume too quickly, and do so to their detriment. As aforementioned, one reason for the decision to consume too quickly may be self-control failure (Hoch and Loewenstein 1991). Indeed, that is precisely why we asked participants to choose their inter-consumption interval prior to being exposed to the stimulus: to avoid the visceral nature of the temptation placed in front of them. However, it is possible that even though participants were not exposed to the stimulus at the time of their decision, they anticipated a failure to regulate their self-control and thus chose accordingly (Herman and Polivy 2004; Raghubir and Srivastava 2009). We address this possibility in two ways. First, we recruited 42 new participants (33 females) who completed a partial replication of this study. All participants set their own consumption schedule as in the self-paced condition of the main study, except that we manipulated whether or not participants believed that the study would actually take place or was merely hypothetical (and that no chocolates would actually be consumed). If the choice of

consumption schedule in this Experiment is due to a failure of self-control, then one would expect participants to consume more rapidly if they thought they were actually going to eat the chocolates than if they did not. This was not the case, Ms = 107.55 vs. 102.55 seconds, respectively ($t(40) < 1$, *ns*). Second, it is still possible that when making a hypothetical decision, self-control failures could arise (e.g. Wilcox, Block, and Eisenstein, 2011). As such, Experiments 2, 3 and 4, among other things, more directly attempt to rule out such concerns by measuring chronic self-control tendencies and showing that they are uncorrelated with the decisions that participants make regarding inter-consumption intervals.

Experiment 1B

Experiment 1B was a conceptual replication of the previous experiment with one critical difference: instead of examining the role of unforeseen satiation on enjoyment, we examined its role on perhaps the more practically important question of the amount consumers choose to consume. It stands to reason that if people fail to foresee the benefit that slowing consumption will have on their enjoyment of the stimuli, they may also fail to foresee the benefit of slowing consumption on their choice to repeat the experience. Specifically, if participants' enjoyment decreases more quickly when they are free to choose their own rate of consumption, then we should expect them to elect to consume less of a stimulus than those participants whose consumption speed is chosen for them to be slower and thus whose enjoyment does not decrease as rapidly.

Method. One hundred participants (55 women; Average Age = 19.3) enrolled in an introductory marketing course at a large US university completed the experiment in exchange for partial course credit. The procedure was identical to that of Experiment 1 except that participants were informed (after they made their inter-consumption interval decision for participants in the *self-paced* condition) that they could decide how many chocolates to consume. They were told that each time they were prompted, they would first indicate if they wished to eat the chocolate or stop consuming chocolates for the remainder of the study. They were also correctly told that, regardless of how many chocolates they chose to eat, they would watch the remainder of the video. Like in Experiment 1A, this was done to ensure that participants would not have any incentive to stop eating chocolates in the false hopes of finishing the experiment early. Once participants were informed of these instructions they consumed the chocolates with either the inter-consumption interval that they set for themselves or with the maximal uniform inter-consumption interval (200 sec.). If participants indicated that they did not wish to continue eating the chocolates, they were instructed to place the remainder of the chocolates to the side of their desks and to continue watching the video.

Results and Discussion. Consistent with the previous Experiment, participants in the *self-paced* condition chose to consume the chocolates approximately twice as quickly as those in the *forced rate* condition (110 vs. 200 sec.). Once again, this was true despite the fact that all participants were told the duration of the film. Thus, as in the previous Experiment, although participants in the *self-paced* condition did space consumption, they did not do so as much as they could have.

Next we turn to the primary measure of interest: the number of chocolates consumed. If, as Experiment 1A demonstrates, enjoyment decreases more rapidly in the *self*-paced condition

than in the *forced rate* condition due to faster consumption, then we would expect participants in the former condition to stop consuming sooner than those in the latter condition. Indeed, this is exactly what we observed. Participants who consumed at their own pace ate fewer chocolates than participants whose rate of consumption was chosen for them. This is true whether we consider the median (3 vs. 4; *Mann-Whitney U* = 986.50, $Z = 1.99$, $p < .05$) or the mean (3.46 vs. 4.24; $t(99) = 2.17$, $p < .05$, $d = .42$) number of chocolates consumed. Also, consistent with the previous Experiment, we observed that for participants in the *self-paced* condition, the greater they set their inter-consumption interval the more chocolates they consumed ($r = .46$, $p < .001$).

As in the previous Experiment, we collected measures of enjoyment both in-experience and retrospectively. Consistent with the previous experiment and our hypothesis, we observed that participants in the *self-paced* condition retrospectively enjoyed the chocolates less than participants in the *forced rate* condition ($M = 6.08$ vs. 6.90; $t(99) = 2.22$, $p < .05$, $d = .43$). This was true despite the fact that unlike in the previous Experiment, participants in the self-paced condition were not only free to select the optimal rate of consumption, but the optimal quantity as well. However, this result should be interpreted with caution in light of the fact that participants in the *self-paced* condition also ate fewer chocolates. As such, this result could either be attributed to a decrease in enjoyment due to unforeseen satiation, consumption of fewer chocolates, or both. We suspect that it is both. Finally, a similar analysis on the slopes of the in-experience measures of enjoyment revealed that, consistent with the previous experiment, enjoyment decreased marginally faster when participants chose their own consumption speed ($M_{\beta\ Self\text{-}Paced} = -.38$, $M_{\beta\ Forced\ Rate} = -0.09$; $t(83) = 1.64$, $p = .11$, $d = .36$). However, like before, these results should be interpreted with caution due to the variability in the number of chocolates consumed by participants in either condition.

EXPERIMENT 2

Having initially demonstrated unforeseen satiation, we next attempt to explain it. As discussed in the introduction, there are three primary reasons for why consumers may choose to consume too quickly. First, they may simply lack the self-control to do otherwise. Though we begin to rule out this explanation in Experiments 1A and 1B, it is still plausible. Accordingly, in the present Experiment (and in the subsequent two Experiments) we include a measure of trait self-control (Tangney, Baumeister and Boone, 2004). If self-control failure is what causes consumers to choose to consume too quickly, then we would expect consumers who are particularly good (bad) at exerting self control to choose to consume more slowly (quickly). That is, we would expect a positive correlation between trait self-control and the inter-consumption interval chosen. However, in absence of such a correlation, self-control failure becomes a less likely mechanism to explain unforeseen satiation.

Second, it still may ebe the case that participants are well aware of the benefits of spaced consumption in general, but simply fail to apply this general knowledge to specific decisions (Wang et al., 2009). If this is the case then making salient the fact that the inter-consumption interval in a specific context has an impact on satiation should remind consumers of these general benefits and allow them to apply that knowledge to the situation at hand. Accordingly, in this Experiment we ask some participants to predict their enjoyment of the upcoming stimuli if they were to consume them very quickly, at a moderate pace, or at a slow pace before they make the decision regarding how quickly to consume. This procedure allows us to both directly assess the intuitions that consumers have about the effect of spacing on satiation and enjoyment and

indirectly assess the effect of highlighting the inter-consumption intervals relationship with enjoyment on their subsequent decision about the inter-consumption interval. If consumers simply fail to apply a general belief about the benefits of longer inter-consumption intervals on satiation, then we should, first, observe that they hold this belief when asked to predict the enjoyment associated with various rates of consumption, and second, observe that merely asking them to make these predictions should lead them to choose to consume more slowly. However, if we fail to observe this, we are more likely to conclude that unforeseen satiation manifests due to the third explanation: consumers lack general knowledge about the effects of spacing on satiation and enjoyment.

In addition to being able to better understanding the underlying psychological mechanism that drives unforeseen satiation, the current Experiment differs from the previous Experiments in three substantive ways. First, we extend our findings to a non-food hedonic stimulus: video games. Specifically, we designed a simple, but enjoyable, video game that participants play across a number of "rounds." The decision they make is about the inter-exposure interval between these rounds. Second, one problem with the previous Experiments is that the candies were consumed while a potentially distracting video was being played in the background. Though this was done intentionally to fix the total length of the experiment, it is possible that the video distracted participants from the candies, causing shifts in the rate at which people satiated. (Epstein et al. 1993). Accordingly, in this Experiment, instead of having participants play the video game while watching a video (a task that is also methodologically intractable), participants completed a simple filler task in between rounds of the video game, thus avoiding any possible distractions. Finally, an interesting question is whether consumers can learn about the benefits of spaced consumption when they either make a "bad" decision or when a "good" decision is made

for them. To test this question, we contacted participants several days after they completed the Experiment asking them to imagine that they were about to complete the same Experiment again and to pick an inter-consumption interval that would maximize their enjoyment of the video game. If participants learned from their past experience, we would expect to see slower inter-consumption intervals.

Method

Part 1 .One hundred and twelve participants (61 females; Average Age = 26.7) from the online panel, Amazon Mechanical Turks, completed the study in exchange for $0.50. There was a problem with the computer program for three of the participants and their data were not recorded. Accordingly, we were left with 109 usable participants. Participants were informed that the main portion of the study would take exactly 12 minutes to complete. They were then all told that during that period of time they would play six rounds (45-seconds each) of a simple video game that involved moving a ball (using the arrow keys on their keyboard) around a constrained playing area to collect coins. For every coin they collected, participants received one point. If participants touched the walls of the playing space, the ball was placed back at the starting location and they lost a point (for a demonstration of the game, see: http://consumerbehaviorlab.com/lab/labdemo/gamedemo.html). This game was pretested to ensure that it was considered fun for participants. In between rounds (and for any remaining time left after completing all 6 rounds, but prior to the completion of 12 minutes), participants were informed that they would complete a simple clicking task where they would click a button as it appeared (the button appeared every 8 seconds in the same location on the screen).

Next, approximately half of the participants were randomly assigned to the *interval salient* condition. They were asked to make three predictions: how much they would enjoy the upcoming game (1 = Not at all Enjoyable, 9 = Very Enjoyable) if it were played with no inter-exposure interval, 45-second intervals, and 90-second intervals (the maximum possible). They made these predictions on separate screens and with visual aids to help them understand what the experience they were making a prediction about would be like. The other half of the participants were randomly assigned to the *interval not salient* condition and made no such predictions.

Orthogonal to the *interval salience* manipulation, participants were randomly assigned to either the *forced delay* or the *self-paced* conditions. Much like in Experiments 1A and 1B, participants in the *self-paced* condition were asked to "indicate how much time you would like to have in between each round of the game keeping in mind that your goal is to maximize your enjoyment of the game" on a slider scale anchored with 10-seconds and 90-seconds (the maximum possible inter-round interval). Participants in the *forced delay* condition made no such choice and their inter-round interval was set to 90-seconds.

Participants then went on to experience the next 12 minutes as either they elected to (*self-paced* condition) or we selected for them (*forced delay* condition). For example, if a participant in the *self-paced* condition chose an inter-exposure interval of 30-seconds, he or she would play round 1 of the game for 45-seconds, complete the simple clicking task for 30-seconds, complete round 2 of the game again for 45-seconds, again complete the simple clicking task for 30-seconds, and so on. Because, for this hypothetical participant, there is time remaining after the completion of the sixth round (720-seconds – 6 rounds @ 45-seconds – 5 inter-round intervals at 30-seconds = 300-seconds), the participant would then complete the clicking task for the remainder of the time. Following each round of play, participants indicated how much they

enjoyed playing that particular round (1 = I Hated It, 9 = I Loved It). Finally, following the entire 12 minute experience, participants indicated how much they enjoyed playing the game in general on the same 9-point scale. Participants were not informed of any follow up studies.

Part 2. Approximately three days after completing Part 1, participants received an email asking them to complete a short follow up study in exchange for $0.15. During the study, participants were reminded of the 12-minute experience that they previously had (but not the inter-exposure interval) and asked to imagine that they would again have the same type of experience (45-second rounds of the game with the clicking task in between rounds). In the same way that participants in the self-paced condition during Part 1 picked their presumed optimal inter-exposure interval, *all* participants in Part 2 did the same for this upcoming hypothetical 12-minute experience. Finally participants completed a short form version of the self-control scale created by Tangney, Baumeister and Boone (2004).

Results

Part 1. We first see if participants appreciate the benefits of longer inter-round intervals. A one-way within subjects ANOVA on the predictions made by the participants in the *interval salient* condition yielded a marginal main effect ($F(2, 102) = 2.60$, $p = .08$) suggesting that participants did have some intuition about the influence of longer inter-round intervals. However, those intuitions were exactly opposite of what past research and Experiments 1A and 1B suggest are actually true. Specifically, participants predicted that enjoyment of the game would *decrease*

with longer inter-round intervals ($M_{Back\text{-}to\text{-}Back}$ = 4.46, $M_{45\text{-}second\ interval}$ = 4.59, $M_{90\text{-}second\ interval}$ = 3.89; only the comparison between the 45-second and the 90-second interval was statistically significant, $t(51) = 2.82$, $p < .01$). These results suggest that consumers not only lack a general appreciation for the benefits of spaced consumption, but may even have the opposite, and incorrect, intuitions.

Next, we turn to the inter-exposure intervals set by participants in the *self-paced* conditions. We find that making the inter-exposure intervals salient had no effect on the chosen rate of exposure ($M_{Salient}$ = 26.2, $M_{Not\ Salient}$ = 30.75; $t(37) = .60$, *ns*), again suggesting that even when the relevance of the inter-exposure interval was made salient, participants did not chose a slower pace of consumption. We do, however, again observe that the average inter-exposure interval was considerably faster than the optimal interval set for participants in the *forced delay* condition (29.0 vs. 90.0 seconds).

We now turn to the enjoyment ratings of the game itself. A 2 (interval salience: *salient, not salient*) x 2 (rate: *self-paced, forced delay*) ANOVA on retrospective enjoyment revealed only a main effect of rate ($F(1, 105) = 5.52$, $p < .05$) such that those participants who chose their own rate of exposure enjoyed the experience less than those whose rate was set by us (*Ms* = 4.18 vs. 5.29). This same pattern was observed in the in-experience ratings of enjoyment. A 2 (interval salience: *salient, not salient*; between) x 2 (rate: *self paced, forced delay*; between) x 6 (round; within) mixed ANOVA on in-experience ratings of enjoyment revealed a main effect of *round* ($F(5, 525) = 2.26$, $p < .05$) such that enjoyment decreased with time, a marginal main effect of *rate* ($F(1, 525) = 3.41$, $p = .07$) such that, overall, participants enjoyed the experience less when they chose their own rate of exposure as compared to when we picked it for them (Ms = 4.25 vs. 4.91), and, most importantly, a 2-way interaction between *rate* and *round* ($F(5, 525) =$

6.25, $p < .001$). As can be seen in Figure 2, whereas enjoyment remained, more or less, constant for participants whose rate of exposure was determined by us, it decreased for those who set their own rate. We confirm that the enjoyment ratings of those in the self paced condition decreased by computing slopes for each participant. We then conduct a 2 (interval salience: *salient, not salient*) x 2 (rate: *self-paced, forced delay*) ANOVA on these slopes and find only a main effect of rate ($F(1, 105) = 8.75$, $p < 0.001$), such that enjoyment for participants in the self paced condition decreased considerably faster than for those in the forced delay condition (*Ms* = -.20 vs .03). Indeed, participants in the *forced delay* condition experienced no satiation (*average-*β = .03; one-sample t-test against 0: $t(69) = .07$, *ns*) while those in the self-paced condition did (*average-*β = -.20; one-sample t-test against 0: $t(39) = -4.18$, $p < .01$).

Finally, we again observe that for participants in the *self paced* condition, those who chose a longer interval time, also enjoyed the experience more ($r = .56$, $p < .001$).

Part 2. Of the 109 participants who completed Part 1, 58 completed Part 2. On average, participants completed Part 2 five days following Part 1 (Minimum = 3 days, Maximum = 7 days). Of importance, those participants in the self-paced condition who chose to complete Part 2, did not choose a different inter-exposure rate during Part 1 as compared to those participants who did not choose to complete Part 2 ($t < 1$). However, not surprisingly, participants who chose to participate in Part 2, did enjoy the video game from Part 1 marginally more than those who chose not to participate ($M_{Participate\ in\ Part\ 2} = 5.22$, $M_{Did\ Not\ Participate\ In\ Part\ 2} = 4.59$, $t(107) = 1.39$, $p = .17$). Accordingly, any results from the subsequent analyses should be interpreted with a bit of caution as it is possible that the sample represented in Part 2 is not truly representative of the entire sample collected during Part 1.

Did participants learn that longer inter-exposure rates led to higher levels of enjoyment? In short, no they did not. Overall, participants chose an inter-exposure rate that was faster than even the one chosen by participants in the self-paced condition during Part 1 (*Ms* = 18.9 vs. 29.0). Interestingly, this was true regardless of whether participants had chosen their own rate of consumption during Part 1 ($M_{Part\ 2}$ = 18.3) or had their rate chosen for them by us ($M_{Part\ 2}$ = 19.53; $t < 1$, *ns*). It appears that participants who chose their rate of exposure in Part 1, did not appreciate that the reason for their decreasing enjoyment over time was due to the rate of consumption, and participants whose rate was determined by us did not appreciate that the reason that their enjoyment did *not* decrease over time was due to the longer inter-exposure interval.

Finally, one possible explanation for why participants in the self-paced condition chose such a short inter-consumption interval during Part 1 is that they lacked the self-control to select a longer one. If this were the case then we would expect that participants who have a particularly low ability to regulate self control would choose to consume the fastest. A correlation between the trait self-control measure collected during Part 2 and the chosen inter-exposure interval by the participants in the self-paced condition in Part 1 revealed that this was not the case (r = -.02, p = .93).

EXPERIMENT 3

The results of the previous Experiments suggests unforeseen satiation manifests because consumers do not appreciate the benefits of spaced consumption and not because of self control failures or inability to apply a general understanding of the benefits of spaced consumption to a

specific decision about rate of consumption. However, in all of these Experiments participants whose enjoyment decreased with time not only consumed too quickly, but also *chose* to consume too quickly. That is, it is unclear if the reason for decreased enjoyment is due to the rate itself or the act of choosing that rate. As such, this Experiment was designed to rule out this possible alternative explanation. Specifically, in this Experiment we employed a pseudo-yoked design where, for some participants, the rate at which they consume was determined by randomly sampling from the rates chosen by participants in Experiment 2. In this way, we can compare the enjoyment of the video game independently as a function of choice and as a function of the rate of consumption. If we find that the participants whose rate is yoked to the rates chosen by participants in the previous Experiment experience the same decrement in enjoyment as those who choose the rate themselves, then this alternative explanation becomes suspect.

Method

Eighty six participants (41 females: Average Age = 27.4) from the online panel, Amazon Mechanical Turks, completed the study in exchange for in $0.50. There was a problem with the computer program for two of the participants and their data were not recoded. Accordingly, we were left with 84 usable participants. The procedure for this Experiment was nearly identical to that of Experiment 2, with three notable differences. First, we did not manipulate the salience of the inter-exposure interval and so no participants indicated their expected enjoyment of the 12 minute experience. Second, in addition to the *forced rate* and *self-paced* conditions, we now included a new condition (*yoked-rate*) where we yoked the inter-exposure intervals chosen by participants from Experiment 2 with the inter-exposure intervals in this Experiment. That is, if a

participant was in the *yoked* condition, he or she had the exact same experience as a participant in the *forced rate* condition except that the inter-exposure interval was not maximized (90 seconds) but was rather determined by selecting, at random, without-replacement, an inter-exposure interval time selected by a participant in the *self-paced* condition in Experiment 2. In this way, we were able to ensure that the distribution of inter-exposure intervals for participants in this *yoked-rate* condition perfectly matched the distribution we had previously observed. Third, using the same self-control scale used in Experiment 2, we now collected measures of self-control immediately after the Experiment concluded, allowing us to assess the relationship between trait self-control and the chosen inter-exposure interval for all participants. Other than these differences, the procedure was identical to that of Experiment 2.

Results

We first confirm that the participants in the *self-paced* condition chose a similar inter-exposure rate to those in the *yoked-rate* condition. They did ($M_{self\text{-}paced}$ = 31.26 seconds; $M_{yoked\text{-}rate}$ = 31.73 seconds; $t(39) = .06$, *ns*). Again, these inter-exposure intervals were considerably faster than those that we chose for participants in the *forced rate* condition (90 seconds). As aforementioned, one possible explanation for why participants in the self-paced condition chose such a short inter-consumption interval is that they lacked the self-control to select a longer one. If this were the case then we would expect that participants who had a particularly high failure to regulate self control would choose to consume the fastest. A correlation between the trait self-control measure and the chosen inter-exposure interval by the participants in the self-paced condition revealed that this was, again, not the case ($r = .35$, *ns*).

We now turn to the enjoyment ratings of the game itself. A one-way (rate: *forced rate, self paced, yoked-rate*) ANOVA on retrospective enjoyment revealed a main effect ($F(2, 81) = 6.01$, $p < .01$) such that participants in the *forced rate* condition ($M = 5.02$) enjoyed the experience more than participants in either the *self-paced* condition ($M = 3.53$; $F(1, 81) = 7.40$, $p < .01$) or the *yoked-rate* condition ($M = 3.50$; $F(1, 81) = 8.46$, $p < .01$).

Like with the previous experiment, a similar pattern was observed in the in-experience ratings of enjoyment. A 3 (rate: *self paced, forced delay, yoked-rate*; between) x 6 (round; within) mixed ANOVA on in-experience ratings of enjoyment revealed a main effect of *round* ($F(5, 405) = 4.51$, $p < .01$) such that enjoyment decreased with time, and, importantly, a marginal 2-way interaction between *rate* and *round* ($F(5, 405) = 1.43$, $p = .16$). As can be seen in Figure 3, whereas enjoyment remained more or less constant for participants whose rate of exposure was determined by us, it decreased for those who set their own rate. We confirm that the enjoyment ratings of those in the self paced condition decreased by computing slopes for each participant. We then conduct a one-way ANOVA (rate: *self paced, forced delay, yoked-rate*) on these slopes and observed a main effect ($F(2, 81) = 3.12$, $p < .05$), such that enjoyment for participants in the *forced rate* condition decreased slower ($M_{slope} = -.01$) than for those in either the *self-paced* condition ($M_{slope} = -.19$; $F(1, 81) = 3.07$, $p = .08$) or the *yoked-rate* condition ($M_{slope} = -.23$; $F(1, 81) = 5.07$, $p < .05$). Indeed, participants in the *forced delay* condition experienced no satiation (*average-*$\beta = -.01$; one-sample t-test against 0: $t(42) = -.20$, *ns*) while those in the *self-paced* condition (*average-*$\beta = -.19$; one-sample t-test against 0: $t(18) = -2.34$, $p < .05$) and the yoked condition (*average-*$\beta = -.23$; one-sample t-test against 0: $t(21) = -2.86$, $p < .01$) did.

These results suggest that the act of *choosing* the rate of consumption is not what drives the decrease in enjoyment, but rather the act of *choosing a fast rate* is.

Finally, consistent with the previous Experiments, for both participants in the *self-paced* ($r = .59$, $p < .01$) and the *yoked-rate* ($r = .66$, $p < .001$) condition, those who experienced a longer interval time, also enjoyed the experience more.

EXPERIMENT 4

In all of our previous Experiments, the outcome of interest has been the enjoyment of the stimulus itself. Though this is the most relevant outcome in the study of satiation, it ignores other dimensions of enjoyment that varied across the different conditions in our previous Experiments: enjoyment of the concurrent experience and enjoyment associated with being able to make a choice (Langer and Rodin, 1976). For instance, it is possible that enjoyment of the videos in Experiments 1A and 1B and the filler task in Experiments 2 and 3 was affected by the different rates of consumption resulting from our manipulations. Likewise, it is possible that across all Experiments, the mere act of making a choice may be have been enjoyable in and of itself. When considering enjoyment of the entire experience, then, it is important to appreciate that these dimensions differed as well. Though we never set out to address these questions, we did measure both the enjoyment of the concurrent task and the enjoyment associated with the rate of consumption for all of the previous Experiments. Across all Experiments, enjoyment of the concurrent task did not differ as a function of conditions (all ps > .15), but enjoyment associated with the rate of consumption as measured on a 9-point scale anchored with 1 (Not at all happy) and 9 (Very happy) did. Though the difference was only directional in Experiments 1A ($M_{Self\ Paced} = 6.18$, $M_{Forced\ Rate} = 5.17$, $t(43) = .92$, $p = .36$) and 1B ($M_{Self\ Paced} = 6.08$, $M_{Forced\ Rate} = 5.45$,

$t(101) = 1.42$, $p = .16$), it was statistically significant in Experiments 2 ($M_{Self\ Paced} = 5.51$, $M_{Forced\ Rate} = 3.14$, $t(107) = 5.13$, $p < .001$) and 3 ($M_{Self\ Paced} = 5.05$, $M_{Forced\ Rate} = 2.95$, $M_{Yoked\ Rate} = 3.73$, $F(2, 81) = 5.36$, $p < .01$; independent sample t-test comparing the self-paced condition with the pooled values of the other two conditions: $t(82) = 3.01$, $p < .01$). When combined in a meta-analytic manner (Rosnow & Rosenthal 2007) we observe a reliable effect ($Z = 4.9$, $p < .001$). These results suggest that whereas the enjoyment of the concurrent experience is unaffected by our manipulation, the enjoyment associated with the rate of consumption very much is. Moreover, these results suggest that the benefits of spaced consumption may, at least somewhat, be offset by the loss of enjoyment associated with the mere act of making a decision about the rate of consumption. Accordingly, the present Experiment sought to identify an optimal context for consumers making such inter-consumption interval decisions, one where they can experience the benefits of spaced consumption and the benefits associated with making a decision about consumption timing. We accomplish this by adding a condition where we allow participants to choose a rate of consumption, but within a very constrained range of options that force them to choose a relatively slow rate. In this way, they will have made a choice (though one that is not all that substantive) and will still consume slowly. We predict that this new condition will not only yield more enjoyment of the target stimulus as compared to when consumers are free to choose any rate they like, but will also lead to more enjoyment of the overall experience when consumers are merely forced to experience a slow rate of consumption.

Method

96 participants (38 female, 57 Male, 1 Unknown; Average Age = 28.5) were recruited off the street and asked to participate in a Food Tasting Study involving M&Ms in exchange for $5. Eleven participants (distributed approximately evenly across conditions) refused to eat all of the M&Ms and were thus excluded from further analyses, resulting in usable data from 85 participants.

Participants were informed that they would be involved in a "10 minute experience" during which they would eat six sets of five M&Ms. They were further informed that in between the sets of M&Ms they would complete a simple clicking task (the same one used in Experiments 2 and 3) and that if they finished eating all of the M&Ms before the 10 minutes were up, they would be required to complete the simple clicking task for the remainder of the time. Next, participants were randomly assigned to one of three conditions. Participants in the *free choice (*analogous to previous *self-paced* conditions) and *constrained choice* conditions were asked to choose an inter-consumption interval that would maximize their enjoyment of the M&Ms. Participants in the *free choice* condition made this choice on a scale ranging from 10 seconds to 100 seconds, and participants in the *constrained choice* condition made this choice on a scale ranging from 80 seconds to 100 seconds, thus forcing them to choose a rate that was relatively slow. Participants in the *forced rate* condition made no such choice and their inter-consumption rate was fixed at the maximum possible time of 100 seconds (allowing, given 10 minutes of total time, on average, about 17-seconds to consume each set of M&Ms, an amount of time pre-determined to be sufficient to consume the M&Ms).

Next, participants were presented with a container that was divided into six equal compartments containing five M&Ms each. The compartments were labeled one through six and participants were instructed to only eat the M&Ms when the compartment number was indicated

by the program. Participants then ate the sets of M&Ms, one at a time, at either the chosen inter-consumption interval (*free choice* and *constrained choice* conditions) or at the pre-determined inter-consumption interval (100 seconds; *forced rate* condition). Following each set of M&Ms, participants indicated how much they enjoyed eating them (1 = I Hated Them, 9 = I Loved Them). Once the 10 minute period had concluded, participants indicated how much they enjoyed eating all of the M&Ms (1 = I Hated Them, 9 = I Loved Them), how happy they were with the rate at which they consumed the M&Ms (1 = Not at all happy, 9 = Very Happy), and how much they enjoyed the entire 10 minute experience (1 = I Hated It, 9 = I Loved It) and completed the same trait self-control scale used in Experiments 2 and 3. Finally, as in Experiment 2, participants were asked to imagine that they would re-experience the same experiment again and asked to pick an inter-consumption interval that would maximize their enjoyment on the same scale used by participants in the *free choice* condition (10 seconds to 100 seconds).

Results

We first examine the inter-consumption interval chosen by participants in the two *choice* conditions. Not surprisingly, participants in the *free choice* (M = 44.83) condition chose to consume faster than participants in the *constrained choice* (M = 85.00) condition ($t(54) = 7.22$, $p < .001$). However, of note, participants in the *free choice* condition chose to consume more than twice as fast as those in the *forced rate* condition, while those in the *constrained choice* condition chose to consume (because they were constrained to do so) only slightly faster than those in the *forced rate* condition. Again, one possible explanation for why participants chose such a short inter-consumption interval is that they lacked the self-control to select a longer one.

If this were the case then we would expect that participants who have a particularly low ability to regulate self control would choose to consume the fastest. A correlation between the trait self-control measure and the chosen inter-exposure interval by the participants in the choice conditions revealed that this was not the case (r = -.03, *ns*).

Next, we turn to the retrospective measures of enjoyment of the M&Ms. A one-way ANOVA (rate: *free choice, constrained choice, forced rate*) on this measure of enjoyment revealed a main effect ($F(2, 82) = 3.31$, $p < .05$). Planned comparisons revealed that participants in the *free choice* condition ($M = 5.41$) enjoyed the M&Ms less than either those in the constrained choice condition ($M = 6.3$*;* $F(1, 82) = 6.20$, $p < .05$) or whose in the *forced rate* condition ($M = 6.72$*;* $F(1, 82) = 3.19$, $p = .08$). This same pattern of results was observed in the in-experience measures of enjoyment of the M&Ms. A 3 (rate: *free choice, constrained choice, forced rate;* between subjects) x 6 (iteration; within subjects) mixed ANOVA revealed only a 2-way interaction *(*$F(10, 410) = 2.38$, $p < .01$). As can be seen in Figure 4, whereas enjoyment of the M&Ms stayed relatively flat for participants in the *forced rate* and *constrained choice* conditions, it decreased significantly for those in the *free choice* condition. We confirmed that the enjoyment ratings of the M&Ms of those in the *free choice* condition decreased relative to those in the other two conditions by computing slopes for each participant. We then conducted a one-way ANOVA (rate: *free choice, constrained choice, forced rate*) on these slopes and found a significant main effect ($F(2, 82) = 4.68$, $p < 0.05$), such that enjoyment for participants in the *free choice* (M = -.18) condition decreased considerably faster than for those in either the *constrained choice* condition (M = .06; $F(1, 82) = 9.04$, $p < .01$)) or the *forced rate* condition (M = -.03; $F(1, 82) = 3.89$, $p = .05$). Of note, there was no difference in the slope of enjoyment across the *constrained choice* and the *forced rate* conditions ($F(1, 82) = 1.14$, *ns*). Indeed,

participants in the *forced delay* condition (*average-β* = -.03; one-sample t-test against 0: $t(28) = -.45$, *ns*) and participants in the *constrained choice* condition (*average-β* = .06; one-sample t-test against 0: $t(26) = 1.12$, *ns*) experienced no satiation while those in the *free choice-paced* condition (*average-β* = -.18; one-sample t-test against 0: $t(29) = -3.10$, $p < .01$) did.

As with all the previous experiments, we also observe a strong positive correlation between the inter-consumption interval and retrospective enjoyment ($r = .68$, $p < .01$) for participants in the *free choice* condition suggesting that the longer the interval that participants chose, the more they enjoyed the candies. However, we observed no such correlation for participants in the *constrained choice* condition ($r = .19$, *ns*). This is likely due to the fact that the range of possible inter-consumption intervals was limited.

In addition to the primary dependent measures related to enjoyment of the M&Ms, we also included a measure asking participants to indicate how happy they were with the rate at which they consumed the candies. We observed that despite the fact that participants in the *constrained choice* and *forced rate* conditions enjoyed the M&Ms the most, a one way ANOVA ($F(2, 82) = 3.32$, $p < .05$) revealed that, compared to participants in the *forced rate* condition ($M = 4.72$), participants in the *free choice* ($M = 6.00$; $F(1, 82) = 5.86$, $p < .05$) and *constrained choice* ($M = 5.78$; $F(1, 82) = 3.85$, $p = .05$) conditions were happier with the rate at which they consumed. This suggests that there may be more than one input to overall enjoyment of an experience. In this case, at least two components are salient: the enjoyment of the M&Ms and the enjoyment associated with choosing a rate to consume at. If so, then we would expect that enjoyment of the entire 10 minute experience may be highest when participants not only have a longer inter-consumption interval, resulting in greater enjoyment of the M&Ms, but also when they are allowed to choose that interval themselves. Accordingly, a one-way ANOVA on

participants enjoyment of the entire 10 minute experience ($F(2, 82) = 4.73$, $p < .05$) revealed that participants in the free choice condition ($M = 4.76$; those whose enjoyment of the M&Ms was lowest) still enjoyed the overall experience the least as compared to participants in either the constrained choice ($M = 6.37$; $F(1, 82) = 9.46$, $p < .01$) or, directionally, the forced rate ($M = 5.55$; $F(1, 82) = 2.38$, $p = .13$) conditions. However, though only directional, it appears that participants in the constrained choice condition (those who both chose an inter-consumption interval and, due to the constraint, enjoyed the M&Ms for a longer period of time) enjoyed the overall experience more than participants in the forced rate condition ($F(1, 82) = 2.44$, $p = .12$; those who did not have the benefit of actually making a choice). This result suggests that the best consumption experience is one where consumers not only experience a longer inter-consumption interval, but one where they choose that interval themselves.

However, as has been observed in all of the previous Experiments, when consumers are given relatively free reign over what inter-consumption interval to set, they choose to consume too quickly. Like with Experiment 2, we can now ask is if consumers are able to learn from the mistakes of their bad choices or from the benefits of the choices imposed on them by the situation. To test this question, we conducted a one-way ANOVA on the new interval that participants said they would set if they were to re-experience the experiment again. Unfortunately for consumers, we found no effects of any kind ($Fs < 1$). Regardless of the experience that participants just had, they all indicated that they would consume roughly at the same rate in the future ($M = 44.32$ seconds). This suggests that participants in the *free choice* condition who consumed too quickly believed that consuming more slowly would not be beneficial and participants in the *constrained choice* and *forced rate* conditions did not appreciate that the longer inter-consumption interval was the reason for their prolonged

enjoyment of the M&Ms. Indeed, it seems that the lesson learned from Experiment 2 applies here as well: even when the inter-consumption interval is made salient for consumers, they do not appreciate that longer intervals lead to greater enjoyment.

GENERAL DISCUSSION

The consequences of unforeseen satiation can be seen all around us. The music lover who sets a favorite album on "repeat" only to find it less and less enjoyable each time it plays. The chocolate aficionado who eats one too many chocolates and discovers that the richness of the cocoa begins to lose some of its appeal. And perhaps even the inseparable lovers who insist on sharing every moment together—only to wonder later whether a little absence might have made the heart grow a little fonder.

The present research documents and partially explains this phenomenon. Across four experiments participants consumed a well-liked food or played an enjoyable video game either at their own pace or at a longer pace dictated by the experimenter. In all cases, although participants left to their own devices did tend to space consumption, they did so less than their online and retrospective evaluations suggested was optimal, at least from a hedonistic perspective. Specifically, in Experiments 1A and 1B, participants who chose their own consumption schedule enjoyed the stimulus less (1A) and, because of this, ate fewer chocolates (1B) than those who had a longer inter-consumption interval chosen for them. In Experiment 2, participants chose to play rounds an enjoyable video too quickly, resulting in more satiation than when their rate of consumption was slowed down by the us. Moreover, this was true regardless

of whether participants were first asked to predict what effect various inter-consumption intervals would have on their enjoyment of the video game, suggesting that consumers' beliefs about the effects of inter-consumption intervals on satiation are faulty. Next, in Experiment 3, we show that the effect of faster consumption on satiation is driven by the rate itself and not by the act of *choosing* that rate. Finally, in Experiment 4, we show that enjoyment of the overall consumption experience, at least in our Experiments, is driven not only by the enjoyment of the focal stimulus, but also by the act of making a decision about consumption. Specifically, when participants are given the ability to choose a rate of consumption, that that decision is constrained to force them to consume slowly, they enjoy the overall experience more than participants who either choose their rate of consumption in an unconstrained manner, or those whose rate of consumption is chosen for them.

The fact that excessive consumption is partly attributable to under-appreciation of satiation does not mean that lack of self-control does not also often play a role. There is no shortage of studies that attest to the powerful influence of appetites on people's ability to restrain consumption (e.g., Wertenbroch 1998), and there is little doubt that excessive consumption resulting from lack of self-control also leads to unforeseen satiation. However, our results also suggest that this phenomenon is more than a mere failure of self-control. Participants tended to select sub-optimally short inter-consumption even though those choices were made prior to the act of consumption and before any tempting stimuli were presented (Experiments 1, 2, 3, and 4) and when the consumption was merely hypothetical (1A, follow up study). Moreover, participants who lacked self-control, in general, chose to consume no faster than those whose ability to regulate self-control was quite strong (Experiment 2, 3 and 4). Taken together, these

results suggest that consumers did not choose to consume too quickly because of self-control or self-regulation failures. (Baumeister, Heatherton & Tice 1994; Polivy & Herman, 2002).

Nor could participants' choices be attributed to failures to apply generally correct beliefs about the benefits of longer inter-consumption intervals. When asked whether longer inter-consumption intervals would lead to slower satiation, participants reported believing the exact opposite: longer inter-consumption intervals would lead to *faster* satiation (Study 2). Moreover, though they were reminded to consider the inter-consumption interval in a consequential decision, they still failed to do so. Taken together, these results suggest that consumers lack the knowledge that longer inter-consumption intervals slow satiation. Though, as we discussed in the Introduction, this lack of knowledge is likely limited to situations where the inter-consumption interval is relatively short.

As such, the phenomenon, unforeseen satiation, can be seen as example of “melioration” described by Herrnstein and Prelec (1991). Melioration refers to the tendency, when choosing between alternatives, to ignore the effects of a current choice on the value of options one will face in the future. By consuming a stimulus now (rather than later), people ignore the influence that choice will have on future enjoyment of that stimulus, and by extension, the value of future alternatives.

In all of our Experiments, the focal stimuli were, by design, enjoyable. An interesting line question involves consumers’ decisions about consumption timing for *aversive* stimuli. For instance, would consumers choose to consume these types of stimuli too slowly, and fail to benefit from the sensitization that occurs with rapid exposure to negative stimuli? Or, would consumers treat these stimuli just like they do positive stimuli and choose to consume quickly, thus sensitizing more rapidly? Future research will have to answer these questions.

Our results are particularly relevant for marketing managers. Given that consumers are ill adept at optimizing their consumption schedule, firms can easily help them and thus make their product more appealing. For example, a firm selling a product intended for repeated consumption could easily partition the individual components in order to reduce consumption speed (Cheema and Soman 2008). We argue that to the extent that such partitioning is successful in reducing the speed of consumption, it is also likely to increase enjoyment of the overall consumption experience. For example, a cookie company could either package their product in a single container holding, say, 20 cookies or in five individually wrapped containers of four. The latter may not only slow consumption, but it might make it more enjoyable as well. Of course, this also presents a problem when we consider unhealthy goods. If partitioning, or any other mechanism designed to slow consumption, is employed with, say, candies, as Experiments 1B demonstrates, this would lead to *more* consumption. Though enjoyment would be increased, a possible negative side effect could also be gluttony. Indeed, this may be exactly what is happening with 100-calorie packs that have become popular in the United States (Horovitz, 2006; Myers, 2006, Scott et al. 2008). Whereas businesses appear to be quite successfully selling smaller portion sizes of their products (Thompson 2006), there may be a perverse effect: people may eat *more*. Indeed, Scott and colleagues (2008) found just this. Though they argue that the reason for greater consumption is due to self-control failures, our research suggests that it may also be due to the fact that smaller packages slow consumption. That slower consumption rate may result in slower satiation and more overall consumption.

Finally, these findings raise the obvious question of why, given the ubiquitous nature of satiation, people do not learn that longer inter-consumption intervals would be optimal. In Experiments 2 and 4, participants failed to update their beliefs about the benefits of longer inter-

consumption intervals when tasked with making a similar decision about consumption timing. Those participants who chose to consume too quickly, failed to realize that the speed decline in their enjoyment of the stimulus was a result of the speedy rate at which they consumed. And those participants whose rate was chosen for them to be slower, failed to realize that the lack of decline in their enjoyment of the stimulus was a result of the slower rate at which they consumed. It seems, then, that regardless of whether participants were allowed to make their own mistakes, or had their mistakes remedied by us, they still chose to consume too quickly again in the future. Though the exact reason for this failure to learn is left to future research, we suspect that a primary reason is the multi-determined nature of enjoyment. As we show in Experiment 4, enjoyment of the focal stimulus is only one component to overall enjoyment. When consumers are tasked with evaluating why a particular experience was or was not enjoyable, they have a number of different dimensions that led to that enjoyment. It appears that in the case of inter-consumption intervals, when consumers make this type of evaluation, they do not appreciate that consumption timing was a relevant determinant to their enjoyment.

Regardless of the cause, the present research suggests a clear prescription. When in the fortunate position of being able to chose how often to consume the things one enjoys, space out consumption. As Figures 1-4 suggest, not only will the consumption experience last longer, but it will be more enjoyable as well.

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Table 1

Pilot Study: Predicted Change in Enjoyment Over Time*

Inter-Consumption Interval	Average Response**	Significantly Different From Mid-point of Scale at .05 Level
Back-to-Back	2.56 $(0.13)_a$	Yes; Below
1 minute	2.63 $(0.11)_{ab}$	Yes; Below
2 minutes	2.68 $(0.10)_{ab}$	Yes; Below
5 minutes	2.62 $(0.10)_a$	Yes; Below
10 minutes	2.81 $(0.11)_b$	Yes; Below
60 minutes	3.02 $(0.10)_c$	No
1 day	3.16 $(0.11)_c$	No
1 week	3.36 $(0.13)_d$	Yes; Above

*1 = I will enjoy them much less over time, 2 = I will enjoy them slightly less over time, 3 = I will enjoy them the same over time, 4 = I will enjoy them slightly more over time, 5= I will enjoy them much more over time

**Values in parentheses represent standard errors. Values that do not share the same subscript are different from one another at the .05 level of significance.

FIGURE 1

Experiment 1A: Enjoyment of the Hershey Kisses over time by rate.

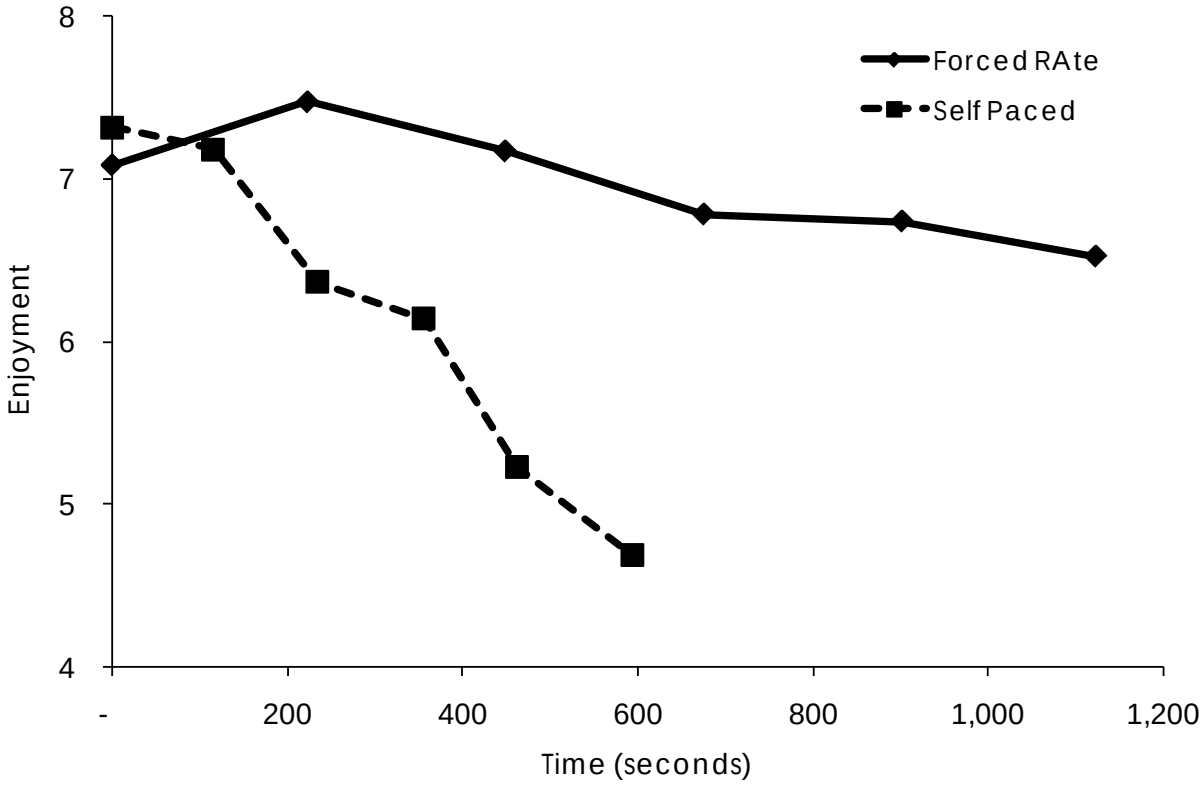

FIGURE 2

Experiment 2: Enjoyment of the video game over time by rate.

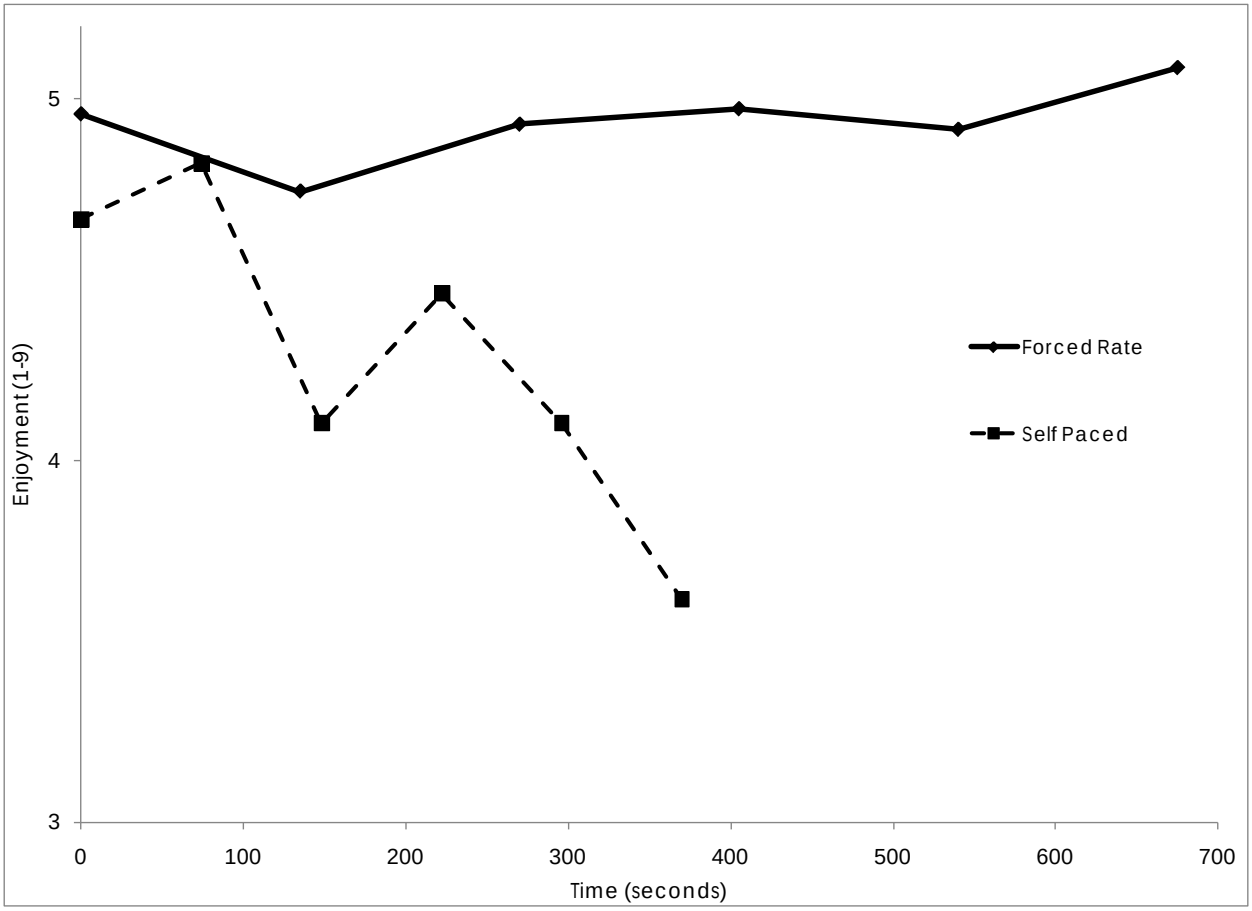

FIGURE 3:

Experiment 3: Enjoyment of the video game over time by rate.

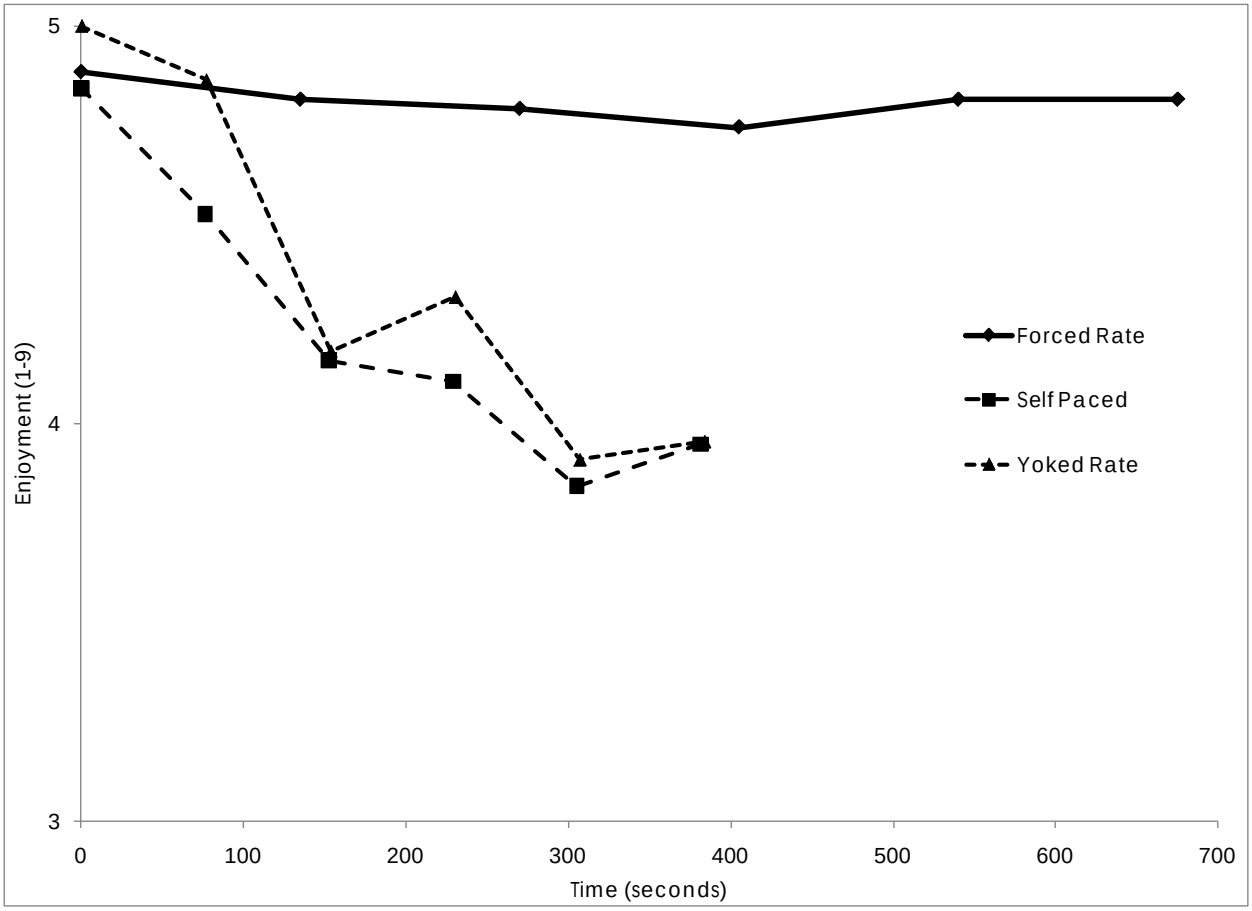

FIGURE 4

Experiment 4: Enjoyment of the M&MS over time by inter-consumption interval condition.