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Mispredicting the Hedonic Benefits of Segregated Gains

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The hedonic benefit of a gain (e.g., receiving $100) may be increased by segregating it into smaller units that are distributed over time (e.g., receiving $50 on each of 2 days). However, if these units are too small (e.g., receiving 1¢ on each of 10,000 days), they may fall beneath the person's *hedonic limen* and have no hedonic benefit at all. Do people know where their limens lie? In 6 experiments, participants predicted that the hedonic benefit of a large gain would be increased by segregating it into smaller units, and they were right; but participants also predicted that the hedonic benefit of a small gain would be increased by segregating it into smaller units, and they were wrong. Segregation of small gains decreased rather than increased hedonic benefit. These experiments suggest that people may underestimate the value of the hedonic limen and thus may oversegregate small gains.

Keywords: affective forecasting, diminishing marginal utility, happiness, judgment, decision making

> It's not money that brings happiness. It's lots of money.
>
> —Russian proverb

Is it wise to get married on Valentine's Day, or should different romantic occasions be assigned to different pages of the calendar? Are picnics and concerts more enjoyable when they are experienced together or several weeks apart? Is a doubleheader better than a pair of Sundays at the ballpark? Is the joy of having twins greater than the joy of having two children at different times?

Most people have one answer to all of these questions: Positive experiences—otherwise known as *gains*—should be segregated, or distributed over time. Research shows that people prefer to win a $25 lottery and then later to win a $50 lottery than to win a single $75 lottery (Thaler, 1985, 1999; Thaler & Johnson, 1990), and the same is true for nonmonetary experiences such as academic successes and the exchange of social pleasantries (Linville & Fischer, 1991). Why do people prefer to segregate their gains? *Diminishing marginal utility* refers to the fact that each unit increase in the magnitude of a gain that is consumed at a single point in time increases the hedonic impact of that gain by a smaller amount than did the previous unit increase. In other words, eating two cookies at the same time is not twice as good as eating one, eating four is not twice as good as eating two, and so on. Because the first X% of a gain accounts for more than X% of its hedonic benefit, one can offset diminishing marginal utility by segregating a gain into a series of smaller gains (Kahneman, 1999; Kahneman & Tversky, 1979; Mellers, 2000; Thaler, 1999).[1] Eating two cookies on different days may, in fact, be twice as good as eating one, and it is almost certainly better than eating two together. This property of utility functions is also a property of psychophysical functions (for a review, see Frederick & Loewenstein, 1999). For example, people may detect a one-unit increase in the brightness of a light or the loudness of a tone when the initial magnitude of visual or auditory stimulation is low, but not when it is high (Fechner, 1860/1966; Fernandez & Turk, 1992; E. H. Weber, 1846/1965).

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[1] Specifically, if the hedonic impact of gain G is V, and the hedonic impact of subsequent gain G′ is V′ < V, then the hedonic benefit of aggregated gain G + G′ = V + V′, whereas the combined hedonic benefit of segregated gains G and G′ = 2V > V+V′.

Hedonic and sensory stimuli may share a second property. A well-established feature of sensation is that a person's ability to detect a stimulus typically falls to zero before the magnitude of the stimulus falls to zero. In other words, sensory stimuli have a *limen*—that is, a detection threshold with a magnitude greater than zero—below which they have no impact on experience. Like sensory stimuli, hedonic stimuli may also have a limen. Just as the magnitude of a tone must exceed a certain threshold to be detected, the magnitude of a gain may need to exceed a certain threshold to be enjoyed. The most suggestive evidence for this possibility is the *peanuts effect* (Prelec & Loewenstein, 1991; B. J. Weber & Chapman, 2005). Studies show that people are generally risk averse in the domain of gains and hence prefer a guarantee of $1,000 to a 10% chance of winning $10,000. However, this effect reverses when gains are small, and most people prefer a 10% chance of winning $10 to a guarantee of $1. This finding is consistent with Markowitz's (1952) suggestion that the utility function has a slight kink at very small values, and it is also consistent with the notion of a hedonic limen, as shown in Figure 1. One reason why people may prefer the possibility of $10 to the guarantee of $1 is that they may recognize that such small gains fall beneath their hedonic limens and hence will have no hedonic benefit.

People may know that they have hedonic limens, but do they know where these limens lie? Research suggests that people often have poor intuitions about the hedonic impact of gains and losses (e.g., Loewenstein & Angner, 2003; Wilson & Gilbert, 2003). For example, people believe they will return to their hedonic baselines more quickly after a small loss than after a large loss even when the opposite is the case (Gilbert, Lieberman, Morewedge, & Wilson, 2004). People believe that the hedonic cost of a loss is greater than the hedonic benefit of an equal-sized gain even when this is not so (Kermer, Driver-Linn, Wilson, & Gilbert, 2006). People believe they would be willing to pay approximately the same amount to gain an item as to avoid losing the item when, in fact, they are actually willing to pay less (Loewenstein & Adler, 1995). These instances of faulty intuition suggest that even if people realize that they have a hedonic limen, they may not know precisely where it lies. Segregation is an excellent strategy for avoiding the diminishing marginal utility of a gain, but only when that gain is segregated into units that fall above the hedonic limen. If people do not know where their hedonic limens lie—that is, if people do not know when small is too small—then those who segregate gains to avoid diminishing marginal utility may end up with no utility at all.

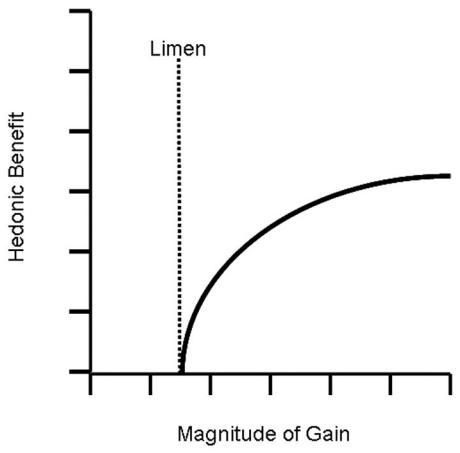

Figure 1. The concavity of the utility function in the domain of gains indicates diminishing marginal benefit, and the nonzero *x*-intercept indicates a hedonic limen.

In the present studies, we sought to determine whether people know how small a gain can be before it loses its hedonic benefit. In six experiments, we measured people's predictions and experiences of the hedonic benefit of large and small segregated and aggregated gains. We expected that people would correctly apply the logic of segregation to large gains but would incorrectly apply the same logic to small gains.

Experiments 1–3: The Prediction of Hedonic Benefits

Experiment 1

In Experiment 1, we sought to establish that people believe that when a small gain is segregated, it has a nonzero hedonic benefit that is greater than the hedonic benefit of an aggregated gain. In Experiment 1, participants predicted the hedonic benefit of no gain ($0 on each of 5 days) and either a small segregated gain ($1 on each of 5 days) or a small aggregated gain ($5 on the 5th day). We expected participants to predict that a small segregated gain would yield greater hedonic benefit than either no gain or a small aggregated gain.

Method

Participants. One hundred forty-one university students (79 men and 62 women; M_{age} = 19.8 years, SD = 3.1 years) volunteered to complete a survey.

Procedure. Participants were asked to imagine answering the question "How happy are you right now?" on 5 consecutive weekdays. Some participants were asked to imagine receiving a payment of $0 on each of the 5 days (no gain) and were then asked to imagine receiving $1 on each of the 5 days (segregated gain). The remaining participants were asked to imagine receiving a payment of $0 on each of the 5 days (no gain) and were then asked to imagine receiving $5 on the last day (aggregated gain). Participants were asked to predict how they would answer the question on each of the 5 days in each of the two circumstances. These predictions were made on 7-point Likert-type scales with the endpoints 1 = *not at all happy* and 7 = *very happy.*

Results and Discussion

Kahneman (1999) has suggested that the proper way to calculate the hedonic benefit of an episode is to aggregate moment-based measures, and this method has broad intuitive appeal. As such, we averaged each participant's five reports to create a *hedonic benefit index* (HBI) that reflected the total hedonic benefit that would accrue to participants over the course of 5 days. We performed statistical analyses on the HBI, and we include graphs of the moment-based data for illustrative purposes.

Figure 2 shows participants' moment-based predictions, and Figure 3 shows the HBI. The HBI was submitted to a 2 (schedule: segregated or aggregated) × 2 (gain: $0 or $5) analysis of variance (ANOVA), which revealed a main effect of gain such that all participants expected to derive greater hedonic benefit from a total payment of $5 than from $0, $F(1, 139) = 60.84$, $p < .001$, $\eta^2 = .30$. The analysis also revealed a Schedule × Total Payment

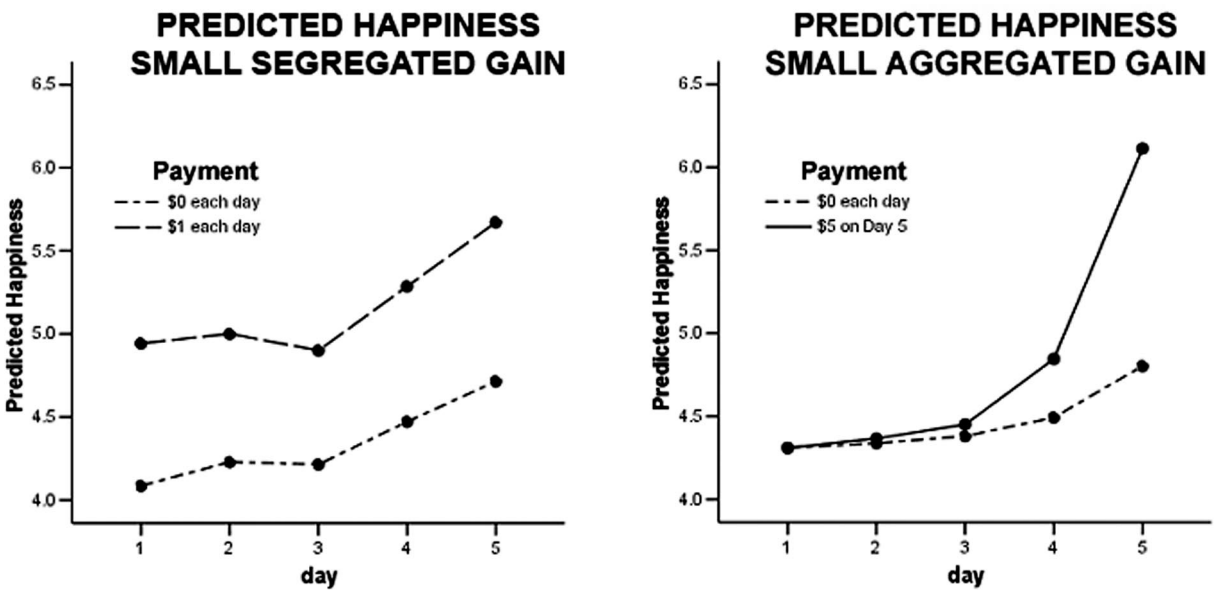

Figure 2. Predicted happiness in Experiment 1.

interaction, $F(1, 139) = 9.62$, $p = .002$, $\eta^2 = .07$. Although participants in the segregated and aggregated conditions expected to receive equal hedonic benefit from a total payment of \$0, $t < 1$, participants in the segregated condition expected to derive greater hedonic benefit from a total payment of \$5 than did participants in the aggregated condition, $t(139) = 1.93$, $p = .055$, $r = .16$. In short, participants believed that a small segregated gain would confer greater hedonic benefit than either no gain or a small aggregated gain.

Experiment 2

In Experiment 2, we sought to establish that people believe that gains are better segregated than aggregated, regardless of their size. Participants were asked to predict the hedonic benefit of a segregated gain (\$X on each of 5 days) or an aggregated gain (\$5X on the 5th day) that was either small (X = 1) or large (X = 5). We expected participants to predict that a segregated gain would yield greater hedonic benefit than an aggregated gain, regardless of whether the gain was small or large.

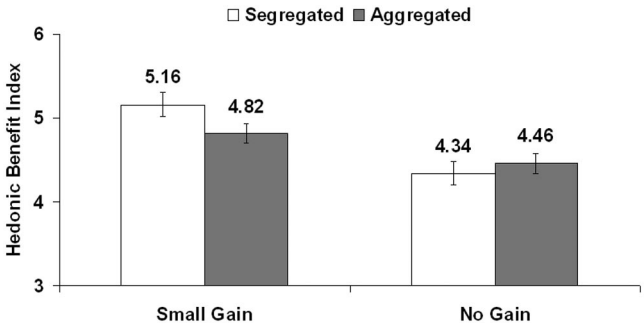

Figure 3. Predicted hedonic benefit index for small gains (\$5) and no gains (\$0) when aggregated and segregated in Experiment 1.

Method

Participants. Eighty-six university students (28 men, 56 women, and 2 who did not report their sex; $M_{age} = 19.3$ years, $SD = 6.1$ years) volunteered to complete a survey.

Procedure. Procedures were the same as those in Experiment 1 except that participants were asked to imagine how they would respond to the happiness question on each of 5 consecutive days if they were to receive \$1 on each day (small segregated gain), \$5 on the 5th day (small aggregated gain), \$5 on each day (large segregated gain), or \$25 on the 5th day (large aggregated gain). All participants made predictions for all four circumstances.

Results and Discussion

Figure 4 shows participants' moment-based predictions, and Figure 5 shows the HBI, which was calculated as in Experiment 1. The HBI was submitted to a 2 (gain: \$5 or \$25) × 2 (schedule: segregated or aggregated) within-subjects ANOVA, which revealed a main effect of gain, $F(1, 85) = 137.29$, $p < .001$, $\eta^2 = .62$; a main effect of schedule, $F(1, 85) = 73.78$, $p < .001$, $\eta^2 = .47$; and a Schedule × Gain interaction, $F(1, 85) = 20.94$, $p < .001$, $\eta^2 = .20$. Participants expected to derive greater hedonic benefit from a segregated gain than from an aggregated gain when the gain was large, $t(85) = 7.78$, $p < .001$, $r = .64$, and when the gain was small, $t(85) = 6.79$, $p < .001$, $r = .59$, and they expected this difference to be greater when gains were large ($M = 1.28$, $SD = 1.51$) than when gains were small ($M = 0.63$, $SD = 0.85$), $t(85) = 4.58$, $p < .001$, $r = .45$.

Experiment 3

In Experiment 3, we sought to demonstrate the robustness and generalizability of the results of Experiment 2. Whereas in Experiment 2 we used a within-participants design to measure participants' predictions of the hedonic benefit of monetary gains, in

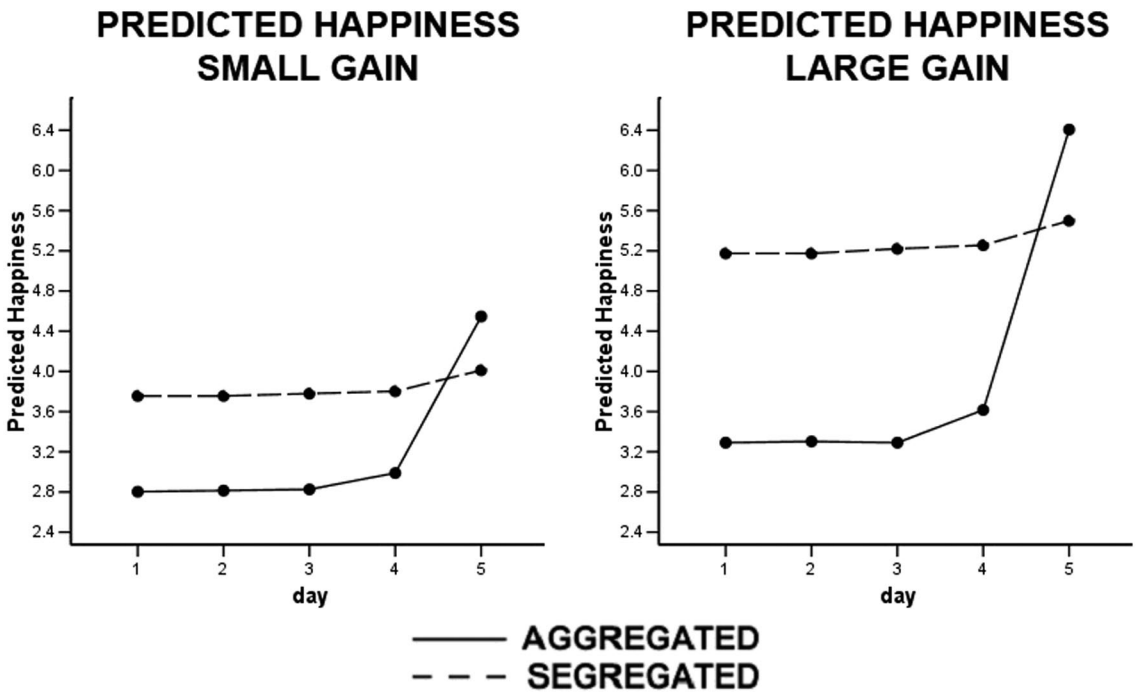

Figure 4. Predicted happiness in Experiment 2.

Experiment 3 we used a completely between-participants design to measure participants' predictions of the hedonic benefit of both monetary and nonmonetary gains. Specifically, participants were asked to predict the hedonic benefit of a segregated gain (X on each of 5 days) or an aggregated gain (5X on the 5th day) that was either small (X = 1) or large (X = 5) and was either monetary (X = dollars) or nonmonetary (X = pieces of chocolate). We expected participants to predict that a segregated gain would yield greater hedonic benefit than would an aggregated gain regardless of whether the gain was large, small, monetary, or nonmonetary.

Method

Participants. Three hundred eighty-eight people in Cambridge, Massachusetts (197 men, 190 women, and 1 who did not report his or her sex; M_{age} = 22.3 years, *SD* = 9.8 years), completed a survey in exchange for a candy bar.

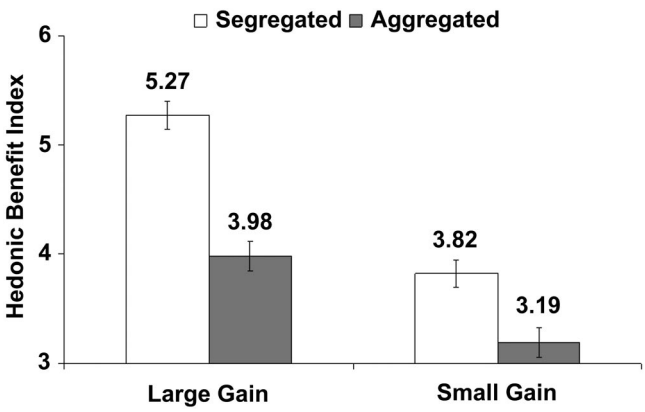

Figure 5. Predicted hedonic benefit index for large gains ($25) and small gains ($5) in Experiment 2.

Procedure. Procedures were the same as those in Experiment 2 except that participants made predictions for a gain that was small or large, monetary or nonmonetary, and aggregated or segregated. Specifically, participants were asked to imagine how they would respond to the happiness question on each of 5 consecutive days if they were to receive either $1, $5, 1 Hershey's Kiss, or 5 Hershey's Kisses on each of 5 days or $5, $25, 5 Hershey's Kisses, or 25 Hershey's Kisses on the 5th day. Each participant made predictions for just one of these eight conditions.

Results and Discussion

Figure 6 shows participants' moment-based predictions, and Figure 7 shows the HBI, which was calculated as in Experiments 1 and 2. The HBI was submitted to a 2 (type of gain: money or chocolate) × 2 (size of gain: small or large) × 2 (schedule: segregated or aggregated) ANOVA, which revealed only a main effect of schedule, $F(1, 380) = 10.13$, $p = .002$, $\eta^2 = .03$. Participants expected to derive greater hedonic benefit from a segregated gain than from an aggregated gain when the gain was monetary, $t(190) = 1.99$, $p = .045$, $r = .14$, and when the gain was nonmonetary, $t(194) = 2.47$, $p = .015$, $r = .17$ (see Figure 5). In short, participants predicted that they would derive greater hedonic benefit from segregated gains than from aggregated gains regardless of whether these gains were small, large, monetary, or nonmonetary.

Experiments 4 and 5: The Experience of Hedonic Benefits

Experiment 4

In Experiments 1–3, participants predicted that gains of every kind and every size would provide greater hedonic benefit when

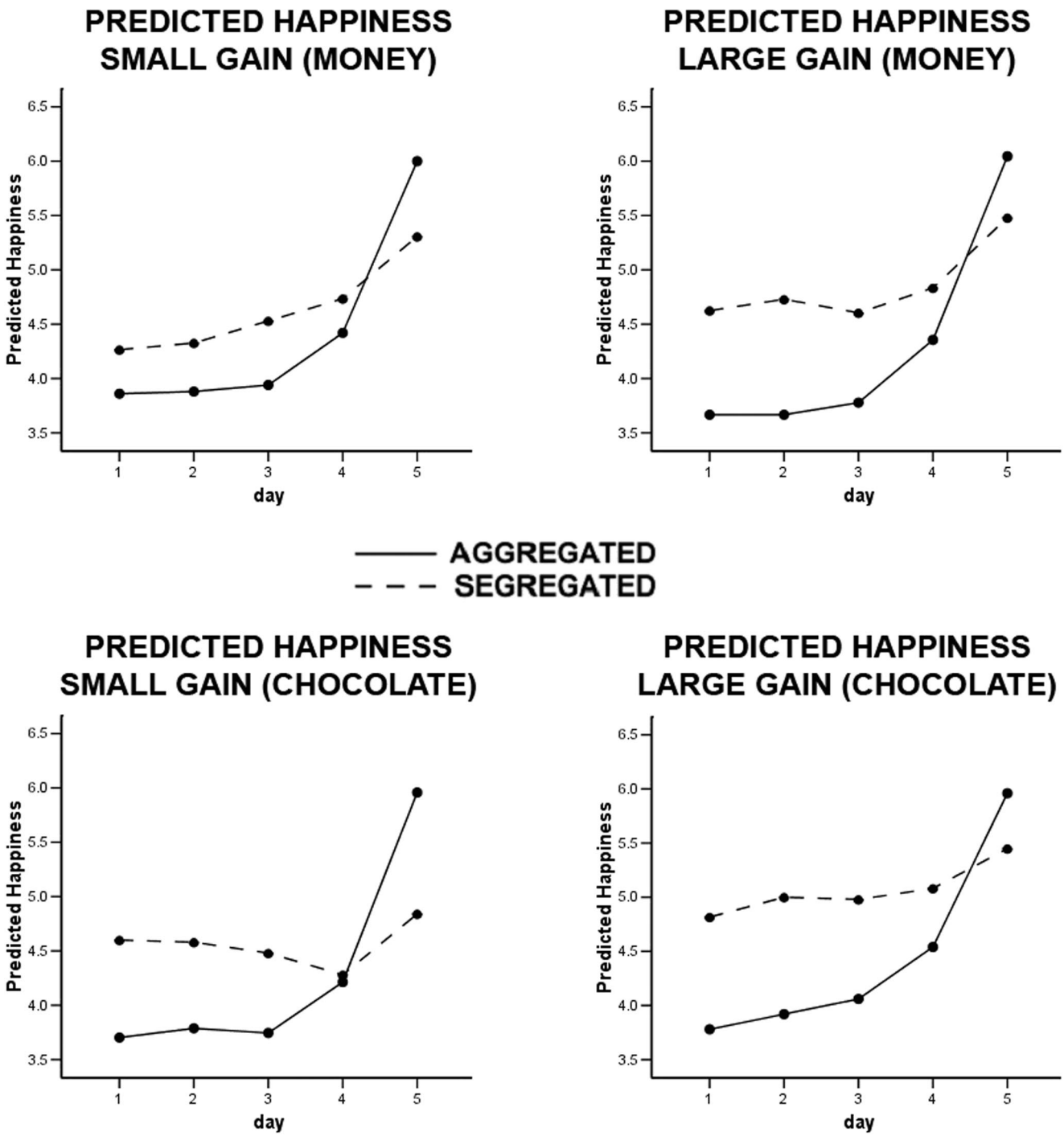

Figure 6. Predicted happiness in Experiment 3.

they were distributed over time than when they were experienced at a single moment in time. We believe they were wrong. Specifically, we believe that a large gain is indeed better when it is segregated than when it is aggregated, but a small gain is often better when it is aggregated than when it is segregated because the units into which small gains are segregated can fall beneath the hedonic limen and thus be experientially equivalent to no gain at all. In Experiment 4, we sought to determine whether we or the participants in Experiments 1–3 were right.

In Experiment 4, participants experienced the circumstances for which participants in Experiment 2 (and some of the participants in Experiment 3) had made predictions. Specifically, participants in Experiment 4 received either a segregated gain ($X on each of 5 days) or an aggregated gain ($5X on the 5th day) that was either

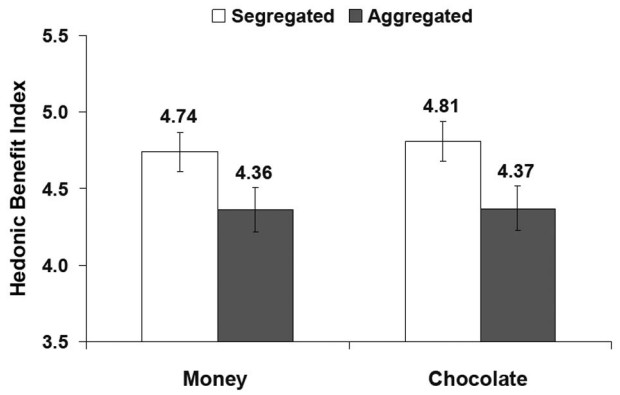

Figure 7. Predicted hedonic benefit index for monetary gains (dollars) and gastronomic gains (chocolate) when aggregated and segregated in Experiment 3.

small (X = 1) or large (X = 5) and reported their hedonic state on each day. We expected that when gains were large, segregated gains would yield greater hedonic benefit than would aggregated gains, but that when gains were small, aggregated gains would yield greater hedonic benefit than would segregated gains.

Method

Participants. One hundred sixty-three university students enrolled in classes that met on 5 consecutive weekdays (84 men and 79 women; M_{age} = 21.3 years, *SD* = 5.6 years) participated in the experiment.

Procedure. At the end of class on each of 5 consecutive days, participants received an envelope containing a one-item questionnaire that asked them to report "How happy are you right now?" on a 7-point Likert-type scale with the endpoints 1 = *not at all happy* and 7 = *very happy.* We manipulated the size and schedule of their payment. Participants received in their envelopes either $1 on each of the 5 days (small segregated gain), $5 on the 5th day (small aggregated gain), $5 on each of 5 days (large segregated gain), or $25 on the 5th day (large aggregated gain). All participants were told on the 1st day what the size and schedule of payment would be. To make sure that the manipulations were invisible, all participants in the same class were assigned to the same experimental condition.

Results

Eighteen participants failed to complete all five surveys, and 10 participants gave responses that were more than 2.5 standard deviations from the mean of their condition. All responses from these 28 participants were removed from the data set prior to analysis, leaving a total of 135 participants. This excluded an equivalent number of participants in conditions receiving large (n = 13) and small gains (n = 15), $\chi^2(1, N = 163) = 0.23$, $p = .63$, and an equal number of participants in conditions receiving aggregated (n = 14) and segregated (n = 14) payment schedules, $\chi^2(1, N = 163) = 0.06$, $p = .80$.

Figure 8 shows the moment-based data, and Figure 9 shows the HBI, which was calculated as in Experiments 1–3. The HBI was submitted to a 2 (gain: $5 or $25) × 2 (schedule: segregated or aggregated) ANOVA, which revealed only the predicted Schedule × Gain interaction, $F(1, 131) = 4.03$, $p = .01$, $\eta^2 = .05$. As

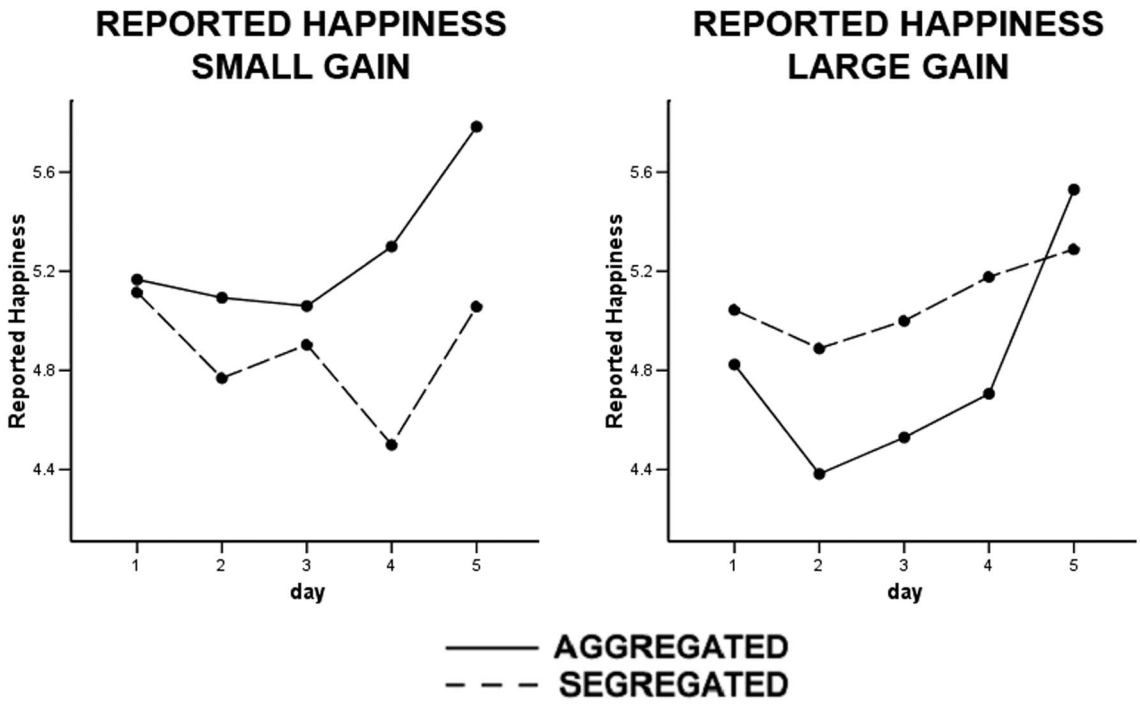

Figure 8. Reported happiness in Experiment 4.

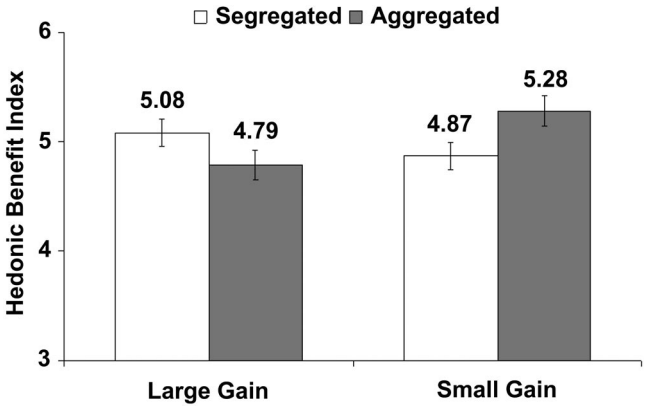

Figure 9. Experienced hedonic benefit index for large gains ($25) and small gains ($5) in Experiment 4.

both we and the participants in Experiments 1–3 predicted, participants in Experiment 4 who received a large gain experienced greater hedonic benefit when the gain was segregated than when it was aggregated, $t(77) = 1.57$, one-tailed $p = .06$, $r = .18$. However, as we predicted and participants in Experiments 1–3 did not, participants in Experiment 4 who received a small gain experienced greater hedonic benefit when their gain was aggregated than when it was segregated, $t(54) = 1.95$, one-tailed $p = .02$, $r = .26$. In short, large gains were better when they were segregated than when they were aggregated, but small gains were better when they were aggregated than when they were segregated.

Experiment 5

In Experiment 4, a small aggregated gain was better than a small segregated gain. Participants always received the small aggregated gain in the final time period, and research suggests that people have some preference for sequences in which hedonic benefit increases over time (Loewenstein & Prelec, 1993). Was the small aggregated gain in Experiment 4 better than the small segregated gain because the former provided a sequence of increasing hedonic benefit? If so, then the hedonic superiority of small aggregated gains may be restricted to those aggregated gains that are delivered at the end of a sequence. To rule out this possibility, we conducted a study in which participants received $5 on the 1st, 3rd, or 5th of 5 days and reported their hedonic experience on each day.

Method

Participants. Ninety-six high school students with parental consent in three advanced placement history classes (37 boys and 59 girls; $M_{age} = 16.0$ years, $SD = 0.30$ years) participated in exchange for $5.

Procedure. The procedures were the same as those in the small aggregated gain condition of Experiment 4 except that instead of receiving $5 on Friday, participants received $5 on Monday, Wednesday, or Friday.

Results

Seven students were absent from class or failed to complete all five daily happiness surveys and were excluded from all analyses. This left a total of 89 participants in the experiment.

Although participants were happier on the day they received a payment than on the average of the 4 days that they did not, $F(1, 86) = 25.88$, $p < .001$, $\eta^2 = .23$, a 3 (day of payment: Monday, Wednesday, or Friday) $\times$ 5 (day of report: Monday, Tuesday, Wednesday, Thursday, or Friday) ANOVA revealed no differences in overall happiness between the day-of-payment conditions, $F(2, 86) = 0.17$, $p = 0.84$ (see Table 1). Although people typically believe that sequences in which hedonic benefit increases over time are superior to those in which hedonic benefit decreases (Loewenstein & Prelec, 1993), the timing of the aggregated gain in this study did not influence its net hedonic benefit. This suggests that the results of Experiment 4 did not depend on the timing of the payment in the aggregated conditions.

Experiment 6: The Prediction and Experience of Hedonic Benefits

Experiment 6

Taken together, the foregoing experiments suggest that people have mistaken intuitions about the wisdom of segregating small gains: They believe they will derive greater hedonic benefit from small gains when those gains are segregated, but they report deriving greater hedonic benefit from small gains when those gains are aggregated. This conclusion is based on the combined results of studies that measured either predictions or experiences but not both. Before we embraced this conclusion, it seemed important to demonstrate the dissociation between forecasts and experiences in a single study.

Table 1
Reported Happiness in Experiment 5

	Day of report											
	Monday		Tuesday		Wednesday		Thursday		Friday		Overall	
Day of payment	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Monday	**4.86**	**1.3**	3.89	1.3	4.39	1.2	4.18	1.4	4.89	1.6	4.44	1.0
Wednesday	4.40	1.3	4.30	1.4	**5.23**	**1.6**	4.23	1.6	4.47	1.6	4.53	1.1
Friday	4.48	1.3	4.13	1.3	4.54	1.5	4.28	1.5	**4.80**	**1.6**	4.44	1.0

Note. The results from the day on which participants in each condition were paid are in bold.

In Experiment 6, some participants (*forecasters*) learned about a game with five blocks of trials that paid the player $1.25 after each block (segregated gain) or $6.00 after the last block (aggregated gain), and they predicted how happy they would be after each block. Other participants (*experiencers*) played the game, received either $1.25 after each block (segregated gain) or $6.00 after the last block (aggregated gain), and reported how happy they were after each block. We expected forecasters to predict greater hedonic benefit when gains were segregated than when they were aggregated, but we expected experiencers to report greater hedonic benefit when gains were aggregated than when they were segregated.

Method

Participants. Seventy-two university students (18 men and 54 women; $M_{age} = 22.8$ years, $SD = 4.6$ years) participated in the experiment for a $17 payment (hereinafter referred to as the *base payment*).

Materials and procedure. On arriving in the laboratory, participants were seated at a computer. Participants reported their baseline happiness by responding to the question "How do you feel right now?" on a linear-analog scale anchored at the endpoints with the phrases *not at all happy* and *very happy.* The scale appeared on the screen as a 900-pixel (horizontal) × 50-pixel (vertical) rectangle, and participants used a computer mouse to click the point on the scale that best represented how they felt.

Participants randomly assigned to the experiencer condition played five blocks of a celebrity matching game. On each trial, experiencers were shown two photographs of celebrities and asked to decide if the two photographs showed the same person or different people. Each picture was approximately 400 pixels × 400 pixels in size. The pictures were displayed in sequence and remained on the screen for 750 ms each. Each block consisted of 100 trials and took approximately 10 min to complete. Across the 500 trials, the two photographs showed the same celebrity on 360 (72%) trials and different celebrities on 140 trials (28%) trials. Pictures were randomly selected from three banks of photographs, each bank containing photos of the same 331 celebrities (167 males and 164 females).

Before playing the game, experiencers in the segregated condition were told that in addition to their base payment, they would receive a payment after they completed each block. Experiencers in the aggregated condition were told that in addition to their base payment, they would receive payment after they completed the fifth block. Experiencers were not told that these payments would be based on their performance, and they were not told the amount of the payments they would receive. Experiencers then played the game and received five payments of $1.25 each in the segregated condition and one payment of $6.00 in the aggregated condition. Experiencers reported how they felt after each block on scales identical to the scale used to record their baseline happiness.

Participants randomly assigned to the forecaster condition played five practice trials of the matching game to familiarize themselves with it. Forecasters then predicted how they would feel if they were to play a version of the game that comprised five blocks of 100 trials each. Forecasters in the segregated condition were asked to imagine that they would receive a payment of $1.25 immediately after completing each block, and forecasters in the aggregated condition were asked to imagine that they would receive a payment of $6.00 immediately after completing the fifth block. Forecasters made predictions about how they would feel after each block on scales identical to the scale used to record their baseline happiness.

Results

Participants' reports of their baseline happiness were submitted to a 2 (role: forecaster or experiencer) × 2 (payment schedule: segregated or aggregated) ANOVA, which revealed no effect of role and no Role × Schedule interaction, Fs < 1, and a marginal effect of schedule, $F(1, 68) = 3.14$, $p = .08$, $\eta^2 = .04$, such that participants in the segregated condition ($M = 21.03$, $SD = 4.73$) were marginally happier at baseline than were participants in the aggregated condition ($M = 18.70$, $SD = 6.37$).

To correct for this marginal baseline difference, we computed a *change in hedonic benefit index* (ΔHBI) by first subtracting each participant's reported happiness at baseline from his or her predicted or reported happiness during the matching game and then (as in the previous studies) averaging these scores across the five blocks. The ΔHBI was submitted to a 2 (role: forecaster or experiencer) × 2 (schedule: segregated or aggregated) ANOVA, which revealed a main effect of role, $F(1, 68) = 4.77$, $p = .03$, $\eta^2 = .07$. This effect, as well as the general direction of the means, suggests that because the matching task was so easy (indeed, experiencers made correct judgments on 86% of the trials), playing 500 trials of the game was somewhat tedious. The ANOVA also revealed the predicted Role × Schedule interaction, $F(1, 68) = 20.89$, $p < .001$, $\eta^2 = .24$. As Figures 10 and 11 show, forecasters expected to derive greater hedonic benefit from a small gain when it was segregated rather than aggregated, $t(34) = 4.38$, $p < .001$, $r = .60$, but experiencers actually derived greater hedonic benefit from a small gain when it was aggregated rather than segregated, $t(34) = 2.07$, $p = .046$, $r = .32$.

General Discussion

Diminishing marginal utility is one of the fundamental problems confronting any organism that wishes to maximize its hedonic experience, and the segregation of gains is an ingenious solution to that problem. Most people realize that they will derive more net pleasure from eating a cookie every day than from eating an entire bag at one sitting. And yet segregation does not always increase the hedonic benefit of a gain. When gains are small, segregation can result in units that are too small to produce any hedonic benefit at all. Eating 1 cookie a day for a month may be better than eating 30 cookies at once, but eating 1/12 of a cookie each day for a year may be the same as eating no cookies at all.

Our studies suggest that people cannot easily predict when segregation will and will not be an optimal strategy for increasing hedonic benefits. Participants correctly expected segregation to increase hedonic benefits when gains were large but incorrectly expected segregation to increase hedonic benefits when gains were small. In other words, participants knew when segregation would succeed, but they did not know when it would fail. We can think of three reasons why people's mispredictions might take this particular form.

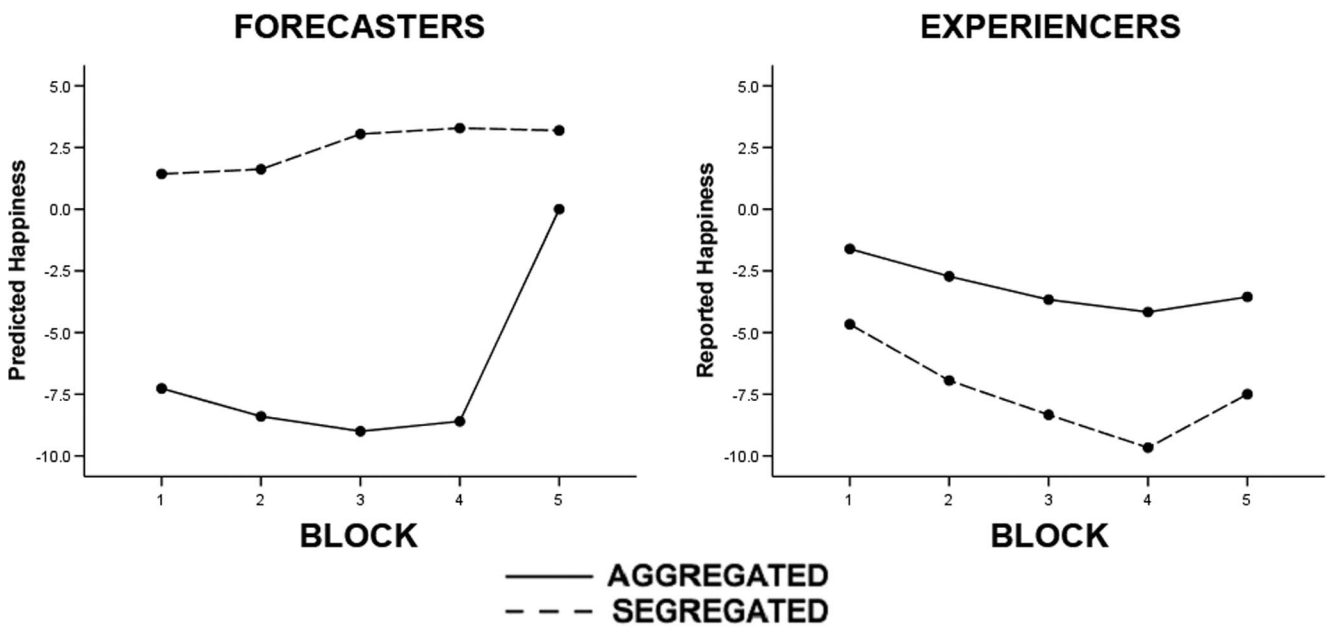

Figure 10. Predicted and reported deviations from baseline happiness in Experiment 6.

First, people may oversegregate gains because segregation is often a good strategy for maximizing hedonic benefits, and people may mistakenly generalize from situations in which segregation improves their experience to those in which it does not. Over the course of their lives, people may come to believe that rationing and pacing oneself are general principles for increasing pleasure over time, and they may export these principles to circumstances in which they do not apply, such as those involving small gains.

Second, people may oversegregate gains because experience does not teach them to do otherwise. Decisions to segregate gains may be made in advance of consumption or may be made during consumption. Decisions that are made a priori (e.g., "I signed up for the Wine-of-the-Month Club") are more prone to oversegregation than are decisions made pro tempore (e.g., "I've had enough egg salad for now, so I'll put it away until tomorrow"). When people consume until they experience a hedonic benefit and then stop when that benefit begins to wane, they are not in danger of oversegregating their gains. If most decisions about the timing of consumption are made pro tempore rather than a priori, people may have little experience with oversegregation.

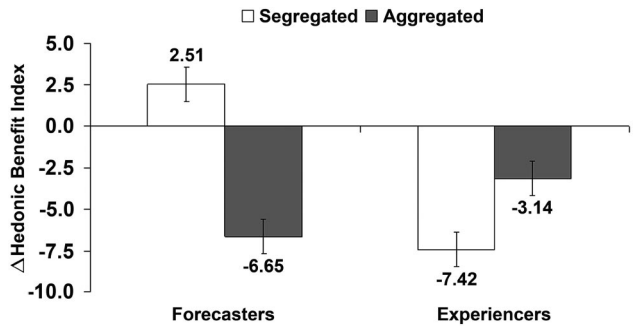

Figure 11. Predicted and reported change in hedonic benefit index in Experiment 6. A score of 0 indicates that a participant either predicted or experienced no change in happiness from baseline.

Third, people may oversegregate gains because they are more sensitive to qualitative than quantitative differences (Hsee & Zhang, 2004). Although the difference between zero and one is mathematically identical to the difference between one and two, people tend to see the first as a qualitative difference between *none* and *some* and the second as a quantitative difference between *some* and *more*. Greater sensitivity to qualitative than to quantitative differences produces phenomena such as dose insensitivity (Rozin, Ashmore, & Markwith, 1996). For instance, a person who is repulsed by the prospect of drinking water from a 10-gal container that has been contaminated with 10 drops of urine is typically just as repulsed if the container has been contaminated with 1 drop of urine. Although the difference between 0 drops and 1 drop is objectively smaller than the difference between 1 drop and 10 drops, the former difference is subjectively larger than the latter. Greater sensitivity to qualitative than to quantitative differences may also explain why a single bite of a forbidden food can lead dieters to binge. The difference between eating one potato chip and no potato chips is a qualitative difference that seems subjectively large, and the difference between eating one potato chip and many potato chips is a quantitative difference that seems subjectively small (Polivy & Herman, 1985).

Greater sensitivity to qualitative than to quantitative differences may also explain why people overestimate the utility of segregation. Although segregation reduces the amount that a person will consume in any time period, it increases the number of time periods in which the person will consume something. Five payments of $1 represent five occasions on which a person is paid something rather than nothing, whereas a single payment of $5 represents just one such occasion. If forecasters are more sensitive

to the number of paydays they experience than to the amount they are paid on each of them, then segregation will strike them as a good idea even when it is not.

In summary, segregation can be a useful strategy for increasing the hedonic benefit of gains, but only when those gains are segregated into units whose magnitude is larger than the hedonic limen. Our studies suggest that people tend to underestimate the value of the hedonic limen—that is, they overestimate how much hedonic benefit they will derive from small gains. These findings suggest that when people try to increase their pleasure by breaking their cookies into pieces, they sometimes wind up with a tasteless pile of crumbs.

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