

PERIODIC PRICING AND PERCEIVED CONTRACT BENEFITS

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Abstract

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

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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 seven versus eight 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 times 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 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 consumer's 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 2017).

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 differences in mental representation can be produced by framing equivalent events differently. 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, Bartels, and Parker 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 (Chakravarti et al. 2002; Wathieu and Bertini 2007; Bertini and Wathieu 2008; Hamilton and Srivastava 2008). 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 (McFadden and Leonard 1993; Kahneman and Knetsch 1992; Desvousges et al. 1992; Baron and Greene 1996), a property that is integrated into standard utility theories (for a summary of utility functions, see Kreps 1990) and behavioral extensions of utility theories (e.g., 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 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 $1/365^{\text{th}}$ 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 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 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 versus \$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 et al. 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, 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 briefly describing 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 ($M_{\text{periodic}} = 0.19, SD = 0.82$ vs. $M_{\text{aggregate}} = -0.20, SD = 0.83$; $F(1, 148) = 8.24, p < .001$).

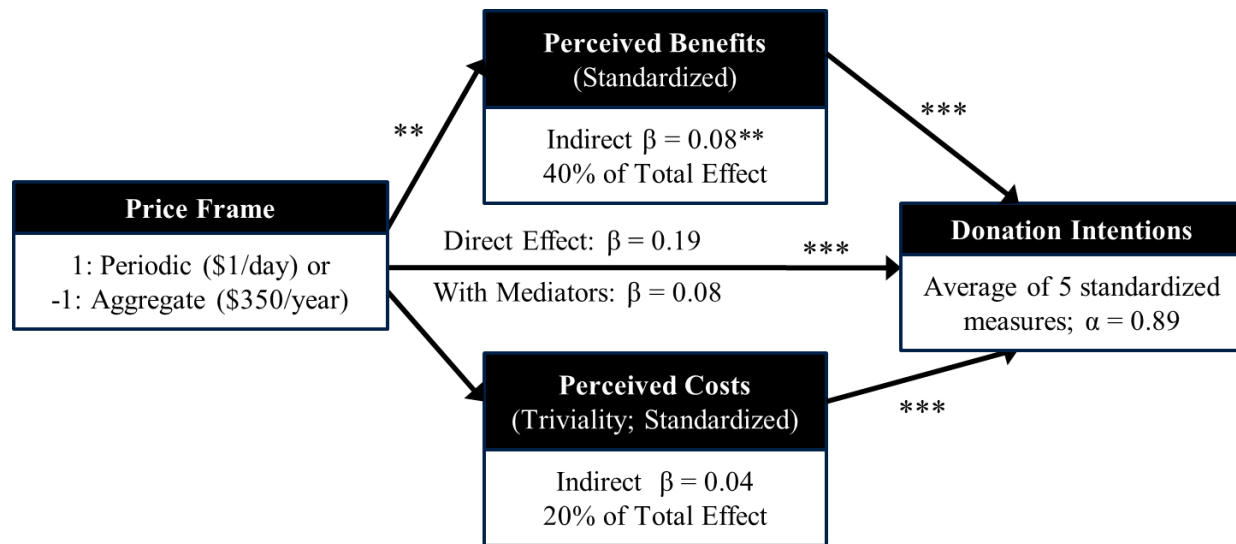
Next, we compared people's perceptions of benefits and costs across the two conditions. Perceived benefit (daily pleasure) ratings were significantly higher under periodic pricing than aggregate pricing ($M_{\text{periodic}} = 4.76, SD = 2.83$ vs. $M_{\text{aggregate}} = 3.75, SD = 2.77$; $F(1, 148) = 4.84, p = .03$) while perceived cost (triviality) ratings did not significantly differ ($M_{\text{periodic}} = 4.90, SD = 3.18$

vs. $M_{\text{aggregate}} = 4.17$, $SD = 2.79$; $F(1, 148) = 2.22$, $p = .14$). Perceived benefits and cost triviality were each highly correlated with donation intentions ($r_{\text{benefits}} = .62$, $p < .0001$; $r_{\text{cost triviality}} = .46$, $p < .0001$).

As shown in figure 1, perceived benefits significantly mediate the relationship between price frame and donation intentions ($\beta_{\text{indirect}} = 0.08$, $SE = 0.04$, 95% $CI = \{0.01, 0.15\}$; 40% of effect) while cost triviality falls short of statistical significance as a mediating variable ($\beta_{\text{indirect}} = 0.04$, $SE = 0.03$; 95% $CI = \{-0.01, 0.10\}$; 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 results testing 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 no evidence that changes in perceived costs explain the relationship between price frame perceived benefits and donation intentions. Hypothesis 1 offers the most compelling explanation for the observed results: periodic pricing increased perceived benefits and, in turn, donation intentions.

Figure 1. Perceived benefits mediate price frame and donation intentions.



Note: Joint estimation of two paths through three simultaneous equations (SUR); bootstrapped with 5,000 replications. * $p < .10$, ** $p < .05$, *** $p < .01$.

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 U.S. 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, which had a time limit imposed by the online recruitment process, Study 1b did not, 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 ($M_{\text{periodic}} = 24.5\%$, $SD = 0.278$; $M_{\text{aggregate}} = 9.9\%$, $SD = 0.165$; $F(1, 134) = 13.46$, $p < .001$), 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 ($M_{\text{periodic}} = 3.45$, $SD = 0.80$; $M_{\text{aggregate}} = 3.15$, $SD = 0.93$; $F(1, 134) = 4.08$, $p < .05$), and subscription costs were rated as more trivial under periodic pricing ($M_{\text{periodic}} = 4.33$, $SD = 1.26$; $M_{\text{aggregate}} = 3.74$, $SD = 1.08$; $F(1, 134) = 8.48$, $p < .01$).

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 ($\beta_{\text{indirect}} = 0.05$, $SE = 0.03$; 95% $CI = \{0.01, 0.12\}$; 18% of effect) while perceived costs again fell short of statistical significance as a mediating variable ($\beta_{\text{indirect}} = 0.01$, $SE = 0.03$; 95% $CI = \{-0.03, 0.07\}$; 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 ($\beta_{\text{daily}} = 0.555$; $z = 2.18$; $p < .05$) and subscription ($X^2(4) = 34.18$; $p < .0001$) but not their interaction ($X^2(4) = 3.65$; $p > .4$), 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 UN 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 ($M_{\text{periodic}} = 6.80$, $SD = 3.07$; $M_{\text{aggregate}} = 4.95$, $SD = 3.07$; $F(1, 93) = 8.46$, $p < .01$). Participants also listed more advantages under the periodic pricing frame ($M_{\text{periodic}} = 2.40$, $SD = 1.58$; $M_{\text{aggregate}} = 1.65$, $SD = 1.55$; $\beta_{\text{periodic}} = 0.12$; $SE = 0.05$, $z = 2.54$; $p = .01$) but an equivalent number of disadvantages ($M_{\text{periodic}} = 1.5$, $SD = 2.0$; $M_{\text{aggregate}} = 1.7$, $SD = 1.2$; $\beta_{\text{periodic}} = -0.03$; $SE = 0.06$, $z = -0.49$; $p > .20$). 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 ($M_{\text{periodic}} = 1.55$, $SD = 0.25$; $M_{\text{aggregate}} = 1.04$, $SD = 0.19$; $\beta_{\text{periodic}} = 0.13$; $SE = 0.06$, $z = 2.19$; $p = .03$). 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 ($\beta_{\text{indirect}} = 0.06$, $SE = 0.04$, 95% $CI = \{0.01, 0.16\}$; 21% of

effect), whereas the number of disadvantages falls short of statistical significance ($\beta_{\text{indirect}} = 0.01$, $SE = 0.05$; 95% $CI = \{-0.10, 0.09\}$; 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).

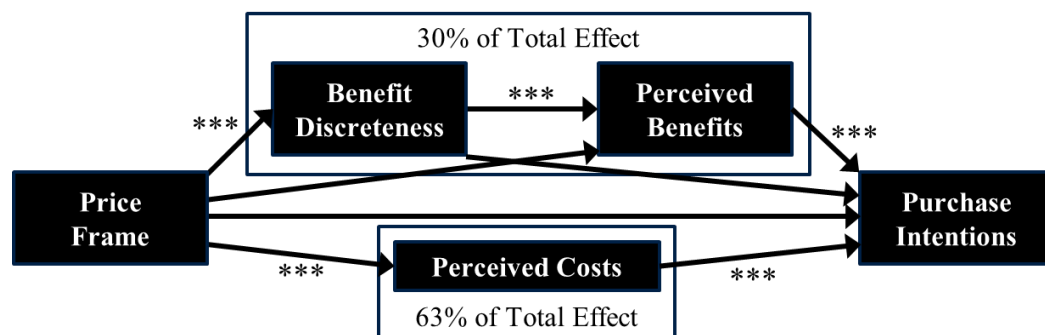
Participants responded to ten 7-point Likert questions measuring whether they imagined their product usage occasions to be discrete/distinct (e.g., "I think about my use of Audible over many distinct sessions," $\alpha = .90$) or integrated/aggregated (e.g., "I think about my total use of the Audible 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 7-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 was 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 ($M_{\text{periodic}} = 4.49$, $SD = 3.26$; $M_{\text{aggregate}} = 3.33$, $SD = 3.05$; $F(1, 269) = 9.15$, $p < .01$). Under periodic pricing, participants viewed the costs to be more trivial ($M_{\text{periodic}} = 3.97$, $SD = 1.52$; $M_{\text{aggregate}} = 3.08$, $SD = 1.43$; $F(1, 269) = 24.61$, $p < .001$) and the benefits to be marginally higher ($M_{\text{periodic}} = 4.49$, $SD = 1.75$; $M_{\text{aggregate}} = 4.125$, $SD = 1.73$; $F(1, 269) = 2.00$, $p < .10$). Under periodic pricing, the benefits were seen as more discrete ($M_{\text{periodic}} = 3.52$, $SD = 0.57$; $M_{\text{aggregate}} = 3.33$, $SD = 0.61$; $F(1, 269) = 6.84$, $p < .01$).

Periodic pricing increases donation intentions because (1) perceiving benefits as more discrete increases perceived benefits ($\beta_{\text{indirect}} = 0.05$, $SE = 0.02$, 95% $CI = \{0.01, 0.10\}$; 30% of effect) and (2) due to lower perceived costs ($\beta_{\text{indirect}} = 0.10$, $SE = 0.02$, 95% $CI = \{0.06, 0.16\}$; 63% of effect). Benefit discreteness mediates 90% of the observed relationship between price frame and perceived benefits ($\beta_{\text{indirect}} = 0.09$, $SE = 0.04$, 95% $CI = \{0.02, 0.17\}$; 90% of effect). The perception of costs and benefits together mediate 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. *Figure 2. 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. * $p < .10$, ** $p < .05$, *** $p < .01$.

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 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).

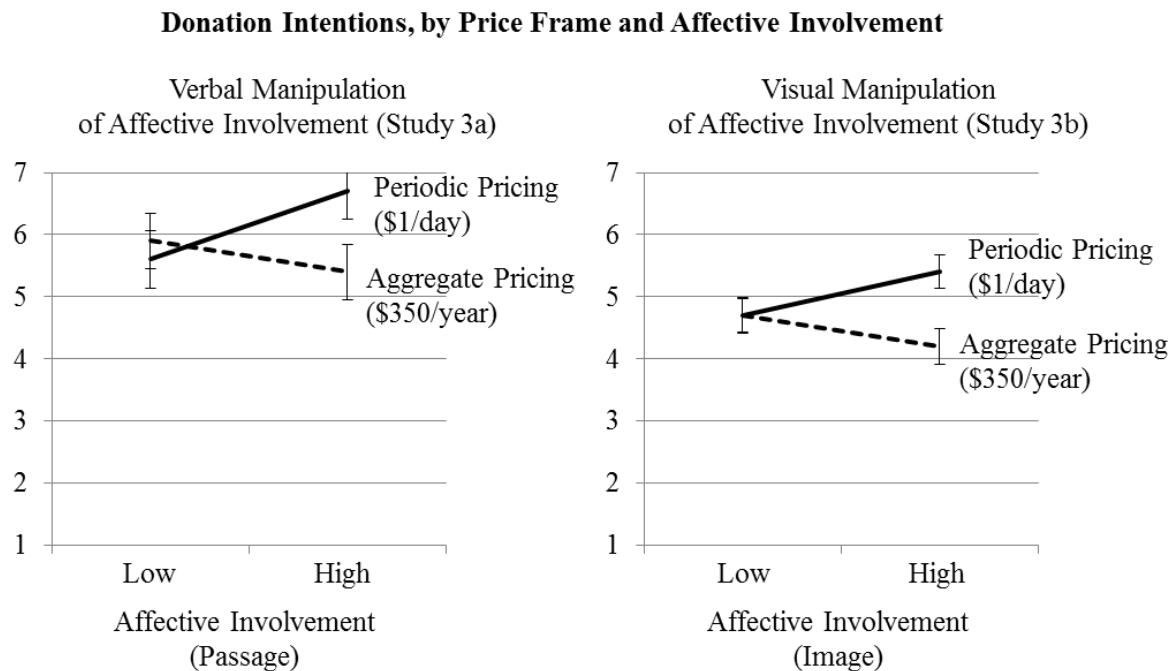
After the passage, participants in both conditions were asked to imagine the benefits of donating and reported their likelihood of donating, based on either a periodic price (\$1 per day) or aggregate price (\$350 for the year) for the 2 x 2 between-subjects design of this study.

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: $M_{\text{periodic}} = 6.65$, $SD = 3.32$ vs. $M_{\text{aggregate}} = 5.42$, $SD = 3.36$; $F(1, 223) = 3.78$, $p = .05$; low affective involvement: $M_{\text{periodic}} = 5.63$, $SD = 3.48$ vs. $M_{\text{aggregate}} = 5.89$, $SD = 3.35$; $F(1, 223) = 0.17$, $p = .68$; 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. Creating higher affective involvement by including the picture, in that study, produced more scope-insensitive valuations (similar results are reported in Kogut and Ritov 2005; 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.

Figure 3. Periodic pricing increases donation intentions for appeals involving high affective involvement.



Method. We presented 577 mTurk participants with a scenario about donating to a charity in a 2 (price frame) x 2 (picture) x 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 ($M_{\text{periodic}} = 5.04$, $SD = 3.36$ vs. $M_{\text{aggregate}} = 4.46$, $SD = 3.18$; $F(1, 573) = 4.49$, $p = .03$). 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: $M_{\text{periodic}} = 5.39$, $SD = 3.49$; $M_{\text{aggregate}} = 4.23$, SD

= 3.18; $F(1, 573) = 9.16, p < .01$; low affective involvement: $M_{\text{periodic}} = 4.70, SD = 3.20$; $M_{\text{aggregate}} = 4.69, SD = 3.18$; $F(1, 573) = 0.00; p = .99$; interaction: $F(1, 573) = 4.60, p < .05$). Although contributions differed by scenario ($M_{\text{homeless}} = 5.17, SD = 3.38$; $M_{\text{pandas}} = 3.87, SD = 3.18$; $M_{\text{unicef}} = 5.20, SD = 3.12$; $M_{\text{wounded}} = 4.75, SD = 3.29$; $F(3, 561) = 5.32, p = .001$), the results are robust across the charities. Web appendix B shows these results also persist when including the other measures that could relate to valuation (age, gender, expenditure, marital status, income, educational level), when excluding participants who failed the attention checks, and also when considering 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, periodic pricing 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.

Pretests. 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 ($M_{\text{periodic}} = 6.89$, $SD = 2.77$ vs. $M_{\text{aggregate}} = 5.03$, $SD = 3.62$; $F(1, 58) = 4.89$, $p = .03$). This effect remains significant when controlling for other variables ($M_{\text{periodic}} = 6.89$, $SE = 0.56$ vs. $M_{\text{aggregate}} = 5.04$, $SE = 0.52$; $F(1, 50) = 5.18$, $p = .03$). Participants reported greater perceived benefits under periodic pricing (perceived benefits: $M_{\text{periodic}} = 7.84$, $SE = 0.46$ vs. $M_{\text{aggregate}} = 6.42$, $SE = 0.42$; $F(1, 50) = 4.59$, $p = .04$). In contrast, triviality ratings did not significantly differ (cost triviality:

$M_{\text{periodic}} = 3.81, SE = 0.45$ vs. $M_{\text{aggregate}} = 2.98, SE = 0.42; F(1, 50) = 1.64, p > .20$). 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; $M_{\text{periodic}} = 3.96, SD = 2.81$; vs. the scale midpoint, 5, one sample $t(27) = -1.95, p = .03; M_{\text{aggregate}} = 2.84, SD = 2.94$ vs. 5; one sample $t(31) = -4.15, p = .0001$).

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 ($\beta_{\text{indirect}} = 0.16, SE = 0.08; 95\% CI = \{0.04, 0.35\}; 59\%$ of effect) while cost triviality does not ($\beta_{\text{indirect}} = 0.02, SE = 0.03; 95\% CI = \{-0.01, 0.13\}; 9\%$ 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 ($\beta = 0.15, SE = 0.08; 95\% CI = \{0.02, 0.34\}; 57\%$ of effect). The perceived triviality path and the path considering perceived benefits as a function of triviality, however, were each not significant (triviality: ($\beta_{\text{indirect}} = 0.02, SE = 0.03; 95\% CI = \{-0.01, 0.12\}; 9\%$ of effect); triviality-to-benefits: ($\beta_{\text{indirect}} = 0.00, SE = 0.01; 95\% CI = \{-0.00, 0.04\}; 1\%$ 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 (Lusardi and Tufano 2009; Lipkus 2001; Frederick 2005) 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 random order, and the items within each scale were randomized.

Results. Purchase intentions were marginally higher when participants were presented with periodic prices ($M_{\text{periodic}} = 6.09$, $SD = 3.08$ vs. $M_{\text{aggregate}} = 5.45$, $SD = 3.30$; $F(1, 319) = 3.20$, $p = .07$). 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 ($r = -.02$, $p > .30$). Controlling for numerical ability, financial literacy, and construal level, purchase intentions were significantly higher under periodic pricing ($M_{\text{periodic}} = 6.12$, $SE = 0.25$, $M_{\text{aggregate}} = 5.42$, $SE = 0.25$, $F(1, 316) = 3.89$, $p < .05$). 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 visitors to the website 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 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; $M_{\text{cost}} = 4.38$, $SD = 1.08$; 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 their 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, 0.7% 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 ($p < 0.01$).

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 payments: 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, i.e., 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 versus 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 when 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, like 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.

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