Periodic Pricing and Perceived Contract Benefits

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Framing a contract's cost as a series of payments over time structures how people mentally account for the contract's benefits. For example, when people are asked to donate to a charity once a year (aggregate pricing), they imagine the benefits they will feel from a single, large donation. In contrast, if the charity frames its request in terms of the equivalent daily donation (periodic pricing), people consider the benefits from making many smaller donations, which is often a more enticing prospect than a single gift. Eight lab experiments and a field test examine how periodic pricing influences purchase intentions. Periodic prices can increase perceived benefits, particularly when people value the first few units of a product each more than additional units of consumption. More frequent payments can help people appreciate recurring pleasures and increase the likelihood of purchasing.

Keywords: temporal framing, scope insensitivity, mental accounting, behavioral pricing, mental representation

Marketers can choose to present the cost of a contract as a single, aggregate price ($250 for the year) or as a series of periodic payments over time (69¢ per day). Whereas previous research focuses on how pricing affects perceived costs (Gourville 1998), we propose that pricing also affects how people mentally represent a contract's benefits. When contracts use periodic pricing, such as a 36-month lease on a luxury car priced at $20 per day, people are more likely to think about the discrete benefits of this lease, such as the distinct benefits they derive from each day. When contracts use aggregate pricing, such as $7,200 yearly for the same lease, people are more likely to think about its aggregate benefits, such as those arising over an entire year. How consumers mentally represent a contract's benefits can affect how enticing the contract is and whether they agree to it.

Segregated benefits are often valued more highly than aggregated benefits. For example, as we will show, a collection of 365 individual days with a luxury car is often more enticing than a full year with the car. For many product categories, the first few units of a product are each valued more highly than additional units of consumption (Stevens 1957). This pattern is particularly strong for (1) hedonic products (e.g., people's emotions exert a stronger influence on their valuation of automobiles than, say, batteries) (Voss, Spangenberg, and Grohmann 2003) and (2) circumstances when people lack sufficient context to map magnitudes to valuation (e.g., deciding whether to pay for 7 vs. 8 ounces of ice cream; Hsee et al. 1999; Hsee, Rottenstreich, and Xiao 2005). We propose that the terms

used to describe prices—periodic prices, like daily prices, versus aggregate prices, like yearly prices—can provide a context for thinking about a contract's costs and benefits and, specifically, that periodic pricing can make consumers more likely to represent a contract's benefits in terms of multiple discrete events. If people tend to value this set of discrete benefits more highly than they would value the aggregated whole, then this can produce a greater intention to purchase.

We propose that the time period used to describe prices, such as a daily price or yearly price, provides a context for representing and assessing the value of a contract's benefits. In eight experiments and a field test, we find that periodic pricing encourages people to mentally represent the contract's benefits as more discrete than under aggregate pricing. We find this can make the benefits seem more appealing and encourage purchases, particularly when people's valuations of a contract's benefits are relatively insensitive to scale (e.g., where tripling the quantity provides much less than three time the value), such as with affect-laden goods (Hsee and Rottenstreich 2004). We also find that this positive effect of periodic pricing on purchase intentions even extends to goods with high daily prices, a result not predicted by preexisting theories that posit that periodic pricing affects consumer decision making by trivializing the contract's costs (Gourville 1998). We conclude by discussing managerial implications for pricing strategy using a framework that incorporates our findings about how pricing modifies a contract's perceived costs and benefits.

Our principal claim is that the way prices are described can influence not only how people think about costs, but also how they mentally represent other aspects of the contract (e.g., the benefits conferred). Our investigation joins others that examine how considering consumers' mental representations of financial options can yield insights into the choices they make (Henderson and Peterson 1992; Reinholtz, Bartels, and Parker 2015; Zhang and Sussman 2018).

PERIODIC PRICING AND TRANSACTION EVALUATIONS

Many consumer decisions, such as mortgages, cell phone plans, some charitable donations, and gym memberships, involve periodic payments. Standard economic models typically assume that consumers will treat a contract with periodic financial events as equivalent to its net present value as a one-time event (Lambrecht and Tucker 2012). But people's responses differ for contracts that present to them, for example, a yearly price of $365 versus a daily price of $1. The approach we describe below combines insights from mental accounting and cognitive psychology. The idea is that people represent simplified

versions of decision alternatives, where framing equivalent events differently can produce differences in mental representation. These differences in mental representation can give rise to differences in choices that can help explain some departures from normative microeconomic predictions (Bartels and Johnson 2015; Medin, Goldstone, and Markman 1995; Reinholtz et al. 2015; Soman 2004; Thaler 1985, 1999).

For contracts, people can represent the costs and benefits over relatively short or long time periods. Research on mental accounting suggests that people often express a "concreteness principle," representing decision alternatives in the terms described to them (e.g., a $1 daily price) rather than spontaneously translating the alternatives to other terms (a yearly cost of $365) (Linville and Fischer 1991; Thaler and Johnson 1990). Understanding mental representation is therefore critical to understanding how framing influences choice (Read, Loewenstein, and Rabin 1999).

Previous attempts to understand why the use of periodic pricing increases purchase intentions have focused on how framing a price influences perceptions of costs. Reframing a cost as a series of small payments makes offers more attractive because small payments call to mind other trivial expenses, like a cup of coffee (Gourville 1998, 1999, 2003). According to this pennies-a-day account, periodic pricing will backfire for larger amounts of money: whereas people might overlook a $1 daily expense, $7 per day is likely to be more painful than its yearly equivalent because it contrasts with the amount involved with routine, trivial expenses.

We propose that framing a price also influences the way people mentally represent a contract's benefits, an idea that prior research has neglected. Just as a daily versus yearly price frame provides a context for understanding costs, it does the same for a contract's benefits. People incorporate their understanding of the contract's benefits and costs in deciding whether to agree to the contract, an assumption widely shared by descriptive approaches to understanding decision making (Payne, Bettman, and Johnson 1993). So, we expect that, in addition to its influence on perceived costs, periodic pricing can influence purchase intentions via its impact on the perceived benefits of the contract.

> **H1:** Periodic pricing can increase perceived benefits and in turn, purchase intentions.

We next consider how periodic pricing affects people's mental representation of the contract's benefits. Dividing a single price into its constituent parts, known as partitioned pricing, has been shown to increase attention and value to the partitioned benefits, such as a room service meal billed separately from the rest of a hotel stay (Bertini and Wathieu 2008; Chakravarti et al. 2002; Hamilton and Srivastava 2008; Wathieu and Bertini 2007). We propose that presenting people with periodic prices encourages

consumers to mentally represent the contract's benefits as multiple discrete events, while aggregate prices encourage people to mentally represent the benefits in aggregate.

Considering the benefits as a collection of discrete components can increase people's valuation of those benefits because the sum of the parts is often seen as greater than the whole. In most circumstances, a few units of goods are valued more than additional units (Baron and Greene 1996; Desvousges et al. 1992; Kahneman and Knetsch 1992; McFadden and Leonard 1993), a property that is integrated into standard utility theories (for a summary of utility functions, see Kreps 1990) and behavioral extensions of utility theories (Kahneman and Tversky 1979). We propose that because periodic pricing will encourage consumers to think about benefits in terms of collections of discrete events (e.g., the enjoyment of a day behind the wheel of a luxury car, several times over) rather than representing some aggregate benefit over the life of the contract, periodic pricing will make the benefits of the contract seem more valuable.

Although people's mental representations of a contract's benefits and costs are not directly observable, we will use two methods to help uncover key aspects of these representations. First, in a thought-listing exercise (Johnson, Häubl, and Keinan 2007), we expect people to list more thoughts that they consider to be recurring advantages of the contract under periodic pricing than under aggregate pricing. Secondly, when asked to characterize a contract's benefits, people presented with periodic pricing should be more likely to describe a collection of discrete consumption events rather than an undifferentiated, aggregate benefit. These each relate to the general prediction below.

> **H2:** Consumers' mental representations of a contract's benefits are more likely to take the form of a collection of discrete benefits (vs. an aggregate benefit) under periodic pricing than under aggregate pricing.

This hypothesis characterizes when periodic pricing will have the greatest effect on increasing purchase intentions. If periodic pricing changes how people think about a contract's benefits, we expect that periodic pricing will increase purchase intentions most when consumers are scope insensitive—that is, when the first few units of a product are each valued more highly than additional units of consumption (e.g., where tripling the quantity provides much less than three times the value) (Hsee et al. 2005). For example, people are more likely to agree to a lease of a luxury car under periodic pricing than aggregate pricing if they value driving a convertible for one day more than 1/365 as much as they value driving it for the year. In contrast, if people's valuation of a product is more sensitive to quantity, the valuation is more "scope sensitive," and we expect that they will be less receptive to periodic pricing.

Not all valuations are equally scope sensitive. One factor that affects scope sensitivity is the ease of scaling subjective values to quantities of a good. Most people know that $100 should be perceived as substantially more valuable than $20, so people are generally scope sensitive for money, more so than they may be for consumption of many product categories that offer less easily quantified benefits (Frederick and Fischhoff 1998). We contend that it is more difficult to assign subjective values to the benefits offered by luxury car leases, charitable donations, cell phone plans, gym memberships, and most other contracts than to lump sums of money.

A second factor that affects scope sensitivity is the affective engagement of the good being evaluated, such as for hedonic products and emotional appeals. The use of feelings to evaluate a good results in more scope insensitivity than the use of calculation (Hsee and Rottenstreich 2004). Because periodic pricing might encourage people to think about discrete consumption events (a collection of days behind the wheel of the luxury car rather than a year of its use), we expect that it will increase purchase intentions more in situations characterized by high degrees of scope insensitivity.

> **H3:** Periodic pricing increases purchase intentions most in situations that give rise to scope-insensitive valuations of a contract's benefits.

If periodic pricing serves to increase people's valuation of a contract's benefits, as noted in hypotheses 2 and 3, it might increase purchase intentions even for relatively high, nontrivial daily prices. The pennies-a-day framework (Gourville 1998) stipulates and finds support for a boundary condition whereby periodic pricing backfires once the daily price is considered nontrivial. For example, one study found that consumers would rather pay a monthly sum than daily payments on property taxes ($11.50 per day), rent ($25 per day), mortgages ($49 per day), and income tax ($58 per day) (Gourville 2003).

Anecdotal evidence suggests that periodic pricing might increase demand for some contracts with nontrivial daily costs. Some well-known brands have used periodic pricing to promote exciting but expensive goods, like an offer to lease an Acura TL ($12 per day), Disney's four-day passes ($30 per day), and Carnival cruises ($70 per day). One paper found that automobiles and vacations were among the most hedonic of 16 product categories tested (Voss et al. 2003), and hence are most likely subject to scope-insensitive valuations (Hsee et al. 2005). We speculate that it is not purely coincidental that these categories provide anecdotal evidence of periodic pricing promotions involving nontrivial amounts of money. If periodic pricing increases a contract's perceived benefits for products like these, then it should increase purchase intentions even when costs are not perceived as trivial. This leads to hypothesis 4.

H4: Periodic pricing can encourage consumers' intentions to purchase even when costs are not perceived as trivial.

In what follows, we present eight experiments and a field test where people consider contracts presenting periodic or aggregate prices. Study 1 adapts the methods from the classic pennies-a-day studies to test hypothesis 1 in a lab setting (study 1a) and with realistic, incentive-compatible subscription choices made by sophisticated consumers (study 1b). Both experiments in study 1 support hypothesis 1—most of the increase in purchase intentions produced by periodic pricing is attributable to changes in the perceived benefits of the contracts on offer. To test hypothesis 2—whether contract benefits are represented as more discrete when presented with periodic prices—we use a thought-listing protocol (study 2a) and elicit ratings (study 2b) to characterize how people think about the contract's benefits. Study 3 tests for moderation by scope sensitivity (hypothesis 3) and finds a stronger positive effect of periodic pricing on purchase intentions in situations that foster scope-insensitive valuations of a contract's benefits. Study 4 finds that periodic pricing increases purchase intentions in situations where daily costs are high, as in the leasing of luxury cars and in a field test of a costly meal delivery service (hypothesis 4). We conclude by discussing the implications of our framework for understanding the effects of periodic pricing.

In all studies except the field study (4c), payments were framed either as periodic (daily) or aggregate (annual). In each study, the actual mechanism and timing of payments was constant across the framing conditions: we described payments as being automatically deducted from participants' monthly paycheck with a fixed contract term, following Gourville (1998). The total cost of the contract using periodic pricing was typically slightly higher than the cost of the aggregate contract (e.g., $1 a day vs. $350 a year). These features together make any observed preference for the periodically priced contract more economically meaningful and allow us to differentiate the effects of periodic versus aggregate price framing from time preferences (Frederick, Loewenstein, and O'Donoghue 2002) and transaction costs associated with different pay frequencies. Across studies, we followed the mediation testing procedure developed by Preacher and Hayes (2008) and endorsed by Zhao, Lynch, and Chen (2010). We simultaneously estimate equations, where noted, also controlling for additional variables that could affect valuations, standardizing continuous variables, and contrast-coding dichotomous variables –1 and 1. Across studies, we report standardized measures for multi-item scales to ease interpretation and comparability across measures and studies. For all studies, the web appendix contains the survey materials (web appendix A), details of models we present (web appendix B), and other supplemental analyses (web appendix C).

STUDY 1: COSTS AND BENEFITS UNDER DAILY PRICING

Study 1 explores perceptions of costs and benefits under periodic and aggregate pricing and the effect of these perceptions on purchase intentions (hypothesis 1). We ran two experiments: a scenario study involving a charitable donation closely resembling study 1 in Gourville (1998) and an experiment that presents realistic, incentive-compatible subscription choices to sophisticated consumers.

Study 1a: Charitable Donations

Study 1a examines hypothesis 1, whether increases in donation intentions produced by periodic pricing are affected by perceived benefits (and costs). If participants are more likely to donate when presented with periodic donations, it could be because (1) the periodic pricing frame may lead participants to perceive more benefits from giving (hypothesis 1) and/or (2) they may perceive the cost to be more trivial (consistent with the pennies-a-day framework). This study tests the relative explanatory power of perceived costs and benefits on how a periodic price frame affects donation intentions.

Method. We recruited 150 online participants, located in the United States, on Amazon's Mechanical Turk (MTurk). They read a scenario involving either a periodic ($1 per day) or aggregate ($350 per year) anonymous donation to a charity helping the underprivileged in the United States, which would be deducted automatically each month. After reading the scenario and learning the benefits they would receive if they donated, participants answered five questions measuring donation intentions on a slider scale of 0 (not at all likely) to 10 (extremely likely) along with perceived costs (triviality, costliness, and expensiveness) and benefits (expected daily pleasure).

We examined how the two price frames influenced participants' donation intentions and their perceptions of the contract's costs and benefits. This allows for mediation analyses that can help to differentiate how periodic pricing influences contract choices via perceived benefits versus via perceived costs.

Results. We find that periodic pricing increases all five donation intention measures. We averaged the standardized items to construct a donation intention index (Cronbach's $\alpha = .89$). People expressed higher donation intentions when participants were presented with periodic prices than with aggregate prices ($M_{periodic} = .19$, SD $= .82$ vs. $M_{aggregate} = -.20$, SD $= .83$; $F(1, 148) = 8.24$, $p < .01$).

Next, we compared people's perceptions of benefits and costs across the two conditions. Perceived benefit (daily pleasure) ratings were significantly higher under periodic pricing than aggregate pricing ($M_{periodic} = 4.76$, SD $= 2.83$ vs. $M_{aggregate} = 3.75$, SD $= 2.77$; $F(1, 148) = 4.84$,

PERCEIVED BENEFITS MEDIATE PRICE FRAME AND DONATION INTENTIONS
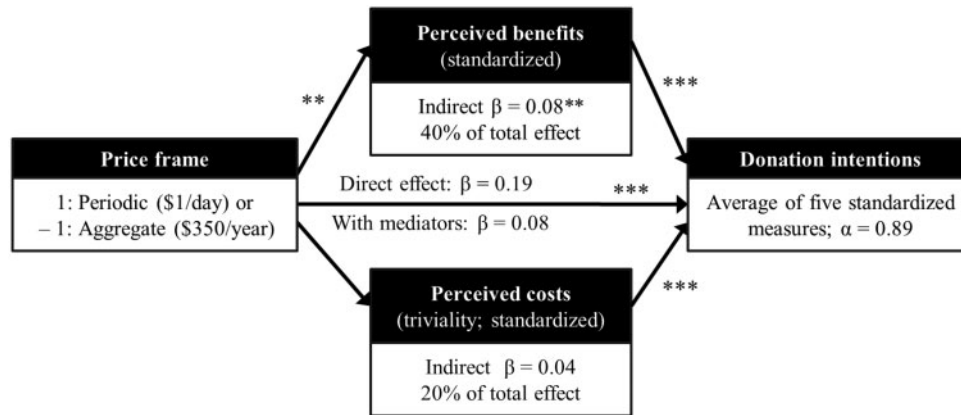
NOTE.—Joint estimation of two paths through three simultaneous equations (SUR); bootstrapped with 5,000 replications. * $p < .10$, ** $p < .05$, *** $p < .01$.

$p = .03$) while perceived cost (triviality) ratings did not significantly differ ($M_{periodic} = 4.90$, SD $= 3.18$ vs. $M_{aggregate} = 4.17$, SD $= 2.79$; $F(1, 148) = 2.22$, $p = .14$). Perceived benefits and cost triviality were each highly correlated with donation intentions ($r_{benefits} = .62$, $p < .0001$; $r_{cost\ triviality} = .46$, $p < .0001$).

As shown in figure 1, perceived benefits significantly mediate the relationship between price frame and donation intentions ($\beta_{indirect} = .08$, SE $= .04$, 95% CI $= [.01, .15]$; 40% of effect), while cost triviality falls short of statistical significance as a mediating variable ($\beta_{indirect} = .04$, SE $= .03$; 95% CI $= [-.01, .10]$; 20% of effect). Periodic pricing contributed to purchase intentions by changing perceptions of an offer's benefits, in support of hypothesis 1.

Our experimental setup also allows us to assess other influences on valuation, including the affective tags attached to money (Levav and McGraw 2009), alternative uses of the money (Spiller and Ariely 2014), or thoughts about benefits reducing the pain of payment (Prelec and Loewenstein 1998) through alternate model specifications considering the effects of perceived costs on perceived benefits. Web appendix C reports the results of three alternative model specifications testing additional explanations for the observed relationship between price frame, daily pleasure, and donation intentions. First, one possibility is that cost perceptions could change attributes of cost other than triviality, which we test by including expensiveness and costliness as additional mediators. Second, the cost and benefit measures could have differed in reliability, so we combined the three cost measures to a single factor. Whereas the more precise cost measure significantly mediates price frame and purchase intentions, the indirect effect of perceived benefits remains roughly the same. Third,

perhaps lower perceived costs could influence perceived benefits rather than simply providing a structure to evaluate the benefits. However, we find that the relationship between price frame, perceived benefits, and donation intentions is not explained by changes in perceived costs. Hypothesis 1 offers the most compelling explanation for the observed results: periodic pricing increased perceived benefits and, in turn, donation intentions.

Study 1b: Real Subscription Services for Experienced Consumers

Study 1a found that periodic pricing increases donation intentions by changing the perceived benefits of donating, supporting hypothesis 1. Study 1b tests the generalizability of this result for a different product, population, choice process, and measurement in a more realistic situation. MBA students made a series of incentive-compatible choices about five discounted subscriptions and answered questions about their perceptions of the subscriptions' benefits and costs. The subscriptions were selected (on the basis of a pretest) to be highly desirable to this population of highly educated and experienced consumers. The choices posed to them are also highly realistic, as this population generally can afford these subscriptions. In fact, 77% of them were current subscribers to one or more of these services. We expect these sophisticated consumers, facing these realistic choices, to perceive greater benefits and be more likely to purchase the subscriptions under the periodic frame (hypothesis 1).

Method. One hundred fifty-three MBA students at a midwestern US university responded to an online real-stakes opportunity to purchase subsidized subscriptions to

five services (*Economist*, *Wall Street Journal*, *New York Times*, Hulu, and Spotify). These consumers were offered an opportunity to purchase the subscription at a 50% discount, with prices presented in either periodic or aggregate terms, between-subjects. We randomly chose one out of every 50 respondents to receive their choice, an incentive-compatible design that helps ensure that participants' choices reflect their true preferences (Starmer and Sugden 1991; Wertenbroch and Skiera 2002).

Participants answered questions measuring purchase intentions, perceived benefits, and perceived costs. We collected and averaged four items each, detailed in web appendix A, to estimate perceived costs ($\alpha = .84$) and perceived benefits ($\alpha = .85$), none explicitly referencing a daily or yearly frequency.

The design mimics study 1a. We evaluated subscription purchases, perceived benefits, and perceived costs as a function of price frame. Unlike the other experiments, study 1b did have not a time limit imposed by the online recruitment process, and this resulted in a coefficient of variation in completion times that was vastly different from the other experiments (see web appendix C). To restrict our analysis to participants who completed the task in one sitting, we excluded participants with extremely long completion times by trimming at 1.5 interquartile ranges (IQR) from the IQR as advised by Tukey (1977). The 16 excluded participants' responses averaged 342 minutes. We report results from the whole sample in web appendix C. This exclusion does not materially change the results, although the effect of price frame on perceived benefits is slightly smaller.

Results. Participants were more likely to purchase the subscription when presented with periodic prices ($M_{periodic} = 24.5\%$, SD $= 0.28$; $M_{aggregate} = 9.9\%$, SD $= .17$; $F(1, 134) = 13.46$, $p < .001$), a finding that is directionally consistent for each of the five services (see web appendix B). Baseline purchase intentions differed strongly by service ($p < .0001$), but the relationship between price frame and purchase intentions did not differ by service (interaction $p > .4$). Benefits were similarly rated more highly under periodic pricing ($M_{periodic} = 3.45$, SD $= .80$; $M_{aggregate} = 3.15$, SD $= .93$; $F(1, 134) = 4.08$, $p < .05$), and subscription costs were rated as more trivial under periodic pricing ($M_{periodic} = 4.33$, SD $= 1.26$; $M_{aggregate} = 3.74$, SD $= 1.08$; $F(1, 134) = 8.48$, $p < .01$).

We conducted a mediation analysis, considering perceived costs and perceived benefits as mediation paths in the relationship between price frame and purchase intentions. As in study 1a, perceived benefits significantly mediated the relationship between price frame and purchase intentions ($\beta_{indirect} = .05$, SE $= .03$; 95% CI $= [.01, .12]$; 18% of effect), while perceived costs again fell short of statistical significance as a mediating variable ($\beta_{indirect} = .01$, SE $= .03$; 95% CI $= [-.03, .07]$; 5% of effect). Web

appendix C reports several robustness checks, first replicating results after estimating alternate scales constructed from the cost and benefit measures (1) weighting using Cronbach's alphas and (2) using the first principal component. We also estimate a general linear model considering interactions between product and frame with random effects of participant, which finds differences in benefits by frame ($\beta_{daily} = .555$; $z = 2.18$; $p < .05$) and subscription ($X^2(4) = 34.18$; $p < .0001$) but not their interaction ($X^2(4) = 3.65$; $p > .4$), which supports pooling results across scenarios.

The results from study 1b are consistent with those found in 1a despite differences in choice context, sample, and measurement. That this generalizes to sophisticated, experienced consumers making real-stakes, highly familiar decisions bolsters our confidence in the robustness of this pattern and its potential managerial implications.

Study 1 Discussion

Study 1 supports hypothesis 1, the idea that periodic pricing encourages the intention to purchase because of a change in people's perception of the contract's benefits. We find this pattern in a scenario-based donations context closely resembling Gourville (1998) and in an experiment that presents realistic, incentive-compatible subscription choices to sophisticated consumers. The next study examines how periodic pricing changes the perception of a contract's benefits.

STUDY 2: PERIODIC PRICING DISAGGREGATES A CONTRACT'S PERCEIVED BENEFITS

This study examines the intervening mental processes that may explain how periodic pricing magnifies perceived benefits. Hypothesis 2 predicts that periodic prices encourage consumers to mentally represent a contract's benefits as a collection of discrete parts. We use two methods of characterizing mental representations—thought listing (study 2a) and rating perceived benefits (study 2b)—to examine how people mentally represent a contract's benefits under periodic and aggregate pricing.

Study 2a: Listing Aspects of Donation Decisions

We use a thought-listing procedure to investigate changes in the mental representation of costs and benefits under periodic and aggregate pricing. If, as we have proposed, periodic pricing causes people to represent a contract's benefits more discretely, then we expect that periodic pricing will increase thoughts about advantages. Hypothesis 2 predicts more recurring advantages under periodic pricing. Hypothesis 2 does not predict a decrease in one-time or recurring disadvantages, like a pennies-a-day approach might.

Method. We presented 95 MTurk participants with a scenario about donating to the United Nations Children's Fund (UNICEF) as a periodic price ($2.50 per day) or aggregate price ($900 per year). This study had no specific prompt for participants to explicitly consider the benefits. Instead we asked participants to list aspects: "make a list of all of the complete thoughts you have about this decision," following Johnson, Häubl, and Keinan (2007). Then, participants rated their likelihood of donating on a scale of 0 (not at all likely) to 10 (extremely likely).

Participants later categorized their own thoughts along two dimensions: (1) as an advantage or disadvantage of donating or neither and (2) as primarily a one-time event, a repeating event, or neither. Participants' categorizations along these two lines allowed us to interpret the thoughts as (1) recurring advantages, (2) recurring disadvantages, (3) one-time advantages, (4) one-time disadvantages, or (5) other. We estimated Poisson regressions to evaluate differences in thought counts by price frame.

Results. Participants expressed a greater likelihood to donate when presented with periodic prices ($M_{periodic}$ = 6.80, SD = 3.07; $M_{aggregate}$ = 4.95, SD = 3.07; $F(1, 93)$ = 8.46, $p < .01$). Participants also listed more advantages under the periodic pricing frame ($M_{periodic}$ = 2.40, SD = 1.58; $M_{aggregate}$ = 1.65, SD = 1.55; $\beta_{periodic}$ = .12; SE = .05, $z = 2.54$; $p = .01$) but an equivalent number of disadvantages ($M_{periodic}$ = 1.53, SD = 1.96; $M_{aggregate}$ = 1.65, SD = 1.21; $\beta_{periodic}$ = −.03; SE = .06, $z = −.49$; $p > .20$). Participants listed the same number of thoughts involving one-time events and recurring events ($ps > .20$).

We next considered whether the advantages and disadvantages are equally distributed as one-time and recurring events. Participants rated more thoughts as recurring advantages under periodic pricing ($M_{periodic}$ = 1.55, SD = .25; $M_{aggregate}$ = 1.04, SD = .19; $\beta_{periodic}$ = .13; SE = .06, $z = 2.19$; $p = .03$). There were no differences in the number of one-time and recurring disadvantages or in the number of one-time advantages ($ps > .20$). A coder blind to condition found that only 7.8% of recurring advantages in the periodic condition and 7.0% of recurring advantages in the aggregate condition related to affordability or low cost, so thoughts about low cost do not explain these results.

We find the number of advantages listed significantly mediates the relationship between price frame and donation intentions ($\beta_{indirect}$ = .06, SE = .04, 95% CI = [.01, .16]; 21% of effect), whereas the number of disadvantages falls short of statistical significance ($\beta_{indirect}$ = .01, SE = .05; 95% CI = [−.10, .09]; 2% of effect). We also tested for mediation of price frame and donation intentions by the number of specifically recurring advantages, and although the result is directionally consistent with our proposed framework, it is not statistically significant (see web appendix C). Together, these results provide additional support that

periodic pricing changes the mental representation of the contract's benefits, supporting hypothesis 2.

Study 2b: Periodic Pricing and Discrete Benefits

Next, we turn to testing whether consumers consider benefits to be more discrete under periodic pricing than under aggregate pricing. We expect to find serial mediation where periodic pricing causes people to represent benefits as more discrete, subsequently increasing perceived benefits and purchase likelihood, in support of hypothesis 2.

Method. We presented 271 MTurk participants with a scenario about buying a discounted Audible subscription as a periodic price (25 cents per day) or an aggregate price ($90 per year). Respondents visited the Audible website and listed three books they would consider downloading if they had a subscription, then rated their likelihood of agreeing to the Audible subscription on a scale of 0 (not at all likely) to 10 (extremely likely).

Participants responded to 10 seven-point Likert questions measuring whether they imagined their product usage occasions to be discrete/distinct (e.g., "I think about my use of Audible over many distinct sessions," $\alpha = .90$) or integrated/aggregated (e.g., "I think about my total use of the Audible service over the year," reverse-coded, $\alpha = .83$), which we pretested to identify more discrete use over daily than weekly, monthly, or yearly usage periods for a free membership (see web appendix C) and averaged to form a benefit discreteness scale. We then asked two sets of four seven-point Likert questions, which we combined to create scales capturing how respondents evaluated the contract's costs ($\alpha = .84$) and benefits ($\alpha = .90$). We also collected cost/benefit measures modeled after those used in study 1a as a robustness check, and replicated the relationships. We conducted a series of ANOVAs to test relationships between price frame, purchase likelihood, perceived benefit discreteness, and cost and benefit evaluations. Figure 2 summarizes the primary serial mediation model, which we estimated using simultaneously estimated regressions to determine whether and how the perceived benefit discreteness explained the relationship between price frame, perceived benefits, and purchase likelihood.

Results. An ANOVA reveals that people's purchase likelihood was higher when they were presented with periodic prices ($M_{periodic}$ = 4.49, SD = 3.26; $M_{aggregate}$ = 3.33, SD = 3.05; $F(1, 269)$ = 9.15, $p < .01$). Under periodic pricing, participants viewed the costs to be more trivial ($M_{periodic}$ = 3.97, SD = 1.52; $M_{aggregate}$ = 3.08, SD = 1.43; $F(1, 269)$ = 24.61, $p < .001$) and the benefits to be marginally higher ($M_{periodic}$ = 4.49, SD = 1.75; $M_{aggregate}$ = 4.13, SD = 1.73; $F(1, 269)$ = 3.00, $p < .10$). Under periodic pricing, the benefits were seen as more discrete ($M_{periodic}$ = 3.52, SD = .57; $M_{aggregate}$ = 3.33, SD = .61; $F(1, 269)$ = 6.84, $p < .01$).

SERIAL MEDIATION MODEL OF HOW CONSUMERS MENTALLY ACCOUNT FOR A CONTRACT'S BENEFITS UNDER PERIODIC AND
AGGREGATE PRICING
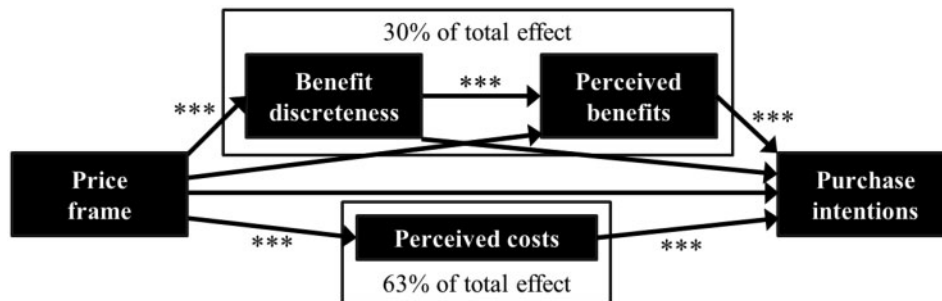
NOTE.— Joint estimation of two paths through four simultaneous equations (SUR); bootstrapped with 5,000 replications. * $p < .10$, ** $p < .05$, *** $p < .01$.

Periodic pricing increases donation intentions because (1) perceiving benefits as more discrete increases perceived benefits ($\beta_{indirect} = .05$, SE $= .02$, 95% CI $= [.01, .10]$; 30% of effect) and (2) due to lower perceived costs ($\beta_{indirect} = .10$, SE $= .02$, 95% CI $= [.06, .16]$; 63% of effect). Benefit discreteness mediates 90% of the observed relationship between price frame and perceived benefits ($\beta_{indirect} = .09$, SE $= .04$, 95% CI $= [.02, .17]$; 90% of effect). The perception of costs and benefits together mediates 93% of the relationship between frame and purchase intention. We find similar results using the alternate measures of costs and benefits (see web appendix C).

Study 2 Discussion

Study 2 supports hypothesis 2. We find that, under periodic pricing, consumers list more recurring advantages and consider the contract's benefits to be more discrete, which explains increases in perceived benefits and purchase intentions. This study suggests that periodic price frames provide people with a cue informing their mental accounting for the contract's benefits.

STUDY 3: AFFECTIVE INVOLVEMENT, SCOPE INSENSITIVITY, AND DAILY DONATIONS

Study 3 explores a boundary condition of when periodic pricing influences purchase intentions, provided by hypothesis 3: if the payment frame affects mental accounting for the contract's benefits, then it should increase purchase intentions most for scope-insensitive goods, when the first few units of a product are each valued more highly than additional units of consumption (e.g., where tripling the quantity provides much less than three times the value). Study 3 examines conditions that foster scope-insensitive

valuations to inform the relationship between periodic pricing and purchase intentions.

We manipulate scope sensitivity by encouraging participants to evaluate a contract's benefits based on their feelings rather than based on calculation, using two different methods based on past manipulations of affective involvement (Hsee and Rottenstreich 2004), because higher affective involvement can foster scope-insensitive valuations. Study 3a participants read an affective-laden passage related to the charity. In study 3b, we presented participants with an evocative picture. In each case, we predict that periodic pricing will increase donation intentions more for affect-rich, and thus presumably more scope-insensitive, charitable appeals.

Study 3a: Manipulating Affective Involvement Verbally

We tested how the relationship between price frame and donation intentions depends on scope insensitivity by asking half of the participants to read a passage designed to evoke greater affective involvement with the cause. We predict that periodic pricing will increase donation intentions to a greater extent after participants read an emotionally evocative passage about the charity, compared to a control passage with unrelated positive affect.

Method. We presented 227 MTurk participants with a scenario about donating to a breast cancer charity. In the high-affective-involvement condition, participants read a passage stating the charity could save a loved one, while participants in the low-affective-involvement condition read an affectively similar passage unrelated to the charity (see web appendix A).

We first confirmed that the high-affective-involvement passage evoked greater scope insensitivity for donations to the cause than the less affectively involving passage. A

PERIODIC PRICING INCREASES DONATION INTENTIONS FOR APPEALS INVOLVING HIGH AFFECTIVE INVOLVEMENT

Donation intentions, by price frame and affective involvement
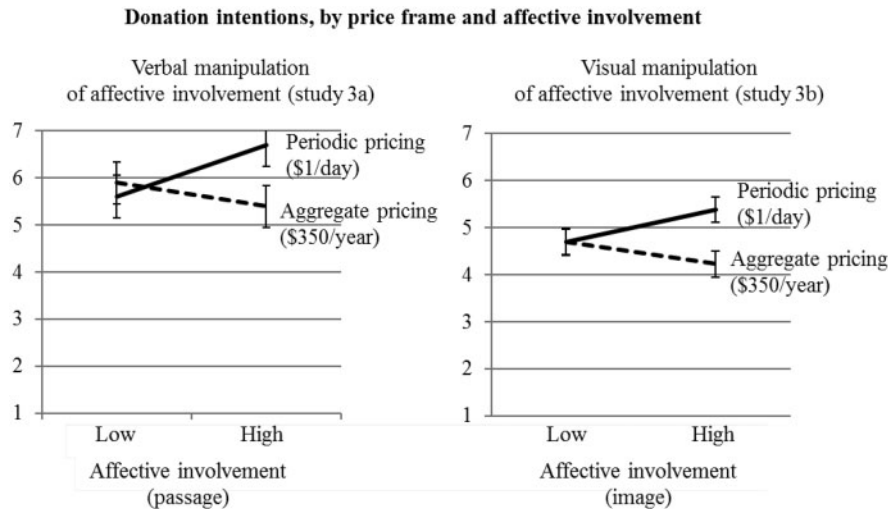
pretest reported in web appendix C found that participants were willing to work fewer hours per dollar as donation amounts increased in the high-affective-involvement condition than the low-affective-involvement condition. The two passages did not differentially affect mood as measured by the short PANAS scale we administered at the end of the survey ($ps > .20$) (Mackinnon et al. 1999).

After the passage, participants in both conditions were asked to imagine the benefits of donating and reported their likelihood of donating, based on either a periodic price ($1 per day) or aggregate price ($350 for the year) for the 2 × 2 between-subjects design of this study.

Results. The left panel of figure 3 summarizes the results. Periodic pricing increased donation intentions only in the high-affective-involvement condition (high affective involvement: $M_{periodic} = 6.65$, SD = 3.32 vs. $M_{aggregate} = 5.42$, SD = 3.36; $F(1, 223) = 3.78$, $p = .05$; low affective involvement: $M_{periodic} = 5.63$, SD = 3.48 vs. $M_{aggregate} = 5.89$, SD = 3.35; $F(1, 223) = .17$, $p = .68$; interaction: $F(1, 223) = 2.76$, $p < .10$). This is consistent with hypothesis 3's ideas about scope sensitivity: high affective involvement, which can increase scope insensitivity, increases purchase intentions.

Study 3b: Manipulating Affective Involvement Visually

Study 3b tests the generality of study 3a's findings by manipulating affective involvement using a different method, including a picture of the charity's beneficiary. This approach was used in Hsee and Rottenstreich's (2004) study 3. In that study, creating higher affective involvement by

including the picture produced more scope-insensitive valuations (similar results are reported in Kogut and Ritov 2005 and in Small, Loewenstein, and Slovic 2007, who find scope-insensitive giving to charity and attribute the pattern to the emotional reactions people have to a charity's identifiable beneficiaries). Hypothesis 3 predicts that including the affect-rich picture will increase willingness to donate in the periodic condition, but not in the aggregate condition, because representing benefits as more discrete should increase the attractiveness of benefits when people value them in a more scope-insensitive manner. Alternatively, if periodic pricing does not encourage consumers to mentally represent the contract's benefits as a collection of distinct, discrete parts, including the picture should not change whether periodic pricing increases donation intentions.

Method. We presented 577 MTurk participants with a scenario about donating to a charity in a 2 (price frame: periodic or aggregate) × 2 (picture: low vs. high affective involvement) × 4 (charity: aiding the homeless, saving the giant panda, UNICEF, or aiding wounded veterans) between-subjects design. These charities are described in web appendix A. For half of the participants, a picture of the cause's beneficiary accompanied this donation appeal, while the other half did not see a picture. This donation was presented as a periodic price ($1 per day) or aggregate price ($350 per year). Participants were not explicitly asked to reflect on the benefits of the contract. They simply rated their likelihood of donating, from 0 (not at all likely) to 10 (extremely likely). Finally, participants reported on additional factors that could influence their valuations, including gender, typical yearly charitable expenditures, age,

marital status, income, and educational level, as well as items checking their attention.

Results. The right panel of figure 3 summarizes the results. On average, participants were more likely to donate when presented with periodic prices ($M_{periodic}$ = 5.04, SD = 3.36 vs. $M_{aggregate}$ = 4.46, SD = 3.18; $F(1, 573)$ = 4.49, p = .03). This effect was moderated by the affective involvement manipulation, with periodic pricing increasing donation intentions only in the high-affective-involvement condition (high affective involvement: $M_{periodic}$ = 5.39, SD = 3.49; $M_{aggregate}$ = 4.23, SD = 3.18; $F(1, 573)$ = 9.16, p < .01; low affective involvement: $M_{periodic}$ = 4.70, SD = 3.20; $M_{aggregate}$ = 4.69, SD = 3.18; $F(1, 573)$ = .00; p = .99; interaction: $F(1, 573)$ = 4.60, p < .05). Although contributions differed by scenario ($M_{homeless}$ = 5.17, SD = 3.38; M_{pandas} = 3.87, SD = 3.18; M_{unicef} = 5.20, SD = 3.12; $M_{wounded}$ = 4.75, SD = 3.29; $F(3, 561)$ = 5.32, p = .001), the results are robust across the charities. Web appendix B shows these results also persist when we include the other measures that could relate to valuation (age, gender, expenditure, marital status, income, educational level), when we exclude participants who failed the attention checks, and also when we consider higher-order interactions between frame, affect, and scenario (ps > .30).

Study 3 Discussion

Study 3 examines conditions that give rise to scope-insensitive valuations, by manipulating affective involvement, to inform hypothesis 3. Since periodic pricing encourages consumers to mentally represent the contract's benefits as a collection of discrete components, periodic pricing increases donation intentions more for contracts involving scope-insensitive valuations than for contracts involving scope-sensitive valuations. By manipulating affective involvement with the target product in two ways, we gain insight into when marketers should use periodic pricing. Periodic pricing encourages purchase most under conditions that foster scope-insensitive valuations of a contract's benefits.

STUDY 4: NOT JUST PENNIES

If periodic pricing increases perceived benefits, it should increase purchase intentions even when periodic costs are not seen as trivial. We explore this prediction (hypothesis 4) in three studies. First, study 4a examines the contributions of perceived costs and benefits for an affect-rich purchase (a luxury car) offered for a nontrivial cost ($20 per day). Then, study 4b tests alternative accounts stipulating that periodic pricing impacts large purchases only because some consumers lack the wherewithal to understand the recurring payments or consider the benefits more concretely. Finally, study 4c reports a field test of periodic and aggregate price promotions for a costly prepared-food delivery service.

Study 4a: Leasing a Car

We predict that people will be more willing to lease a luxury car—an affect-rich product (Voss et al. 2003)—under periodic pricing, even when the daily costs are not considered trivial. We use the methods from study 1 to assess how perceived benefits and costs relate to the effect of nontrivial periodic pricing on purchase intentions.

Method. We presented 60 MTurk participants with a scenario about a luxury car lease. Participants could lease their choice of four cars with retail prices between $35,525 and $59,700. The 36-month lease featured a periodic price ($20 per day) or aggregate price ($7,250 per year). To avoid floor effects, the lease was discounted from standard lease prices, which were $630 to $1,060 monthly. Before responding to the dependent measures, we asked participants to reflect on the benefits they would receive from the contract, a step we omit in study 4b.

Participants rated their purchase intentions, their enjoyment of using the car (perceived benefits), and the triviality of the lease payment (perceived costs) on a scale of 0 to 10. Finally, participants rated the importance of owning a nice car, their knowledge about cars, experience with cars (hours driving), gender, age, income, and native language. We measured and controlled for these factors because any of them could affect people's preferences for luxury automobiles and could relate to differences in perceptions of costs and benefits.

Pretest. We tested whether $20 per day is considered to be a trivial amount of money relative to the total cost of the car, in a supplementary experiment presented in web appendix C. We independently manipulated the daily cost ($2, $10, or $20) and the base price of the car ($10,000, $50,000, and $100,000) and measured whether people considered the price to be trivial or substantial. People's cost perceptions were almost entirely a function of the (absolute) daily price and were insensitive to the fraction of the total price it represents. This suggests that $20 per day is not a trivial amount of money, even for a car.

Our account predicts that participants would be more likely to agree to the periodic lease. We further expected that their ratings of perceived benefits, rather than or in addition to perceived costs, would account for the difference in purchase intentions.

Results. Participants were more likely to agree to the lease when presented with periodic prices ($M_{periodic}$ = 6.89, SD = 2.77 vs. $M_{aggregate}$ = 5.03, SD = 3.62; $F(1, 58)$ = 4.89, p = .03). This effect remains significant when we control for other variables ($M_{periodic}$ = 6.89, SE = .56 vs. $M_{aggregate}$ = 5.04, SE = .52; $F(1, 50)$ = 5.18, p = .03). Participants reported greater perceived benefits under

periodic pricing (perceived benefits: $M_{periodic}$ = 7.84, SE = .46 vs. $M_{aggregate}$ = 6.42, SE = .42; $F(1, 50)$ = 4.59, p = .04). Consistent with the pretest, we found that participants viewed the price of the car to be relatively nontrivial in each condition (1 = not at all trivial; 10 = very trivial; $M_{periodic}$ = 3.96, SD = 2.81; vs. the scale midpoint, 5, one sample $t(27)$ = –1.95, p = .03; $M_{aggregate}$ = 2.84, SD = 2.94 vs. 5; one sample $t(31)$ = –4.15, p = .0001), and triviality ratings did not significantly differ by price frame ($F(1, 50)$ = 1.64, p > .20).

We next examined how well perceived benefits and perceived costs explain the effect of price frame on lease intentions by price frame. We find that perceived benefit significantly mediates the effect of price frame on lease intentions ($\beta_{indirect}$ = .16, SE = .08; 95% CI = [.04, .35]; 59% of effect) while cost triviality does not ($\beta_{indirect}$ = .02, SE = .03; 95% CI = [–.01, .13]; 9% of effect).

Finally, we tested whether the mediating role of perceived benefits could be explained through changes in perceived costs rather than as a direct effect of price frame. We estimated a modified version of the simultaneous equation model where perceived benefits were also a function of cost triviality. Perceived benefits again significantly mediate the effect of price frame on lease intentions (β = .15, SE = .08; 95% CI = [.02, .34]; 57% of effect). The perceived triviality path and the path considering perceived benefits as a function of triviality, however, were each not significant (triviality: ($\beta_{indirect}$ = .02, SE = .03; 95% CI = [–.01, .12]; 9% of effect); triviality-to-benefits: ($\beta_{indirect}$ = .00, SE = .01; 95% CI = [–.00 .04]; 1% of effect).

Study 4a finds that periodic pricing increases purchase intentions even in a high-cost situation, not because the high total cost made the high daily cost seem trivial, but rather because the daily frame changed how participants thought about the benefits of the lease.

Study 4b: Lease Replication

In study 4a, we find that purchase intentions were higher under periodic pricing than aggregate pricing even when costs were nontrivial, consistent with hypothesis 4. Study 4b replicates this result without asking participants to reflect on the contract's benefits. It also contrasts our account with two alternative accounts. First, we test whether these pricing effects are influenced by people not comprehending how a daily price accumulates over time, by assessing any impact of numerical and financial competence. Second, we investigate the possibility that people consider the purchase more concretely as opposed to abstractly (Fiedler 2007; Trope and Liberman 2010) under periodic pricing, a process distinct from mental accounting (Webb and Shu 2013). The analysis of this study will test whether concrete construal helps to explain the relationship between periodic pricing and purchase intentions.

Method. We presented 321 MTurk participants with a scenario about an opportunity to lease their choice of several luxury vehicles. The 36-month lease was presented as a periodic price ($20 per day) or aggregate price ($7,250 per year). Participants rated their likelihood of signing the lease on a scale of 0 (not at all likely) to 10 (extremely likely).

After completing the main choice task, participants completed tasks that assess financial and numerical reasoning (Frederick 2005; Lipkus, Samsa, and Rimer 2001; Lusardi and Tufano 2009) and individual differences in concreteness of mental representation (Fiedler 2007; Trope and Liberman 2010) (details of stimuli in web appendix A and pretest in web appendix C). In the main experiment, the scales were presented in a random order, and the items within each scale were randomized.

Results. Purchase intentions were marginally higher when participants were presented with periodic prices ($M_{periodic}$ = 6.09, SD = 3.08 vs. $M_{aggregate}$ = 5.45, SD = 3.30; $F(1, 319)$ = 3.20, p = .07). Numerical ability and financial literacy each related to purchase intentions (numerical ability: r = –.15, p < .01; financial literacy: r = –.21, p < .001), whereas abstraction did not (r = –.02, p > .30). When we controlled for numerical ability, financial literacy, and construal level, purchase intentions were significantly higher under periodic pricing ($M_{periodic}$ = 6.12, SE = .25, $M_{aggregate}$ = 5.42, SE = .25, $F(1,316)$ = 3.89, p < .05). Numerical ability, financial literacy, and construal level remained constant across price frame conditions, and none interacted with price frame to explain purchase intentions (ps > .30). These results suggest that price frame influences purchase intentions for nontrivial amounts of money, for reasons other than differences in financial or numerical reasoning or construal level.

Study 4c: Field Test for Meal Delivery Service

Study 4c tests whether periodic pricing can increase purchases in the field in situations involving nontrivial costs. We ran a field test in collaboration with a prepared food delivery company shipping across the United States. In the year prior to the test, the company had 531,418 unique website visitors, who generated 8,088 transactions totaling $1.3 million in revenues. Our primary analysis focuses on first-time visitors. We expect first-time users to be most likely to purchase under periodic pricing, as their mental representations of a product are more receptive to environmental cues than those of people who have used the service previously (Hamilton and Thompson 2007).

Method. We first verified that the company's customers did not consider the cost of the meals to be trivial. In a pretest, 429 customers rated that, on average, they generally did not consider the cost of the meals to be trivial (1 = trivial; 7 = very expensive; M_{cost} = 4.38, SD = 1.08; vs.

the scale midpoint, 4, one sample $t(428) = 7.27$, $p < .0001$). Only 16% of respondents reported scores of 3 or lower.

Over the course of the study, 15,127 visitors to the company's website saw a banner ad on the landing page that presented a periodic price ($16 per day) or an aggregate price ($99 per week) for one possible, representative package. We wanted to test whether the periodic price frame in the banner could increase purchases despite being 13% more expensive. The company initially intended to collect data for three months, and its setup allowed us to track transactions and revenues by condition, segmented into new/returning users, but did not provide user-level data. The average session lasted 3 minutes 12 seconds, with 5.58 pages per session and the average sale was for $145.53. Eighty-four percent of visitors (12,648) were there for the first time.

After five weeks, the field partner suspended data collection, in part due to what they perceived to be a managerially relevant effect size and in part because they found the implementation of A-B testing functionality more complicated than anticipated. Following the study, the field partner used a periodic, per-meal price.

Results. After five weeks, first-time visitors purchased 77% more meals under periodic pricing (periodic: 81 transactions, 1.3% conversion vs. aggregate: 47 transactions, .7% conversion), $\chi^2(1) = 10.03$, $p < .01$), a difference of $5,200 in revenues over the treatment period. We also ran a follow-up analysis using the whole sample, including returning customers, which found a 19% lift when the banner ad presented periodic prices (periodic: 185 transactions, 2.5% conversion vs. aggregate: 159 transactions, 2.1% conversion, $\chi^2(1) = 2.78$, $p < .10$). During the treatment period, periodic pricing led to roughly $5,500 more in revenues. A logistic regression finds that first-time visitors were more responsive to price frame than returning visitors ($p < .01$).

This pattern, which our partner treated as managerially significant, represents a statistically significant effect on one comparison (first-time visitors only) and a marginally significant effect on the other (first-time and returning customers). These results suggest that the advantage of periodic pricing over aggregate pricing extends beyond lab settings to real purchases in a field context involving substantial costs.

Study 4 Discussion

Studies 4a, 4b, and 4c find support for hypothesis 4. Periodic pricing can increase purchase intentions even when daily costs are nontrivially high. This increase is explained primarily by the change in perceived benefits (studies 4a and 4b and study 1). It does not seem to be driven by participants' inability to comprehend the consequences of many recurring payments nor by differences in the construal level (study 4b). In addition, study 4c finds evidence in the field that periodic pricing of nontrivial costs can increase purchases.

These results contrast with the finding that periodic pricing can backfire for nontrivial payments (Gourville 1998). We think the pennies-a-day framework, in which the perception of costs as trivial increases willingness to purchase, makes correct predictions for many contexts. Yet study 4 finds at least one class of situations where periodic pricing can increase purchase intentions for a nontrivial recurring payment: when the contract offers a highly valued hedonic product. Whereas previous research finding a backfiring effect considered less emotionally evocative product categories (e.g., rent, mortgages, and tuition), studies 4a and 4b used leases for luxury cars, which past research found to be highly affectively engaging (Voss et al. 2003); and study 4c used periodic pricing to promote food, which we think might be more affectively engaging than rent.

GENERAL DISCUSSION

We examined how, when, and why people are more likely to agree to contracts when prices are framed in periodic terms. Consistent with our predictions, periodic pricing can increase people's valuation of a contract's benefits, contributing to increased purchase intentions (study 1), because periodic pricing encourages consumers to consider the contract's benefits to be more discrete than aggregate pricing does (study 2). Periodic pricing increases the contract's appeal most under conditions of high affective involvement, which can give rise to scope-insensitive valuations—that is, where a few units of a product are each valued more than additional units (study 3)—even when daily costs are nontrivial (study 4).

We explored a number of alternative explanations for these results. The nine experiments collectively suggest that the results we observe cannot be explained by differences in time preferences, transaction costs, cost triviality, or other changes to cost perceptions between the price conditions. We find no evidence that differences in choices between conditions are attributable to differences in the concreteness or abstractness of mental representations or mood. Furthermore, the patterns generalize across different kinds of respondents, choice settings, and products, and across factors relating to people's ability to understand the contracts under consideration.

These results are not limited to hypothetical stimuli or idiosyncratic features of the design of our laboratory studies and are highly robust to differences in experimental design. For example, we find the same results whether we ask participants to reflect explicitly on the benefits associated with the contract (in studies 1a, 3a, and 4a) or without this instruction (in studies 1b, 2a, 2b, 3b, 4b, and 4c).

Furthermore, study 1b, which presents realistic, incentive-compatible subscription choices to sophisticated consumers, finds the predicted pattern in each of five subscription services; study 3a finds the predicted pattern in four alternate scenarios; and study 4c represents a field test of the effects of periodic pricing for purchasing an expensive meal delivery service. Across consumer settings and product offerings, these studies find that periodic pricing frequently structures consumers' mental representations of a product's benefits and that these differences in mental representation produce differences in willingness to purchase.

Managerial Implications

This research offers insights for marketers about when to use periodic or aggregate pricing. Our framework and results suggest that periodic pricing can help people appreciate the benefits they could accrue from a purchase. So, under the right conditions, marketers can encourage purchase with periodic pricing, even for significant sums of money. In our field test, we found periodic pricing produced a 77% increase in sales for a meal delivery service.

Our studies also provide guidance about when periodic pricing is most likely to contribute to purchase intent. We would expect this pattern of valuation for hedonic product categories, contracts that contain emotional appeals, or circumstances when target customers lack the context to appreciate the full magnitude of a contract's benefits (Hsee and Lelerc 1998). These characteristics foster scope-insensitive valuations, when the first few units of a product are each valued more highly than additional units of consumption (e.g., where tripling the quantity provides much less than three times the value). The principles we elucidate are comparatively easy for marketing managers to implement in practice, based on simple changes in how prices are described and on the inclusion of affective cues in appeals.

Theoretical Implications and Future Study

Previous approaches suggested that because periodic pricing involves small payments, the costs bring to mind other small, routine expenses, like a daily cup of coffee (Gourville 1998), and we replicate the result that contract costs are often rated as more trivial when described in daily terms. Our results, however, suggest that the effects of periodic pricing also occur because of a distinct and highly robust effect of price framing on perceived benefits. Accordingly, we extend the analysis in the prior literature to consider other contexts where periodic pricing affects preferences.

Besides offering a new perspective on the pennies-a-day phenomenon, our approach uniquely predicts where periodic pricing may fail to increase purchase intentions despite trivial daily costs (e.g., for more scope-sensitive valuations) and where periodic pricing can succeed despite nontrivial daily costs (e.g., for more scope-insensitive valuations). Across studies, we find that periodic versus aggregate pricing affects representation of both costs (as in the prior literature) and benefits (per our framework), indicating that our new perspective and the pennies-a-day framework are compatible and complementary.

Our investigation of the effects of periodic versus aggregate pricing primarily compared daily and yearly prices, but the implications could extend to other time periods (e.g., monthly bills vs. the 30-year total cost of a mortgage) and perhaps other ways of partitioning a contract, such as per-use versus flat-rate pricing or purchasing items per unit rather than in bulk. In general, we expect that partitioning contracts or purchases increases purchases more when people are more likely to express scope-insensitive valuations.

This investigation joins a broader field of work that examines how people respond to components of prices being "partitioned" instead of subsumed in an aggregate price. Our research suggests that different ways of presenting prices can highlight benefits consumers might have overlooked, which can cause them to value these benefits differently. For example, although partitioned prices can reduce perceptions of overall costs (Morwitz, Greenleaf, and Johnson 1998), they can also increase attention to and, consequently, valuation of the benefits associated with those partitioned costs, such as an in-flight movie billed separately from the base fare (Bertini and Wathieu 2008; Chakravarti et al. 2002; Hamilton and Srivastava 2008). The results of our nine experiments are thematically consistent with the "benefits-based" approach to partitioned pricing proposed by Hamilton, Srivastava, and Abraham (2010) and discussed by Greenleaf et al. (2016), in which separating prices for highly valued benefits can emphasize those benefits.

More research is needed on the relationships between periodic pricing, product usage, and satisfaction with a contract. Psychologically linking payments to benefits can serve to increase use of a service (Gourville and Soman 2001, 2002), particularly when consumption calls to mind thoughts about payment (Prelec and Loewenstein 1998). More event markers associated with periodic pricing could elongate the perceived duration of a contract (Zauberman et al. 2010) or increase patience (May 2017), which could affect anticipated benefits or retrospective evaluations assessing satisfaction. Future research could also help to identify boundary conditions where people's representations of costs and benefits may be unresponsive to periodic or aggregate pricing. The effects of periodic pricing may be reduced in situations where it is more difficult to represent benefits in terms of emotionally evocative events (e.g., paying an energy bill), when too much information is provided, or when the terms used to describe the payments are irrelevant to the benefits. Understanding these

boundaries is important because of the many situations where price frame provides a cue for consumers to better appreciate the benefits conferred from a contract.

DATA COLLECTION INFORMATION

The first author collected all data except from study 1b between 2010 and 2017. The first author also supervised field data collection by the field study partner in fall 2016. The second author collected data from study 1b in spring 2017 at the University of Chicago. The first author analyzed the data with input from the second author.

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Periodic Pricing and Perceived Contract Benefits

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Contents of Web Appendix:

This document contains three types of supplementary materials. Web appendix A contains complete stimuli from all studies. Web appendix B contains details of any analyses not fully reported in the paper, and web appendix C reports details of pretests and supplementary analyses.

WEB APPENDIX A: STIMULI FROM ALL STUDIES

Stimuli and Measures from Study 1A: Donation Drive

Imagine that you are earning $50,000. Your company is sponsoring a donation drive to help the underprivileged in the United States. Your participation would be optional and completely anonymous. If you choose to make the requested donation, it would be automatically deducted once per month from your paycheck for one year.

    Requested Donation:

    $350 per year ⁄ $1 per day

Next, please pause for a moment to imagine what benefits you would receive if you agreed to donate the amount requested. Please briefly describe how you would feel. (Approximately 10-20 words are sufficient.)

We then asked several 0-10 items measuring donation intentions:

1. What is the likelihood you would agree to donate the amount requested? Please provide your answer on the following scale, where 0 is "not at all likely" and 10 is "extremely likely.

2. How attractive is the donation opportunity?

3. How favorable is the offer?

4. Would you feel better if you made the donation or if you didn't make the donation?

5. Overall, how valuable is the contribution, compared with its cost?

Next, we asked the participants questions that would help identify differences in perceived costs and benefits depending on the price frame (0-10 scales):

1. How trivial is the amount you were asked to pay? (0 = not at all trivial;10 = very trivial)

2. How much daily pleasure would you get from donating the requested amount to the cause? (0 = very little; 10 = very much)

Stimuli and Measures from Study 1B: Subscription Services

We have listed five subscription services below. To which of the following services do you currently subscribe? Please check the box next to each subscription that you currently own.

- o   The Economist.
- o   New York Times
- o   Spotify
- o   Hulu Plus
- o   Wall Street Journal

We will next ask you about your interest in purchasing some of these subscriptions at a discount.

In each case, if you agree to the subscription, the experimenter will pay for half of the cost, and you would pay the other half. The prices on the following pages reflect this subsidized price. That is, we're subtracting the half that we would pay, presenting you with the discounted price. You are welcome to accept or reject as many of these subscription offers as you like.

Please take this seriously, as these choices are for real stakes. Specifically, for one out of every 50 respondents, we will randomly choose one choice made by that participant and enact this choice for real. So, please choose carefully.

We would like to offer you an annual subscription to [SUBSCRIPTION]. We are offering a subsidized price of [PRICE] for [DETAIL].   Please indicate below whether you would accept this offer.

- o   Yes - sign me up.
- o   No - I am not interested.

Perceived Cost Measures (1-7 scales; 1 = strongly disagree; 7 = strongly agree)

1. The cost of the subscription is trivial.
2. <r> The subscription costs a lot of money.
3. I would barely notice the cost of the subscription.
4. I frequently make purchases that cost more than the subscription, without much serious consideration.

Perceived Benefits Measures (1-7 scales; 1 = strongly disagree; 7 = strongly agree)

1. I would get a lot of pleasure from the subscription.
2. I would miss out on many benefits if I did not have the subscription.
3. I would benefit a lot from having the subscription.
4. <r> The subscription would not be very beneficial for me.

Stimuli and Measures from Study 2A

Important! Please read the following scenario carefully. Later, we will ask you a series of questions based on the information provided on this page.

The Scenario:

Imagine that you are earning $50,000. Your company is sponsoring a donation drive to improve the lives of impoverished children in developing countries. Your participation would be optional and completely anonymous.

If you choose to make the requested donation, it would be automatically deducted once per month from your paycheck for one year.

The Cause:

Every 4 seconds, a child dies-- from a preventable cause.

The United Nation's Children's Fund (UNICEF) is a global humanitarian relief organization that promotes the health and well-being of children in developing countries. Among other lifesaving programs, UNICEF provides:

- Lifesaving vaccines for 58% of the world's children
- Emergency relief in the wake of natural disasters

- Mosquito-repelling bed nets that help fight malaria

- Neonatal care to reduce the transmission of HIV from mother to child

For each of the past six years, UNICEF received the highest possible fiscal responsibility rating from the leading charity watchdog, Charity Navigator.

This Year's Requested Donation:

$2.50 per day / $$900 per year

Your contribution would provide emergency medical equipment to one hospital lacking adequate medical amenities.

Next, please pause for a moment to think through the decision about whether or not to donate. Please make a list of all of the complete thoughts you have about this decision. You may enter up to 10 thoughts.

- o Thought 1

- o Thought 2

- o …

- o Thought 10

What is the likelihood you would agree to donate to the cause? Please provide your answer on the following scale, where 0 is "not at all likely" and 10 is "extremely likely."

For each of the thoughts that you entered earlier, please categorize it as primarily:

1) An advantage of donating

2) A disadvantage of donating, or

3) Neither

For each of the thoughts that you entered earlier, please categorize it as primarily:

1) A one-time event / single-episode concern

2) A repeating event / recurring concern, or

3) Neither

Stimulus and Measures from Study 2B

Please read the following hypothetical scenario involving Audible. We will ask you to answer some questions. Please answer as you would if the situation were real.

Audible.com is the world's largest provider of audio books, with over 180,000 titles. Audio books can be listened to on a computer, a smart phone, or over your car auxiliary input.

Suppose you were offered a discount on a one-year Audible contract, with payments made in monthly installments.

The subscription would cost 25 cents per day / 90 dollars per year.

People most commonly listen to audio books on their commute, while exercising or in their home. If you have a subscription, you could listen to an additional 12 books over the course of the year.

How much and how often would you pay?

Please take a minute to look at the Audible.com's website and list some books you would consider listening to if you had an Audible subscription.

- o Audio Book 1

- o Audio Book 2

- o Audio Book 3

What is the likelihood you would agree to the Audible subscription? Please provide your answer on the following scale, where 0 is "not at all likely" and 10 is "extremely likely."

[Measuring Benefit Separateness]

As you think about the Audible subscription, please rate the extent you agree or disagree with each of the following statements: (1-7 scale, 1=strongly disagree, 7=strongly agree)

Segregated contract benefits

1. I think about my use of Audible over many distinct sessions.

2. I can easily picture specific days when I would use an Audible subscription.

3. If I had Audible, I would use it repeatedly.

4. I think about what it would be like to access Audible each time.

5. I think about the benefits from Audible on a typical day.

Integrated contract benefits

1. I think about my total use of the Audible service over the year.

2. I can NOT easily picture specific days when I would use the Audible subscription.

3. I would use an Audible subscription constantly during the year.

4. The Audible service would be reliable throughout the year.

5. I think about the benefits from the Audible service over the whole year.

[Measuring Benefit and Cost Evaluations]

Please rate the extent you agree or disagree with each of the following statements: (1-7 scale, 1=strongly disagree, 7=strongly agree)

Evaluation of Benefits

1. I would get a lot of pleasure from Audible.

2. I would benefit a lot from having Audible.

3. An Audible subscription would not be very beneficial for me. (R)

4. I would NOT benefit very often from my use of Audible. (R)

Evaluation of Costs

1. The cost of Audible is trivial.

2. Audible costs a lot of money. (R)

3. I would barely notice the cost of Audible.

4. I frequently make purchases that cost more than Audible, without much serious consideration.

Alternate Benefit and Cost Measures from Study 2B (For Robustness Checks and Replication)

Benefits: How much pleasure would you get from the Audible subscription? Please answer on a scale of 0-10, where 0 is very little and 10 is very much.

Costs: How trivial is the amount you were asked to pay? Please answer on a scale of 0-10, where 0 is not at all trivial and 10 is very trivial.

Scenarios and Measures from Study 3A

Please read the following scenario carefully. Later we will ask you a series of questions based on the information presented on the next page.

[High Affective Involvement]
Imagine that one of your closest loved ones has been fighting breast cancer for years. How would you feel learning that her life may be saved by a new treatment made possible by Susan G. Komen for the Cure? Please take a moment to put yourself in her shoes and write a sentence below to describe your (her) feelings.

[Low Affective Involvement]

Think about how it would feel to receive an unexpected card in the mail today from a loved one—just someone reaching out to let you know they care. Please write a sentence below to describe your feelings.

The Scenario:

Imagine that you are earning $50,000. Your company is sponsoring a donation drive to fight breast cancer. Your participation would be optional and completely anonymous.

If you choose to make the requested donation, it would be automatically deducted once per month from your paycheck for one year.

The Cause:

Susan G. Komen for the Cure, the global leader of the breast cancer movement, having invested nearly $1.5 billion since inception in 1982.

As the world's largest grassroots network of breast cancer survivors and activists, we're working together to save lives, empower people, ensure quality care for all and energize science to find the cures.

Thanks to events like the Susan G. Komen Race for the Cure®, and generous contributions from our partners, sponsors and fellow supporters, we have become the largest source of nonprofit funds dedicated to the fight against breast cancer in the world.

This Year's Requested Donation:

$1 per day / $350 per year

Next, please pause for a moment to imagine what benefits you would receive if you agreed to donate the amount requested. Please write a sentence below to describe how you would feel.

What is the likelihood you would agree to donate the amount requested? Please provide your answer on the following scale, where 0 is "not at all likely" and 10 is "extremely likely."

Scenarios and Measures from Study 3B

Important!

Please read the following scenario carefully. Later, we will ask you a series of questions based on the information provided on this page.

The Scenario:

Imagine that you are earning $50,000. Your company is sponsoring a donation drive to [Cause]. Your participation would be optional and completely anonymous.

If you choose to make the requested donation, it would be automatically deducted once per month from your paycheck for one year.

This Year's Requested Donation:

$1 per day / $350 per year

The Cause:

[Cause Detail]

Cause 1: Homelessness in America

    Cause: "Your company is sponsoring a donation drive to help the underprivileged in the United States."

    Cause Detail: "The Coalition for the Homeless provides emergency shelter, food and clothing as well as long-term training and housing programs."

Cause 2: Saving the Giant Panda

    Cause: "Your company is sponsoring a donation drive to help preserve endangered species of Panda."

    Cause Detail: "The World Wild Fund for Nature (WWF) works internationally to influence policy-level conservation decisions to protect the Giant Panda's habitat."

Cause 3: Health of Children in Developing Countries

    Cause: "Your company is sponsoring a donation drive to improve the lives of impoverished children in developing countries."

    Cause Detail: "The United Nation's Children's Fund (UNICEF) is a global humanitarian relief organization that promotes the health and well-being of children in developing countries."

Cause 4: American Veterans

Cause: "Your company is sponsoring a donation drive to improve the lives of wounded

American veterans."

Cause Detail: "The Wounded Warrior Project honors and empowers wounded American

veterans by assisting their recovery and transition back to civilian life."

What is the likelihood you would agree to donate the amount requested? Please provide your

answer on the following scale, where 0 is "not at all likely" and 10 is "extremely likely."

Please enter your gender: [Male / Female]

How much do you donate to charities each year, on average?

o   Less than $50   o $1,000-$5,000

o $50-$200   o $5,000-$10,000

o $200-$1,000   o $10,000 or more

What year were you born?

Are you (Check all that apply)

o   Married   o   Separated

o   Divorced   o   Single

o   Widowed   o   Cohabitating / living with a partner

Please indicate your total household income:

- o Under $25,000
- o $25,000-$29,999
- o $30,000-$39,999

- o $40,000-$49,999
- o $50,000-$59,999
- o $60,000-$69,999

- o $70,000-$84,999
- o $85,000-$99,999
- o Over $100,000

What is the highest level of education you have completed?

- o Less than high school
- o High school / GED
- o Some college
- o 2-year college degree

- o 4-year college degree
- o Masters degree
- o Doctoral degree
- o Professional degree (JD, MD)

Attention Checks

Please answer this next question to the best of your ability. You will not be penalized if you guess wrong or don't know. Your answer to this question helps us understand how much information everyone retained from the previous scenarios.

In each of the previous scenarios, you were told that you had a particular amount of income. How much was that annual income?

People vary in the amount they pay attention to these kinds of surveys. Some take them seriously and read each question, whereas others go very quickly and barely read the questions at all. If you have read this question carefully, please select the Other box below. (This question will

confirm that you are reading the questions carefully.)

- o   0 – Not At All

- o   1

- o   2

- o   3

- o   4

- o   5

- o   6 – Very

- o   Other

Scenario and Measures for Study 4A

Suppose your current employer offered to subsidize your choice among several luxury

automobiles.

Terms

A 36-month lease, with unlimited miles. Payments would be automatically deducted from your

monthly paycheck.

Your employer is willing to pay all additional taxes and fees and heavily subsidize the lease

payment.   They will also provide comprehensive insurance for the car at no additional cost. This

means that you can lease the car at a steep discount. If you reject the offer, you will not receive

any alternate compensation from your employer.

The Available Cars: (each presented with a picture)

Option 1: 2011 Mercedes-Benz E550 Sedan

Retail Price: $59,600

Option 2: 2011 Lexus LS 460

Retail Price: $65,380

Option 3: 2011 BMW 5-Series 550i Sedan

Retail Price: $59,700

Option 4: 2011 Cadillac STS

Retail Price: $52,720

Suppose your employer has offered to heavily subsidize your 36-month lease of this car.

Your Cost:

$20 per day or $7,250 per year,

This is less than half the cost of a regular lease.

Next, please pause for a moment to imagine the benefits you would receive if you leased this car. Please briefly describe how you would feel if you agreed to the lease. (Approximately 10-20 words is sufficient.)

What is the likelihood you would agree to pay the amount requested? Please provide your answer on the following scale, where 0 is "not at all likely" and 10 is "extremely likely."

How much fun would it be to lease the car? Please answer on a scale of 0-10, where 0 is very little and 10 is very much.

How trivial is the amount you were asked to pay? Please answer on a scale of 0-10, where 0 is not at all trivial and 10 is very trivial.

How important is it for you to drive a nice car? (0: Not at all important; 10: extremely important)

Relative to other people, how knowledgeable would you say that you are about the cars that appeared on the previous page? (0: Much less knowledgeable; 10 Much more knowledgeable)

If you were to lease the car, how much time would you spend in the car on a typical day?

o   Less than 15 minutes

o   16-30 minutes

o   31-60 minutes

o   1 hour to 1.5 hours

o   1.5 hours to 2 hours

o   2 hours to 2.5 hours

o   2.5 hours to 3 hours

o   More than 3 hours

Please enter your gender: (Male / Female)

Please write the year in which you were born:

Please indicate your total yearly household income:

o $0 to $10,000

o $11,000-$20,000

o $21,000-$35,000

o $36,000-$50,000

o $51,000-$65,000

o $66,000-$80,000

o $81,000-$100,000

o   Over $100,000

What is your native language (the first language you learned)?

o English

o Spanish

o Other

Study 4B Covariates

Numerical ability. Next we will ask you a few pages of brain teasers. Please answer the following as best as you can.

CRT1.   A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? (5 or 0.05)

CRT2.   In a lake, there is a patch of lilypads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? (47)

CRT3.   A 21 page album contains 480 photos. Each page displays either 18 large photos or 24 small photos. How many pages display small photos? (17)

NUM1. In the ACME PUBLISHING SWEEPSTAKES, the chance of winning a car is 1

in 1,000. What percent of tickets of ACME PUBLISHING SWEEPSTAKES win a car? (0.1)

NUM2.   Suppose you have a close friend who has a lump in her breast and must have a mammogram. Of 100 women like her, 10 of them actually have a malignant tumor and 90 of them do not. Of the 10 women who actually have a tumor, the mammogram indicates correctly that 9 of them have a tumor and indicates incorrectly that 1 of them does not have a tumor. Of the 90 women who do not have a tumor, the mammogram indicates correctly that 81 of them do not have a tumor and indicates incorrectly that 9 of them do have a tumor. The table below summarizes all of this information. Imagine that your friend tests positive (as if she had a tumor), what is the likelihood that she actually has a tumor? (Please enter a percent.) (50)

	Tested positive	Tested negative	Totals
Actually has a tumor	9	1	10
Does not have a tumor	9	81	90
Totals	18	82	100

Financial/Debt Literacy. Correct answers are denoted by *.

Flit1.   Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?

- More than today

- Exactly the same as today

- Less than today*

- × I don't know

Flit2.   True or False? Buying a company stock usually provides a safer return than a stock mutual fund.

- True

- False*

- I don't know

Dlit1.   Suppose you owe $1000 on your credit card and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?

- 2 years

- Less than 5 years*

- More than 5 years but less than 10 years

- More than 10 years

- Do not know

- Prefer not to answer

Dlit2.   You owe $3,000 on your credit card. You pay a minimum payment of $30 each month. At an Annual Percentage Rate of 12% (or 1% per month), how many years would it take to eliminate your credit card debt if you made no additional new charges?

- Less than 5 years

- Between 5 and 10 years

- Between 10 and 15 years

- Never, you will continue to be in debt*

- Do not know

- Prefer not to answer

Construal Level / Psychological Distance / Behavioral Identification Form. Concrete (vs abstract) items are denoted by *.

Any behavior can be described in many ways. For example, one person might describe a behavior as "writing a paper," while another person might describe the same behavior as "pushing keys on the keyboard." Yet another person might describe it as "expressing thoughts." This form focuses on your personal preferences for how a number of different behaviors should be described. Below you will find several behaviors listed. After each behavior will be two different ways in which the behavior might be identified. For example:

1. Attending class

   a. sitting in a chair

   b. looking at a teacher

Your task is to choose the identification, a or b, that best describes the behavior for you. Simply select the option you prefer. Be sure to respond to every item. Please mark only one alternative for each pair. Remember, mark the description that you personally believe is more appropriate for each pair.

CL1. Making a list

- Getting organized

- Writing things down*

CL2. Voting

- Influencing the election

- Marking a ballot*

CL3. Taking a test

- Answering questions*

- Showing one's knowledge

CL4. Eating

- Getting nutrition

- Chewing and swallowing*

Stimuli in Study 4C

Pretest Question

How would you describe the cost of <Company Name> meals?

1= trivial

7= very expensive

Figure WA1. Price frames tested in field study 4C
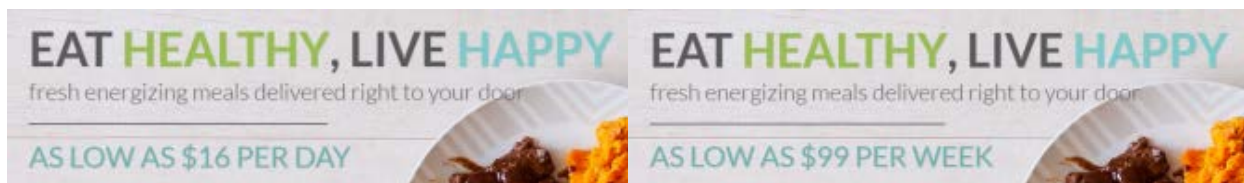
WEB APPENDIX B: DETAILS OF ANALYSES REPORTED IN PAPER

Table WA1. Donation intentions, price frame, and perceived benefits and costs in study 1a

	(1) Donation Intentions	St. Err.	*p*-value	(2) Donation Intentions	St. Err.	*p*-value
Price Frame	0.193	0.067	0.005	0.078	0.049	0.116
Perceived Benefits				0.440	0.050	0.000
Perceived Costs (Reverse-Coded Triviality)				-0.311	0.050	0.116
Constant	-0.008	0.067	0.909	-0.003	0.048	0.949
Adj R^2	0.046			0.514		
n	150			150		

Linear regression of donation intentions on price frame, pleasure and cost triviality. Price frame

codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized.

Table WA2. Perceived benefits and perceived costs, by price frame in study 1a

	Perceived Benefits			Perceived Costs		
	Coeff.	St. Err.	*p*-value	Coeff.	St. Err.	*p*-value
Price Frame	0.177	0.081	0.029	-0.121	0.081	0.138
Constant	-0.007	0.081	0.930	0.005	0.081	0.953
Adj R^2	0.025			0.008		
n	150			150		

Linear regressions of anticipated pleasure and cost triviality on price frame. Price frame codes

are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized.

Table WA3. Mediation by perceived benefits and perceived costs in study 1a

	Indirect β	St. Err.	*p*-value	95% *CI* Low	95% *CI* High

Perceived Benefits	0.078	0.036	0.029	0.014	0.153
Perceived Costs (Reverse-Coded Triviality)	0.038	0.027	0.165	-0.010	0.099

DV: Donation intentions	β	St. Err.	p-value
Perceived Benefits	0.440	0.049	<0.001
Perceived Costs (Reverse-Coded Triviality)	-0.311	0.049	<0.001
Price Frame	0.078	0.048	0.110
Constant	-0.003	0.047	0.948
R^2	0.524		
DV: Perceived Benefits	β	St. Err.	p-value
Price Frame	0.177	0.080	0.027
Constant	-0.007	0.080	0.929
R^2	0.032		
DV: Perceived Costs (Reverse-Coded Triviality)	β	St. Err.	p-value
Price Frame	-0.121	0.081	<0.001
Constant	0.005	0.081	0.952
R^2	0.015		

Effect of price frame on donation intentions, mediated by perceived benefits and costs. Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5000 replications, with bias-corrected 95% confidence interval.

Table WA4: Subscriptions offered in study 1B

Subscription	Content	Discounted cost		Current Subscribers	Non-subscribers Agreeing to New Contract
		$/day	$/year	Percent	Percent
Economist	Print and	$0.26	$95.00	27.7%	14.1%

	Digital				
Wall Street Journal	Print and Digital	$0.07	$24.50	34.3%	46.7%
New York Times	Digital	$0.27	$97.50	15.3%	6.0%
Hulu	Plus	$0.13	$47.94	14.6%	17.1%
Spotify	Premium	$0.16	$59.94	45.3%	10.7%

Table WA5: Study 1B summary statistics by price frame, by subscription

Price Frame	Stat.	Economist	NYT	WSJ	Hulu	Spotify
Daily	Mean	22.8%	8.3%	54.2%	26.2%	12.2%
	St. Err.	0.056	0.036	0.073	0.055	0.052
	SD	0.423	0.279	0.504	0.443	0.331
	N	57	60	48	65	41
Yearly	Mean	2.4%	3.6%	38.1%	5.8%	8.9%
	St. Err.	0.024	0.025	0.076	0.033	0.049
	SD	0.154	0.187	0.492	0.235	0.288
	N	42	56	42	52	34
Total	Mean	14.1%	6.0%	46.7%	17.1%	10.7%
	St. Err.	0.035	0.022	0.053	0.035	0.036
	SD	0.350	0.239	0.502	0.378	0.311
	N	99	116	90	117	75

Table WA6. Mediation by perceived benefits and costs in study 1B

	Indirect β	St. Err.	*p*-value	95% *CI* Low	95% *CI* High
Perceived Benefits	0.053	0.029	0.070	0.005	0.121
Perceived Costs (Triviality)	0.014	0.026	0.581	-0.028	0.077
DV: Purchase intentions	β	St. Err.	*p*-value		
Perceived Benefits	0.312	0.078	<0.001		
Perceived Costs (Triviality)	0.058	0.080	0.466		
Price Frame	0.234	0.080	0.004		
Constant	-0.010	0.077	0.893		
R^2	0.190				

DV: Perceived Benefits	β	St. Err.	p-value
Price Frame	0.171	0.084	0.042
Constant	-0.008	0.084	0.928
R^2	0.030		
DV: Perceived Costs (Triviality)	β	St. Err.	p-value
Price Frame	0.243	0.083	0.003
Constant	-0.011	0.083	0.897
R^2	0.060		

Effect of price frame on purchase intentions, mediated by perceived benefits and costs. Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5000 replications, with bias-corrected 95% confidence interval.

Table WA7: Study 2A mediation results

	Indirect β	St. Err.	p-value	95% *CI* Low	95% *CI* High
Number of Advantages	0.062	0.038	0.104	0.007	0.159
Number of Disadvantages	0.006	0.049	0.896	-0.098	0.092
DV: Donation intentions	β	St. Err.	p-value		
Number of Advantages	0.300	0.083	<0.001		
Number of Disadvantages	-0.437	0.081	<0.001		
Price Frame	0.223	0.083	0.007		
Constant	0.035	0.081	0.665		
R^2	0.384				
DV: Number of Advantages	β	St. Err.	p-value		
Price Frame	0.207	0.101	0.041		
Constant	0.033	0.101	0.747		

R^2	0.042		
DV: Number of Disadvantages	β	St. Err.	*p*-value
Price Frame	-0.014	0.103	0.889
Constant	-0.002	0.103	0.982
R^2	0.000		

Effect of price frame on donation intentions, mediated by number of thoughts self-rated as advantages and disadvantages. Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5,000 replications, with bias-corrected 95% confidence interval.

Table WA8: Study 2B serial mediation results

	Indirect β	St. Err.	*p*-value	95% *CI* Low	95% *CI* High
Benefit Discreteness -> Perceived Benefits	0.049	0.020	0.011	0.013	0.091
Perceived Costs (Triviality)	0.103	0.025	<0.001	0.060	0.158
DV: Purchase Intentions	β	St. Err.	*p*-value		
Benefit Discreteness	0.072	0.050	0.149		
Perceived Benefits	0.524	0.050	<0.001		
Perceived Costs (Triviality)	0.357	0.043	<0.001		
Price Frame	0.012	0.041	0.774		
Constant	0.000	0.039	0.997		
R^2	0.583				
DV: Benefit Discreteness	β	St. Err.	*p*-value		
Price Frame	0.157	0.060	0.009		
Constant	-0.002	0.060	0.977		
R^2	0.025				

DV: Perceived Benefits	β	St. Err.	p-value
Benefit Distinctness	0.072	0.050	0.149
Price Frame	0.011	0.049	0.828
Constant	0.000	0.048	0.998
R^2	0.362		
DV: Perceived Costs (Triviality)	B	St. Err.	p-value
Price Frame	0.289	0.058	<0.001
Constant	-0.003	0.058	0.956
R^2	0.084		

Effect of price frame on purchase intentions, mediated by perceived benefits and perceived costs, with perceived benefits serially mediated by benefit discreteness. Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5,000 replications, with bias-corrected 95% confidence interval.

Table WA9: Study 2B mediation of perceived benefits

	Indirect β	St. Err.	p-value	95% *CI* Low	95% *CI* High
Benefit Discreteness	0.094	0.037	0.010	0.023	0.169
DV: Benefit Discreteness	β	St. Err.	p-value		
Price Frame	0.157	0.060	0.009		
Constant	-0.002	0.060	0.977		
R^2	0.025				
DV: Perceived Benefits	β	St. Err.	p-value		
Benefit Distinctness	0.600	0.049	<0.001		
Price Frame	0.011	0.049	0.828		
Constant	0.000	0.048	0.998		

R^2	0.362		

Effect of price frame on perceived benefits, mediated by benefit discreteness. Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5,000 replications, with bias-corrected 95% confidence interval.

Table WA10: Study 3B donation intentions models with controls, higher-order interactions and excluding participants who failed attention checks

	Model 1: No Controls			Model 2: Adding Controls			Model 3: Higher-Order Interactions			Model 4: Higher-Order Interactions, Excluding Participants Who Failed Attention Checks		
	d.f.	F	*p*-value	d.f.	F	*p*-value	d.f.	F	*p*-value	d.f.	F	*p*-value
Price Frame	1	4.49	0.03	1	4.21	0.04	1	4.74	0.03	1	5.01	0.03
Affective Involvement	1	0.19	0.66	1	0.60	0.44	1	0.10	0.75	1	0.06	0.81
Price Frame x Affective Involvement	1	4.60	0.03	1	3.56	0.06	1	4.72	0.03	1	4.18	0.04
Controls												
Age				1	0.03	0.85						
Gender				1	9.16	0.00						
Charitable Expenditure				5	6.10	0.00						
Marital Status				1	0.01	0.92						
Income				1	2.49	0.12						
Education				7	1.83	0.08						
Scenario							3	5.32	0.00	3	4.93	0.00
Higher-Order Interactions												
Price Frame x Scenario							3	0.85	0.47	3	1.06	0.36
Affective Involvement x Scenario							3	1.20	0.31	3	0.96	0.41
Price Frame x Affective Involvement x							3	0.11	0.95	3	0.23	0.87

Scenario												
Residual	573			554			561			546		
Adj R^2	0.01			0.10			0.03			0.03		
n	577			577			577			562		

ANOVA results relating donation intentions with price frame, affective involvement and controls. In each model, when affective involvement is high the simple main effects of price frame is statistically significant ($p < 0.05$), and not significant ($p > 0.30$) when affective involvement is low.

Table WA11. Purchase intentions, perceived benefits and perceived costs in study 4A

	Lease Intentions			Perceived Benefits			Perceived Costs		
	β	St. Err.	*p*-value	β	St. Err.	*p*-value	β	St. Err.	*p*-value
Price Frame	0.276	0.121	0.027	0.277	0.129	0.037	0.143	0.112	0.206
Importance	0.259	0.129	0.050	0.275	0.138	0.051	0.198	0.119	0.103
Knowledge	0.207	0.130	0.118	0.166	0.139	0.236	0.113	0.120	0.350
Time in Car	0.282	0.118	0.020	0.013	0.126	0.920	0.401	0.109	0.001
Driving Frequency	-0.079	0.140	0.576	-0.089	0.150	0.557	-0.176	0.129	0.181
Gender	-0.068	0.120	0.576	-0.061	0.129	0.637	-0.263	0.111	0.022
Age	-0.167	0.113	0.148	-0.169	0.121	0.170	-0.419	0.105	0.000
Income	-0.098	0.121	0.420	-0.266	0.129	0.044	-0.083	0.111	0.459
Language	-0.301	0.228	0.193	-0.522	0.244	0.037	0.099	0.210	0.639
Constant	-0.196	0.247	0.433	-0.382	0.264	0.155	0.204	0.228	0.375
Adj R^2	0.597			0.212			0.503		
n	60			60			60		

Each set of three columns represents a separate linear regression. Binary measures are coded 1/-1 and continuous variables are standardized.

Table WA12. Mediation by perceived benefits and perceived costs in study 4A

	Indirect β	St. Err.	*p*-value	95% *CI* Low	95% *CI* High
Perceived Benefits	0.163	0.076	0.033	0.037	0.349

Perceived Costs (Triviality)	0.025	0.034	0.457	-0.011	0.130

DV: Purchase intentions	β	St. Err.	p-value
Perceived Benefits	0.586	0.091	<0.001
Perceived Costs (Triviality)	0.174	0.105	0.098
Price Frame	0.088	0.087	0.313
Controls	YES		
Constant	-0.008	0.174	0.965
R^2	0.672		
DV: Perceived Benefits	β	St. Err.	p-value
Price Frame	0.277	0.118	0.019
Controls	YES		
Constant	-0.382	0.241	0.114
R^2	0.332		
DV: Perceived Costs (Triviality)	B	St. Err.	p-value
Price Frame	0.143	0.102	0.161
Controls	YES		
Constant	0.204	0.208	0.327
R^2	0.503		

Effect of price frame on purchase intentions, mediated by perceived benefits and costs. Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5,000 replications, with bias-corrected 95% confidence interval.

Table WA13. Mediation by perceived benefits, perceived costs and costs on benefits in study 4A

	Indirect β	St. Err.	p-value	95% *CI* Low	95% *CI* High
Perceived Benefits	0.152	0.074	0.041	0.032	0.332
Perceived Costs (Triviality)	0.025	0.033	0.450	-0.012	0.121
Costs -> Benefits	0.003	0.009	0.726	-0.003	0.053

Effect of price frame on purchase intentions, mediated by perceived benefits, perceived costs,

and perceived costs through perceived benefits. Linear regressions estimated simultaneously.

Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are

standardized. 5,000 replications, with bias-corrected 95% confidence interval.

Table WA14. Correlations of study 4B

	Price Frame	Financial Literacy	CRT/ Numeracy	Construal Level
Financial Literacy	0.057 (0.309)			
CRT/ Numeracy	-0.051 (0.366)	0.531 (<0.001)		
Construal Level	-0.008 (0.890)	0.066 (0.241)	0.053 (0.347)	
Purchase Intentions	0.100 (0.075)	-0.207 (<0.001)	-0.148 (0.008)	-0.019 (0.738)

Correlations and p-values. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly),

and continuous variables are standardized.

Table WA15. Lease intentions, price frame and controls in study 4B

	(1)			(2)		
	Lease Intentions	St. Err.	p-value	Lease Intentions	St. Err.	p-value
Price Frame	0.099	0.056	0.075	0.108	0.055	0.049
Financial Literacy				-0.192	0.065	0.003
CRT/Numeracy				-0.040	0.065	0.536
Construal Level				-0.003	0.055	0.953
Constant	0.000	0.056	0.996	0.000	0.055	0.995
Adj R^2	0.007			0.045		
N	321			321		

Linear regression of lease intentions on price frame and covariates. Price frame codes are

1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized.

Table WA16. Lease intentions, price frame, and interactions with controls in study 4B

	(1)			(2)			(3)		
	Lease Int.	St. Err.	p-value	Lease Int.	St. Err.	p-value	Lease Int.	St. Err.	p-value
Price Frame	0.112	0.055	0.042	0.092	0.055	0.096	0.099	0.056	0.076
Financial Literacy	-0.214	0.055	0.000						
Price Frame x Financial Literacy	-0.009	0.055	0.867						
CRT/Numeracy				-0.144	0.055	0.010			
Price Frame x CRT/Numeracy				-0.009	0.055	0.865			
Construal Level							-0.018	0.056	0.742
Price Frame x Construal Level							0.010	0.056	0.860
Constant	0.000	0.055	0.997	-0.001	0.055	0.865	0.000	0.056	0.860
Adj R^2	0.047			0.021			0.001		
N	321			321			321		

Linear regression of lease intentions on price frame, covariates, and interactions. Price frame

codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized.

Table WA17: Visitor counts and purchases of field study 4C

			Price Frame		
			Per Day	Per Week	Total
Choice	Purchase	n	185	159	344
		Percent	2.48%	2.07%	2.27%
	No Purchase	n	7,278	7,505	14,783
		Percent	97.52%	97.93%	97.73%
	Total	n	7,463	7,664	15,127
		Percent	100%	100%	100%

Table WA18: Visitor counts and purchases of field study 4C, by visitor segment

	Price Frame		
	Per Day	Per Week	Total

New Visitors	Purchase	n	81	47	128
		Percent	1.30%	0.73%	1.01%
	No Purchase	n	6,162	6,358	12,520
		Percent	98.70%	99.27%	98.99%
	Total	n	6,243	6,405	12,648
		Percent	100%	100%	100%
Returning Visitors	Purchase	n	104	112	216
		Percent	8.52%	8.90%	8.71%
	No Purchase	n	1,116	1,147	2,263
		Percent	91.48%	91.10%	91.29%
	Total	n	1,220	1,259	2,479
		Percent	100%	100%	100%

Table WA19: Logistic regression of purchases in field study 4C

	Coef.	St. Err.	*p*-value
Price Frame	0.132	0.058	0.023
Visitor Segment	-1.135	0.058	0.000
Price Frame x Visitor Segment	0.156	0.058	0.008
Log-Likelihood	-1443.6		
Pseudo R^2	0.121		
N	15,127		

Logistic regression of purchase by price frame and visitor segment (new vs returning). Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly) and segment codes are 1=New visitors / -1 = Returning visitors.

APPENDIX C: SUPPLEMENTRY ANALYSES AND RESULTS

Robustness Checks from Study 1A

We consider three alternate explanations for the results in study 1A. First, perhaps our measure of periodic and aggregate pricing changed cost perceptions in ways other than triviality, such as calling to mind different alternative uses of funds (Spiller and Ariely 2014) or providing different affective tags for the funds (Levav and McGraw 2009) that could affect donation intentions. To test this, we estimated an additional mediation model with multiple measures of cost perceptions to increase reliability of the cost perception measure. Two other cost-related items, expensiveness and costliness, correlated with cost triviality -0.56 and -0.59 (p's $< .001$). In a first additional test of our hypotheses, we estimate a model that includes all three cost-related questions and perceived benefits as mediators, and our results persist (see table WA20).

A second potential issue in study 1 is that cost triviality may be a noisier measure than perceived benefits. So in a second robustness check (see table WA21), we combined ratings for cost triviality, expensiveness, and costliness into a single factor using principle-component analysis ($\lambda_1 = 2.3$; others < 1). In this model, relative to the aggregate price frame, in the periodic price frame, participants perceived the contract's benefits to be higher ($p = .027$) and costs to be lower ($p = .009$). Further, donation intentions increase with perceived benefits ($p < .001$) and donation intentions decrease with perceived costs ($p < .001$). The indirect effect of periodic pricing on donation intentions through perceived benefits remains roughly the same size and direction ($\beta = 0.08$, $SE = 0.04$; 95% $CI = \{0.01, 0.15\}$). The indirect effect through cost perceptions is larger than the model with a single-measure and is statistically significant ($\beta = 0.08$, $SE = 0.03$; 95% $CI = \{0.02, 0.15\}$). So, although improving the reliability of the perceived

cost measure improves the explanatory power of cost perceptions, the perceived benefits results are not an artifact of low reliability in the perceived cost measure. These results provide support for the compatibility of the new perspective offered by this paper and for the pennies-a-day framework.

Third, we tested an account where the lower perceived costs (rather than the structure of those costs) could have affected donation intentions. A third model (see WA22) considers and finds no evidence that price frame impacts perceived benefits and donation intentions because of the change in perceived costs. To do so, we modified the simultaneous equation model to make perceived benefits a function of perceived costs. We tested whether perceived benefits still mediate the effects of price frame on donations despite this effect, or alternately, whether the indirect effect of perceived benefits is itself mediated by perceived costs. We find in this model that perceived benefits again mediates daily payments and donation intentions ($\beta = 0.07$, $SE = 0.03$ 95% $CI = \{0.00, 0.14\}$). In contrast, the path price frame → cost triviality → perceived benefits → donation intentions is not significant ($\beta = 0.01$, $SE = 0.01$; 95% $CI = \{-0.00, 0.03\}$). This suggests that the mediating effects of benefits on purchase intention are not explained by the whether the costs appear trivial.

Table WA20. Mediation by perceived benefits and three costliness measures in study 1A

	Indirect β	St. Err.	p-value	95% CI Low	95% CI High
Perceived Benefits	0.077	0.035	0.031	0.011	0.153
Cost Triviality (R)	0.019	0.017	0.248	-0.002	0.068
Costliness	0.007	0.019	0.709	-0.022	0.055
Expensiveness	0.052	0.029	0.066	0.009	0.127

DV: Donation intentions	β	St. Err.	*p*-value
Perceived Benefits	0.433	0.046	<0.001
Cost Triviality (R)	-0.160	0.056	0.004
Costliness	-0.036	0.079	0.648
Expensiveness	-0.234	0.081	0.004
Price Frame	0.038	0.046	0.410
Constant	-0.002	0.044	0.973
R^2	0.585		
DV: Perceived Benefits	β	St. Err.	*p*-value
Price Frame	0.177	0.080	0.027
Constant	-0.007	0.080	0.929
R^2	0.032		
DV: Cost Triviality (R)	β	St. Err.	*p*-value
Price Frame	-0.121	0.081	0.133
Constant	0.005	0.081	0.952
R^2	0.0148		
DV: Costliness	β	St. Err.	*p*-value
Price Frame	-0.199	0.080	0.013
Constant	0.008	0.080	0.921
R^2	0.040		
DV: Expensiveness	β	St. Err.	*p*-value
Price Frame	-0.223	0.080	0.005
Constant	0.009	0.080	0.911
R^2	0.050		

Effect of price frame on donation intentions, mediated by perceived benefits, and three measures

of perceived costs. Linear regressions estimated simultaneously. Price frame codes are

1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5,000

replications, with bias-corrected 95% confidence interval.

Table WA21. Mediation by single-item perceived benefits and single cost scale in study 1A

	Indirect β	St. Err.	*p*-value	95% *CI* Low	95% *CI* High
Perceived Benefits	0.078	0.036	0.039	0.042	0.15
Perceived Costs Scale	0.078	0.032	0.015	0.021	0.147
DV: Donation intentions	β	St. Err.	*p*-value		
Perceived Benefits	0.439	0.046	<0.001		
Perceived Costs Scale	-0.246	0.030	<0.001		
Price Frame	0.037	0.046	0.419		
Constant	-0.001	0.045	0.973		
R^2	0.579				
DV: Perceived Benefits	β	St. Err.	*p*-value		
Price Frame	0.177	0.080	0.027		
Constant	-0.007	0.080	0.929		
R^2	0.032				
DV: Perceived Costs Scale	β	St. Err.	*p*-value		
Price Frame	-0.317	0.121	0.009		
Constant	0.013	0.121	0.917		
R^2	0.044				

Effect of temporal frame on purchase assessment, mediated by anticipated pleasure and three cost measures combined to a single factor using principle-component analysis (λ=2.3). Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5,000 replications, with bias-corrected 95% confidence interval.

Table WA22. Mediation by perceived benefits, perceived costs, and costs-to-benefits in study 1A

	Indirect β	St. Err.	*p*-value	95% *CI* Low	95% *CI* High
Perceived Benefits	0.067	0.035	0.057	0.000	0.137
Perceived Costs (Reverse-Coded Triviality)	0.038	0.027	0.160	-0.010	0.098
Costs -> Benefits	0.011	0.009	0.218	-0.001	0.035
DV: Donation intentions	β	St. Err.	*p*-value		
Perceived Benefits	0.440	0.049	<0.001		
Perceived Costs (Reverse-Coded Triviality)	-0.311	0.049	<0.001		
Price Frame	0.078	0.048	0.109		
Constant	-0.003	0.047	0.948		
R^2	0.524				
DV: Perceived Benefits	β	St. Err.	*p*-value		
Perceived Costs	-0.198	0.079	0.013		
Price Frame	0.153	0.080	0.052		
Constant	-0.006	0.079	0.938		
R^2	0.070				
DV: Perceived Costs (Reverse-Coded Triviality)	β	St. Err.	*p*-value		

Price Frame	-0.121	0.081	0.133
Constant	0.005	0.081	0.952
R^2	0.015		

Effect of price frame on donation intentions, mediated by perceived benefits, perceived costs, and perceived costs on perceived benefits. Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized.

Robustness Checks for Study 1B

We consider three robustness checks for calculating cost and benefit measures, and also validated the dropping of data from 16 respondents whose completion times were inordinately long. First, instead of calculating the average response to the cost and benefit measures, we tried combining the items within subscriptions using Cronbach's alphas (averaging scenario-level alphas, which were each greater than 0.70). Second, we calculated the first dimension from a principal component analysis for cost and for benefit measures (in each case, the first eigenvalue was > 2 and the second eigenvalue was < 1). In both cases, we replicate all key relationships with unchanged direction, magnitude, and significance levels.

Third, we ran a general linear model describing subscription-level choice, with random-effects of participant, to test whether it was appropriate to combine across scenarios. In this model, we find differences in benefits by frame ($\beta_{daily} = 0.555$; $z = 2.18$; $p < .05$) and subscription ($X^2(4) = 34.18$; $p < .0001$) but not their interaction ($X^2(4) = 3.65$; $p > .4$). This analysis supports pooling across scenarios for the main tests. Together, these robustness checks help reinforce the conclusion that the results found in study 1b, which are consistent with those of study 1a, are not driven by peculiarities in the sample, how costs and benefits are measured, or

issues around incentive compatibility.

We also provide some additional detail about the process and impact of dropping slow responses from Study 1b. First, Figure WA2 examines variability in completion times across studies. We calculated coefficients of variability ($CV = SD$ / $Mean$) of completion times for each study, which, excluding study 1b, range from 0.32 to 0.60. The Study 1b completion time CV was 3.35, indicating much higher dispersion in completion times in study 1b. We consider this is due to a time limit required by the online recruitment platform which did not apply to the MBA student survey. To restrict to participants who completed the study in a single session, we analyzed responses from students whose completion times were within 1.5 interquartile ranges (IQR) of the IQR (Tukey 1977), which was roughly 90% of the sample. This excluded 16 participants whose completion times averaged 342 minutes ($SD = 457$). Study 1b's final CV is 0.43, in line with the other studies. Tables WA23-26 show that the exclusion criterion does not materially change the results, with the exception of a marginally significant result for perceived benefits when including extremely slow responses ($p = 0.076$).

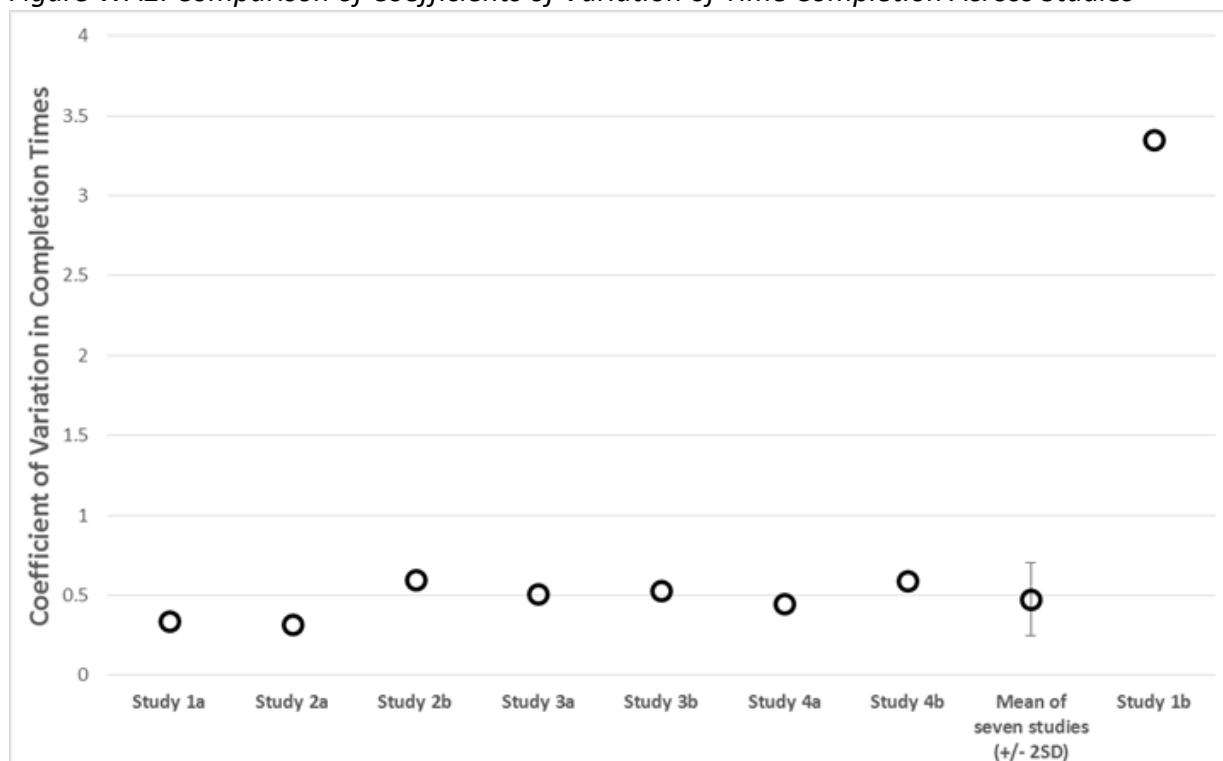*Figure WA2. Comparison of Coefficients of Variation of Time Completion Across Studies*

Table WA23. Subscriptions offered in study 1B, including data from participants with long completion times

Subscription	Content	Discounted cost		Current Subscribers	Non-subscribers Agreeing to New Contract
		$/day	$/year	Percent	Percent
Economist	Print and Digital	$0.26	$95.00	27.4%	13.5%
Wall Street Journal	Print and Digital	$0.07	$24.50	37.3%	45.8%
New York Times	Digital	$0.27	$97.50	14.4%	6.9%
Hulu	Plus	$0.13	$47.94	13.1%	17.3%
Spotify	Premium	$0.16	$59.94	41.2%	11.1%

Table WA24. Study 1B summary statistics by price frame, by subscription, including data from participants with long completion times

Price Frame	Stat.	Economist	NYT	WSJ	Hulu	Spotify

Daily	Mean	21.3%	10.6%	51.9%	25.0%	14.6%
	St. Err.	0.053	0.038	0.070	0.051	0.051
	SD	0.413	0.310	0.504	0.436	0.357
	N	61	66	52	72	48
Yearly	Mean	4.0%	3.1%	38.6%	8.2%	7.1%
	St. Err.	0.028	0.022	0.074	0.035	0.040
	SD	0.198	0.174	0.493	0.277	0.261
	N	50	65	44	61	42
Total	Mean	13.5%	6.9%	45.8%	17.3%	11.1%
	St. Err.	0.033	0.022	0.051	0.033	0.033
	SD	0.343	0.254	0.501	0.380	0.316
	N	111	131	96	133	90

Table WA25. Study 1B purchase intentions, costs and benefits by price frame, including data from participants with long completion times

Price Frame	Stat.	Purchase Intentions	Costs	Benefits
Daily	Mean	24.4%	4.37	3.44
	St. Err.	0.031	0.140	0.09
	SD	0.271	1.23	0.78
	N	78	78	78
Yearly	Mean	9.98%	3.65	3.19
	St. Err.	0.019	0.12	0.11
	SD	0.165	1.06	0.92
	N	74	74	74
Total	Mean	17.4%	4.02	3.32
	St. Err.	0.019	0.10	0.07
	SD	0.236	1.21	0.86
	N	152	152	152
$F(1,150)$		15.56	3.19	14.90
p-value		0.0001	0.0760	0.0002

Data excludes one participant who has all five subscriptions and thus provided no data on purchase intentions, costs and benefits for unowned subscriptions.

Table WA26. Mediation by perceived benefits and costs in study 1B, including data from

participants with long completion times

	Indirect β	St. Err.	*p*-value	95% *CI* Low	95% *CI* High
Perceived Benefits	0.045	0.027	0.100	-0.009	0.098
Perceived Costs (Triviality)	0.019	0.030	0.524	-0.040	0.079
DV: Purchase intentions	β	St. Err.	*p*-value		
Perceived Benefits	0.311	0.074	<0.000		
Perceived Costs (Triviality)	0.065	0.076	0.397		
Price Frame	0.242	0.077	0.002		
Constant	-0.006	0.073	0.930		
R^2	0.193				
DV: Perceived Benefits	β	St. Err.	*p*-value		
Price Frame	0.144	0.080	0.072		
Constant	-0.004	0.080	0.962		
R^2	0.020				
DV: Perceived Costs (Triviality)	β	St. Err.	*p*-value		
Price Frame	0.300	0.077	<0.001		
Constant	-0.008	0.077	0.919		
R^2	0.090				

Effect of price frame on purchase intentions, mediated by perceived benefits and costs. Linear

regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate

(Yearly), and continuous variables are standardized. 5000 replications, with bias-corrected 95%

confidence interval.

Table WA27. Study 2A mediation by recurring advantages

	Indirect β	St. Err.	*p*-value	95% *CI* Low	95% *CI* High
Number of Recurring Advantages	0.062	0.043	-0.011	-0.011	0.162
DV: Donation intentions	β	St. Err.	*p*-value		
Number of Recurring Advantages	0.363	0.092	< 0.001		
Price Frame	0.229	0.093	0.014		
Constant	0.036	0.092	0.694		
R^2	0.211				
DV: Number of Recurring Advantages	β	St. Err.	*p*-value		
Price Frame	0.171	0.102	0.093		
Constant	0.027	0.102	0.791		
R^2	0.029				

Effect of price frame on donation intentions, mediated by number of thoughts self-rated as recurring advantages. Linear regressions estimated simultaneously. 5,000 replications, with bias-corrected 95% confidence interval.

Pretest of Separateness Measures of Study 2B

We asked 381 mturkers to imagine either their daily, weekly, monthly, or yearly use of a free Audible membership provided at no-cost by their local library. We then asked the 10 benefit separateness measures, of which half were reverse-coded for pertaining to more aggregate mental representations. We expected that over short periods (daily and weekly) benefits would be reported as more separate than use over long periods (monthly and yearly).

We find results consistent with that prediction. Respondents reported more separate benefits in the frames involving shorter periods than longer periods (M_{daily} = 3.71, SD = 0.55; M_{weekly} = 3.68, SD = 0.45; $M_{monthly}$ = 3.59, SD = 0.59; M_{yearly} = 3.56, SD = 0.58; F(1, 379) = 4.69, p = .03). Restricting to participants who passed an attention check, the results strengthen (F(1, 249) = 13.20, p = .0003). We take these results to indicate that the separateness measures capture differences in consumer perceptions of a contract's benefits as more segregated collection or in aggregate.

As an additional robustness check, the main Study 2B also asked the perceived benefits and cost measures using other measures measured on 0-10 scales. These include, for perceived benefits, "How much pleasure would you get from the Audible subscription? (10 is "very much") and for costs, "How trivial is the amount you were asked to pay? (10 is "very trivial"). We replicated the same relationships reported in the paper, using these alternate measures of benefits and costs.

Table WA28: Replication of study 2B serial mediation results using alternate measures of perceived benefits and costs

	Indirect β	St. Err.	*p*-value	95% CI Low	95% CI High
Benefit Discreteness -> Perceived Benefits	0.042	0.017	0.014	0.010	0.078
Perceived Costs (Triviality)	0.058	0.020	0.004	0.026	0.106
DV: Purchase Intentions	β	St. Err.	*p*-value		
Benefit Discreteness	0.153	0.050	0.002		
Perceived Benefits	0.064	0.017	<0.001		

Perceived Costs (Triviality)	0.103	0.016	<0.001
Price Frame	0.060	0.043	0.158
Constant	-1.38	0.116	<0.001
R^2	0.532		
DV: Benefit Discreteness	β	St. Err.	*p*-value
Price Frame	0.157	0.060	0.009
Constant	-0.002	0.060	0.977
R^2	0.025		
DV: Perceived Benefits	β	St. Err.	*p*-value
Benefit Distinctness	1.639	0.153	<0.001
Price Frame	-0.023	0.154	0.881
Constant	5.827	0.152	<0.001
R^2	0.297		
DV: Perceived Costs (Triviality)	β	St. Err.	*p*-value
Price Frame	0.564	0.166	0.001
Constant	4.079	0.166	<0.001
R^2	0.041		

Effect of price frame on purchase intentions, mediated by alternate measures of perceived

benefits and perceived costs, with perceived benefits serially mediated by benefit discreteness.

Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -

1=Aggregate (Yearly), and continuous variables are standardized. 5,000 replications, with bias-

corrected 95% confidence interval.

Table WA29: Replication of study 2b mediation of perceived benefits using alternate measures of

perceived benefits and costs

	Indirect *β*	St. Err.	*p*-value	95% CI Low	95% CI High

	β	St. Err.	p-value		
Benefit Discreteness	0.086	0.034	0.013	0.018	0.153
DV: Benefit Discreteness	β	St. Err.	p-value		
Price Frame	0.157	0.060	0.009		
Constant	-0.002	0.060	0.977		
R^2	0.048				
DV: Perceived Benefits	β	St. Err.	p-value		
Benefit Distinctness	0.547	0.052	<0.001		
Price Frame	-0.008	0.051	0.881		
Constant	0.000	0.051	0.999		
R^2	0.297				

Effect of price frame on alternate measure of perceived benefits, mediated by benefit discreteness. Linear regressions estimated simultaneously. Price frame codes are 1=Periodic (Daily) / -1=Aggregate (Yearly), and continuous variables are standardized. 5,000 replications, with bias-corrected 95% confidence interval.

Pretest Verifying Affective Involvement Manipulated Scope-Sensitivity for Study 3A

We ran a pretest to test whether the affective involvement manipulation influenced scope-sensitivity as expected in study 3A. Though our manipulation is conceptually based on the affective involvement manipulation used by Hsee and Rottenstreich's (2004) study 4, we wanted to assess whether our affective involvement manipulation manipulated scope-sensitivity.

In the pretest, 325 participants were asked how long they would be willing to work for the charity to receive an amount of money. Participants were first either exposed to the high affective involvement or low affective involvement condition as well as description of the charity. We asked the number of hours participants would be willing to work overtime so their

employer would donate $10, $50, $250, or $1,250.

If a participant is less scope-sensitive for dollars donated to the charity than for working overtime, she would be willing to work fewer hours per dollar as the total donation amount increases. So, if the affectively engaging passage reduces scope-sensitivity, we expect a significant interaction between donation amount and affective involvement. In particular, the hours per dollar would decline faster over donation amount after reading the affectively engaging passage than the control passage.

After collecting data on the number of hours participants were willing to work, we calculated dollars per hour donated for each participant as hours willing to work divided by donation amount. Since the response range was unbounded, we Winsorized outliers that fell outside the interval {Q1 - 1.5 * IQR, Q3 + 1.5 * IQR} (Tukey 1977). Participants reported that they would work, on average 0.061 hours ($SD = 0.068$) per donated dollar.

Figure WA3 shows that affective involvement manipulation changed scope-sensitivity. To test whether donation amount and affective involvement interacted to predict hours worked per donated dollar, an ANOVA analysis included amount (10, 50, 250, 1250), affective involvement (high vs. low), and their interaction. We found that amount donated reduced hours per donated dollar ($M_{10} = 0.122$, $SD = 0.080$ vs. $M_{50} = 0.069$, $SD = 0.062$ vs. $M_{250} = 0.029$, $SD = 0.033$ vs. $M_{1250} = 0.022$, $SD = 0.022$; $F(3, 317) = 64.14$; $p < .0001$) while affective involvement did not affect hours per donated dollar ($M_{high} = 0.065$, $SD = 0.069$ vs. $M_{low} = 0.057$, $SD = 0.066$; $F(1, 317) = 2.46$; $p = .12$). Critically, the interaction between affective involvement with the cause and donation amount was significant ($F(3, 317) = 4.83$; $p < .01$), suggesting less scope-sensitivity in the high affective involvement condition than in the low affective involvement condition.

Figure WA3. Affective involvement manipulation reduces scope-sensitivity to charitable donation
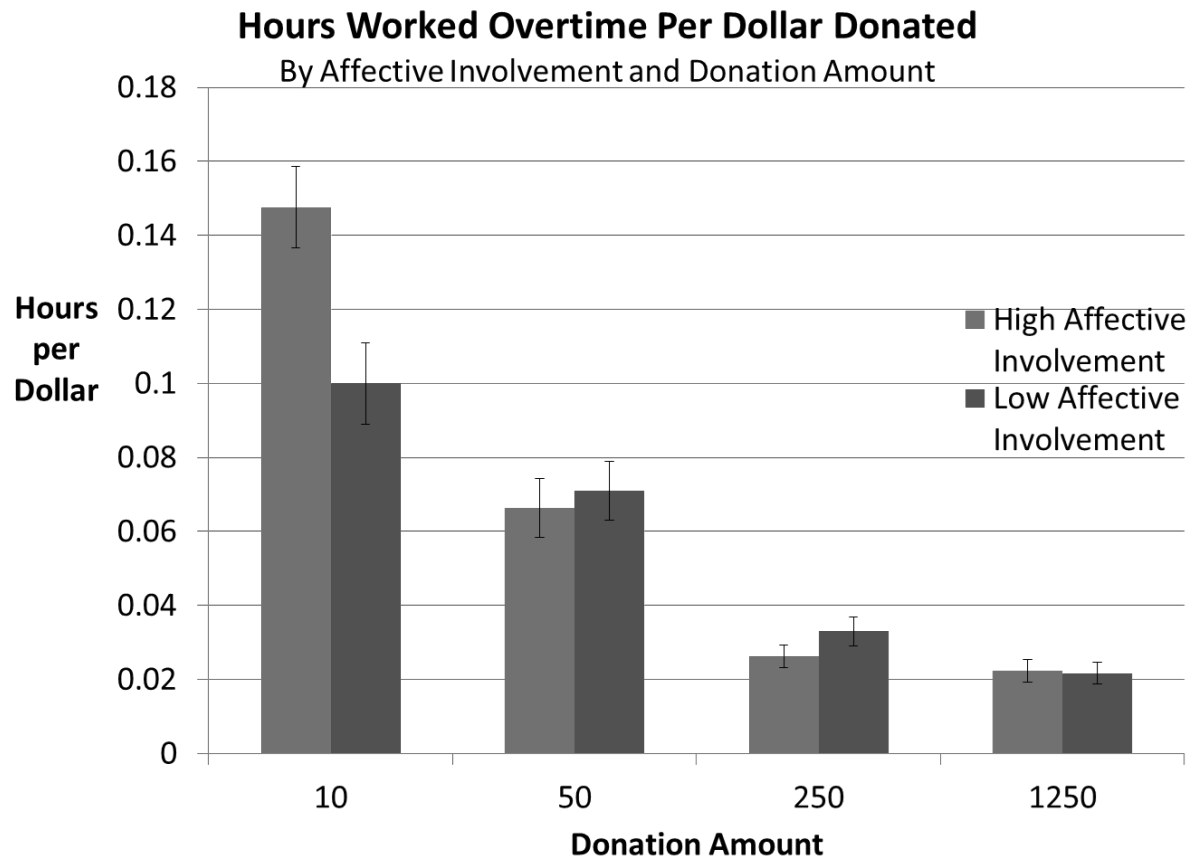
Pretesting Relative Cost Triviality for Study 4A

One of the key findings from this research is that periodic pricing can work outside the domain of trivial costs. This is seen in the study 4A scenario where people are more willing to agree to a car lease presented in a periodic pricing frame ($20/day) than the aggregate (yearly) equivalent. As discussed throughout the paper, we believe that we obtained this result because the periodic pricing frame changed how an individual perceives the contract's benefits. Yet one plausible alternative account is that the periodic price appears *relatively* trivial, compared to the

complete cost while the aggregate cost does not appear relatively trivial. This possibility

warrants further study, first, because it offers a conflicting account from our theory. Second, if

true, it would suggest other cases where periodic pricing could increase purchase intentions even

though it does not call to mind other contracts involving *explicitly* trivial amounts of money. So,

we ran an ancillary study to understand what information people consider when determining if an

expenditure is trivial.

In this test, we wanted to know whether people consider a car's periodic cost to be trivial

when the daily cost is low in absolute dollars or relative to the car's total cost. We recruited 95

participants to complete a fully randomized 3 x 3 repeated-measures study. We asked

participants to suppose they were deciding whether to buy a car, and to rate whether they

considered the proposed payment "trivial, like a cup of coffee, or very substantial." We

manipulated the daily cost of the car ($2, $10 or $20) and the base cost of the car ($10,000,

$50,000, or $100,000). Each item read "Pay $x per day to lease a $y car" and participants

responded on a 0-10 (0 = "Very Trivial Expense"; 10 = "Very Substantial Expense"). If cost

triviality ratings are relative to total cost, responses would decrease with the cost of the car. In

contrast, if cost triviality ratings are based on explicit payment amounts, responses would

increase with the daily payments.

The results indicate support for much stronger support for an explicit account of cost

triviality. As figure WA4 illustrates, when base car cost increases by a factor of 10, a repeated

measures ANOVA reveals that mean expensiveness ratings decrease ($10,000 vs. $50,000 vs.

$100,000 total cost: $M_{10k} = 4.71$, $SD = 3.0$ vs. $M_{50k} = 4.3$, $SD = 2.9$ vs. $M_{100k} = 4.0$, $SD = 2.9$; $F(2,$

$188) = 13.4$, $p < .0001$). As daily payments increase by a factor of 10, mean expensiveness

ratings rise ($2 vs. $10 vs. $20 per day: $M_2 = 2.3$, $SD = 2.4$ vs. $M_{10} = 4.8$, $SD = 2.6$ vs. $M_{20} = 6.1$,

$SD = 2.8$; $F(2, 188) = 182.3$, $p < .0001$). Comparing effect sizes, the daily payment amount influenced cost triviality dramatically more than the base car cost. Estimated partial ω^2s reveal that the base car cost accounts for less than 1% of variance while the daily payment amount accounts for 23% of variance. This stark contrast suggests that cost triviality in periodic pricing is much more influenced by explicit payment amount than how the amount relates to the full cost. These results suggest that the findings in study 4 are not due to the fact that the periodic price is low relative to the total cost of the car.

Figure WA4. Daily payments, total costs and car lease expensiveness ratings
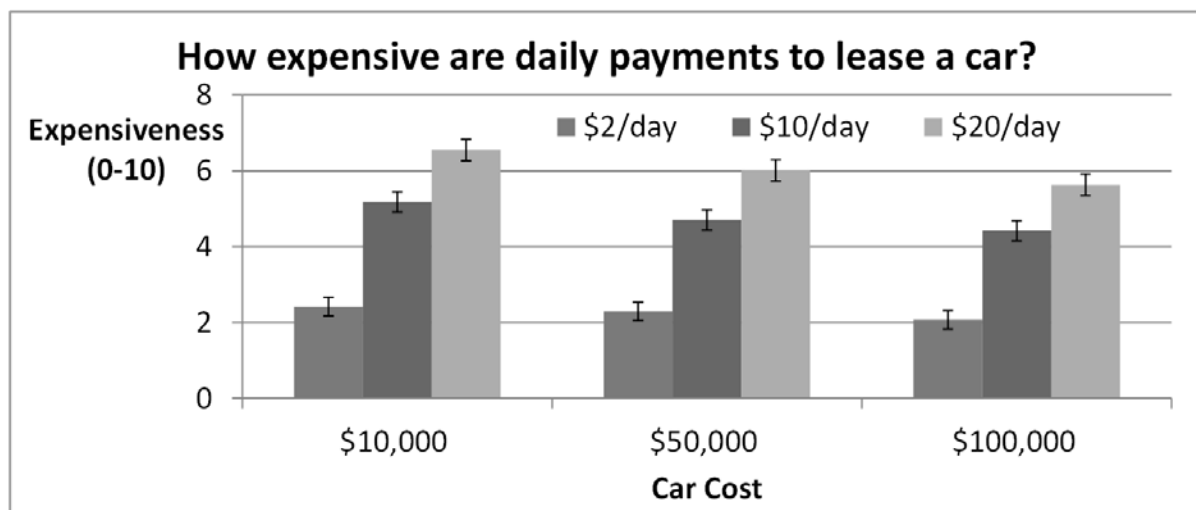
Scale Construction in Study 4B

Following a scenario and purchase likelihood question identical to study 4a, participants answered a series of questions which allowed us to evaluate participants' financial/debt literacy, numerical ability, and construal level. We construct scales that would measure numerical ability, financial/debt literacy, and construal efficiently, because we wondered whether online

participants' attentional capacities might flag over the course of a long survey. Seventy participants completed the long-form scales in random order, and within each scale the items were randomized.

First, we constructed a large numerical ability scale combining 11 items measuring numeracy (Lipkus, Samsa, and Rimer 2001) and 10 items measuring cognitive reflection (CRT) (Frederick 2005; Frederick, personal communication, February 29, 2012). We wanted to construct a reliable scale of 4 to 6 items that contained at least two numeracy and two CRT items. Starting with a scale consisting of all 21 items, we iteratively eliminated items with the lowest item-rest correlation to maximize the alpha resulting from the fewest items. Our final scale consisted of five items (two numeracy and three CRT) with a Cronbach's α of .75. Scores on this scale ranged from zero to one and increased by 0.2 for each item answered correctly.

We constructed a shortened scale comprised of items from the financial literacy (Lusardi and Mitchell 2011) and debt literacy (Lusardi and Tufano 2009) scales. Together, these six items had a Cronbach's α of .5335, and again we iteratively eliminated items with low item-rest correlation to produce a four-item scale (α = .5988). This scale ranged from zero to one and increased by 0.25 for each item answered correctly.

We followed an analogous process for our construal level scale. Aiming to arrive at a final scale with 4-6 items, we iteratively dropped items, following the procedure described above, from Vallacher and Wegner's (1989) 24-item Behavioral Identification Form to arrive at a four-item scale (α = 0.77). Scores on this scale ranged from zero to one and increased by 0.25 for each abstract option selected.

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