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# $29 for 70 Items or 70 Items for $29? How Presentation Order Affects Package Perceptions

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When consumers consider a package (multi-item) price, which presentation order is more appealing, price first ($29 for 70 items) or item quantity first (70 items for $29)? Will this depend on package size (larger [70 items] vs. smaller [7 items]) or unit price calculation difficulty (higher [$29 for 70 items] vs. lower [$20 for 50 items])? Why? Three studies demonstrate how presentation order affects package evaluations and choice under different levels of package size and unit price calculation difficulty. The first piece of information becomes salient and affects evaluations when packages are larger and unit price calculations are difficult (i.e., price-item [item-price] makes price [items] salient, negatively [positively] affecting evaluations). These effects do not persist with smaller packages or easier unit price calculations. Our findings contribute to several literatures (e.g., numerosity, computational difficulty) but primarily to the order effects literature and have implications for measurement and practice (e.g., pricing).

Firms use different strategies to communicate price. One approach is to simply advertise unit price. For instance, Apple's iTunes could advertise a promotional price of $.41 for each song. Another popular approach is to communicate a package price (i.e., a price for multiple items). Apple's iTunes could advertise price as $29 for 70 songs and allow consumers to buy as many songs (items) as they wish. Although the unit price is still $.41, presenting a package price might have consequences. For example, changing the order of price and item (70 songs for $29 instead of $29 for 70 songs) might change how consumers perceive the offering. We provide initial insights on how different factors moderate the influence of presentation order (price-item vs. item-price) on consumer evaluations (e.g., unit price, trial likelihood) and choice.

Package pricing is used frequently in the marketplace. Sam's Club and Costco sell larger packages of products. Walmart and Kroger also advertise multiple items together (10 cans of soup for $10). Newspapers offer monthly and yearly subscription rates. One class of products that lends itself to package pricing is electronic content, such as songs, television shows, and movies. For instance, with most online music stores (e.g., Apple iTunes), a consumer can buy a single song or an entire album. Few physical limits exist for how electronic content is offered, and different price presentation strategies can easily be employed. We focus on divisible packages where consumers can purchase as many items as they wish.

A package price consists of two components: price and item quantity. Three different factors can be changed to influence the relationship between these two components: presentation order (price-item [$29 for 70 songs] or item-price [70 songs for $29]), package size (larger [$29 for 70 songs] or smaller [$2.90 for 7 songs]), and unit-price calculation difficulty (higher [$29 for 70 songs] or lower [$20 for 50 songs]; 29/70 is harder to calculate than 20/50). We draw attention to two constructs (package pricing and unit prices) that have received little attention (see Capon and Kuhn [1982] for an exception) and study how the effect of

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price-item order on evaluations and choice is moderated by factors integral to these constructs (package size and unit price calculation difficulty).

We argue that when unit price calculation difficulty is higher, consumers use heuristics to arrive at an estimate. In the larger (vs. smaller) packages, the magnitude of all the numbers is larger ($29 for 70 songs). We posit that in the larger packages, the first piece of information will be more salient. Thus, price-item ordering ($29 for 70 songs) will make price more important, but item-price ordering (70 songs for $29) will make items more important. Correspondingly, consumers will judge price-item (vs. item-price) ordering less favorably (e.g., higher unit prices, lower trial likelihoods). We draw from the anchoring literature (Epley and Gilovich 2010) to provide support. We do not expect presentation order to influence evaluations in the smaller packages. This is because we expect consumers to convert the difficult calculation ($2.90 for 7) into an easier approximate one (e.g., $2.80 for 7 or $3.00 for 10) to arrive at an estimate. The number-encoding literature (Dehaene 1992) provides support.

When difficulty of calculating unit price is lower, irrespective of package size ($20 for 50 songs or $2 for 5 songs), the unit prices are computable ($.40/item). Because unit prices are comparable and the package is divisible, the effect of other package characteristics on perceptions will be attenuated. In summary, we posit that the effects of presentation order (price-item vs. item-price) on product evaluations and choice will be moderated by package size (larger vs. smaller) and unit price calculation difficulty (higher vs. lower).

Although we contribute to several literatures (e.g., numerosity, computational difficulty), our primary contribution is to further understanding of how order effects manifest. As evidenced by the variability of predictions in the order-effect literature, without theory and empirical testing it is difficult to predict if order affects outcomes (evaluation, choice) in a given context. Order effects could materialize as a primacy or recency effect, where the first or last piece of information is overweighted, respectively. Alternatively, no order effects may appear. Previous research has developed theories that can predict whether primacy or recency will occur, or identify boundary conditions when no order effect will occur. Some of the contexts that have been used include belief updating (Hogarth and Einhorn 1992), persuasive messaging (Haugtvedt and Wegener 1994; Unnava, Burnkrant, and Erevelles 1994), and product evaluation and choice (Carlson, Meloy, and Russo 2006; Kardes and Herr 1990).

We test order effects in a pricing context; however, our theory should generalize to any context where two numerical components combine to create a third evaluable component and where per-unit calculations are important—especially if size of numbers can vary and per-unit calculation can be difficult (e.g. price and quantity combine to form a "package," miles and gallons combine to form "MPG"). For instance, Larrick and Soll (2008) demonstrated that miles per gallon (MPG) elicit different responses relative to gallons per 100 miles. In their conceptualization, the numbers change as units change (e.g., 30 MPG = 3.3 gallons per 100 miles). It is possible—as we demonstrate with pricing—that reversing the order can elicit different responses even when the units remain invariant (e.g., 30 miles for 1 gallon or 1 gallon for 30 miles), especially when the numbers are larger and per-unit calculations difficult (540 miles for 18 gallons or 18 gallons for 540 miles). Implications also arise in other contexts (e.g., spending, savings, risks) when choices are bracketed (Gourville 1998; Read, Loewenstein, and Rabin 1999). Our research also raises a few methodological questions and makes important managerial contributions. We elaborate on all these topics in the General Discussion.

## THEORETICAL BACKGROUND

We draw from three literature streams to derive our hypotheses. First, research on computation ease suggests that consumers use biased approaches to form evaluations when calculations are more difficult. Second, research on numerosity and number-encoding guides our hypotheses of how larger and smaller package sizes impact consumer perceptions. Finally, anchoring research informs how presentation order impacts judgments.

### Ease of Computation

Extant literature suggests that individual difference variables (e.g., cognitive skills/analytical ability, need for closure; Cacioppo and Petty 1982; Webster and Kruglanski 1994), situational factors (e.g., information overload, time constraints; Dhar and Nowlis 1999; Suri and Monroe 2003), or even factors embedded in the decision context (e.g., the nature of the numbers involved; Thomas and Morwitz 2005, 2009a, 2009b) can lead to real or perceived difficulty in performing the required computations. In such instances, consumers use heuristics to make inferences (Chaiken and Maheswaran 1994; Petty and Cacioppo 1981; Simon 1990).

Recently, Thomas and Morwitz (2009a) demonstrated how computation ease influences judgments of price differences. They find that magnitude differences are judged smaller when computations are harder (e.g., 4.93 − 3.92 = 1.01) versus easier (e.g., 4.00 − 3.00 = 1.00) because harder computations are less fluent. These effects do not manifest when mental computations are not needed, suggesting that such kinds of biased processing strategies are used when computations are difficult or when cognitive ability is limited.

This "ease-of-computation effect" is closely related to —yet conceptually different from—the effects we are investigating. We investigate how ease of unit price calculations, based on price and item quantity, affects inferences. The combination of price and quantity can increase the complexity of unit price calculations. Unit price computation is harder when 70 songs cost $29 relative to when 50 songs cost $20 (29/70 is harder to calculate than 20/50), even though the actual unit price is comparable ($.41 vs. $.40). When unit price calculations are not as difficult, we do not expect any effects of the other variables, as unit costs are computable. When calculations are difficult, the largeness of numbers may skew inferences, as discussed next.

## Numerosity and Number Encoding

Extant literature on numerosity demonstrates how largeness of numbers influences perceptions. Wertenbroch, Soman, and Chattopadhyay (2007) found that changing currency numerosity affects perceptions. A difference of $9 between a consumer's budget (US$10) and price of a target item (US$1) appears higher in a currency that is 1.7 times more numerous (e.g., Singapore dollars S$17 − S$1.7 = S$15.3), leading to increased spending.

Bagchi and Li (2011) show how the magnitude of the medium (higher vs. lower) in which loyalty rewards are offered affects inferences. Imagine a reward that costs $100 to earn. In the higher (vs. lower) magnitude program, consumers need to accumulate more points to earn the reward (e.g., 1,000 vs. 100), although the number of points earned per dollar is also higher (10 vs. 1 point[s]/dollar). These researchers show that when consumers focus on points needed alone, distance differences appear larger in the higher (vs. lower) magnitude program.

Pelham, Sumarta, and Myaskovsky (1994) provide an explanation for the effects documented above by suggesting that as larger numbers are often associated with larger sizes, individuals use the magnitude of a number to infer size and ignore other relevant cues. Similarly, we expect the higher numerosity of price and quantity inherent in larger (vs. smaller) packages to have a greater impact on evaluations. We do not expect smaller numbers in smaller packages to skew perceptions and draw from the number-encoding literature to provide support.

Dehaene's (1992) triple-code model suggests that numbers are mapped onto a logarithmic number line. This leads to more analog representations (e.g., a small-large mental number line) for larger numbers but symbolic representations (exact) for smaller numbers (see also Thomas and Morwitz 2009b). Judgments based on analog representations might not follow the rules of math because such representations are intuitive in nature. But with smaller numbers, consumers might resort to more careful computations using symbolic representations. However, when calculations are difficult ($2.90 for 7) it may not be easy to do the exact computations. So, consumers may convert the difficult calculation into an easier approximate one (e.g., $2.80 for 7 or $3.00 for 10) and arrive at an estimate. Even if the calculations are "off," consumers will think they are in the ballpark as all the numbers are smaller. Analog representation of larger numbers makes such computations difficult. Even if exact numbers were used, it would be hard to convert a difficult calculation into an easier one as a small change can lead to a large difference in estimates. Indeed, approximations are difficult with larger numbers (Dehaene and Mehler 1992). But how do larger numbers affect decisions? The anchoring literature provides insights.

## Anchoring

There is little doubt that numerical anchors influence subsequent judgments (Epley and Gilovich 2010; Tversky and Kahneman 1974). An example from Tversky and Kahneman's (1974) article illustrates these effects. Participants under time pressure gave very different estimates of 8! depending on presentation order ($1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$ vs. $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$). The descending sequence produced higher estimates, suggesting that participants focused on the first piece(s) of information as a "starting point" to make inferences (Epley and Gilovich 2010).

The anchoring literature suggests that individuals often anchor on the first piece of information provided, form initial judgments, and then fail to update those judgments to account for subsequent information. While most anchoring research has used anchors unrelated to the focal judgment, Epley and Gilovich (2010, 21) contend that it is important to study the effects of anchors encountered in everyday life that are related to the focal judgment.

We study anchoring in package pricing contexts and argue that individuals will anchor on the first piece of information presented and the magnitude of that number will affect perceptions. If a firm advertises "$29 for 70 songs," consumers will anchor on price ($29) and adjust insufficiently for item quantity (70 songs). However, if the presentation order is changed ("70 songs for $29"), a reversal will emerge; consumers will anchor on quantity and adjust insufficiently for price. When anchoring on price, consumers will provide more negative evaluations (e.g., higher unit price, lower trial likelihoods, and value judgments). This should also affect choice. We do not expect these effects when package size is smaller or when calculations are easier because individuals will be able to compute unit prices. We thus predict a three-way interaction of presentation order by package size by calculation difficulty. Formally:

> **H1:** The effect of order on perceptions will be moderated by package size and calculation difficulty.
>
> Higher unit price calculation difficulty.—When package sizes are larger, price-item (vs. item-price) presentation order will lead to more negative evaluations of the product offering (e.g., higher unit price judgments, lower trying likelihoods, lower value perceptions,) and to lower choice proportions. When package sizes are smaller, order effects will not persist.
>
> Lower unit price calculation difficulty.—Order effects will not persist.

We report findings from three studies. In study 1, we use an online television service to investigate effects on trial likelihoods and value perceptions. We then briefly discuss a study that replicates these effects on unit price judgments using a music download context. In study 2, we substitute time pressure for calculation difficulty as a process manipulation. Participants compare two prices—a unit price and a package price—and indicate which has a lower per-unit price. Time constraints increase calculation and decision difficulty (Dhar and Nowlis 1999), and lead to heuristic processing (Benson and Beach 1996). This study thus provides process support by demonstrating that order effects occur when consumers process information heuristically. Study 3 investigates a wider range of variables—including affective and marketing relevant variables and choice—using an on-demand movie context. We show that the independent variables also influence whether price or item quantity is perceived as more important. When calculation difficulty is higher, importance mediates the effects of order on trial likelihoods when package size is larger but not when it is smaller.

## STUDY 1: STREAMING ONLINE TELEVISION

### Participants, Method, and Design

We recruited 218 undergraduates in return for course credit ($M_{age}$ = 21 years, 52% female). We excluded responses from six participants whose responses were 3 or more standard deviations away from the mean. The analyses reported use the remaining 212 responses.

The scenario indicated that a company introduced a web-based television service in which payment for access was by the hour. Consumers could purchase as many hours as they wished (i.e., they were not required to purchase the number of hours advertised).

We manipulated order by presenting price first (e.g., $300 for 600 hours) or item quantity first (e.g., 600 hours for $300). Larger packages used larger numerosities (600 or 580 hours) relative to the smaller packages (60 or 58 hours). Calculation difficulty was also manipulated between subjects. In the higher (lower) difficulty conditions, 580 hours cost $285.90 or 58 hours cost $28.59 (600 hours cost $300 or 60 hours cost $30). Thus, each hour cost $.49 ($.50) in the higher (lower) difficulty conditions.

This study used a 2 (order: price-item vs. item-price) × 2 (package size: larger vs. smaller) × 2 (calculation difficulty: higher vs. lower) full factorial between-subjects design. We asked participants to indicate how likely they were to try this offer (1 = not likely at all, 7 = very likely). We also asked participants to indicate how good a deal and how good a value they thought the service provided (both scales: 1 = not good at all, 7 = very good), and used these to create a composite perceived value score (Cronbach's $\alpha$ = .77).

Additionally, participants indicated how many hours of programming were advertised in the offer (text entry), how much it cost (text entry), and whether it was difficult or easy to calculate the price per hour (1 = very difficult, 7 = very easy). These served as manipulation checks for the package size and calculation difficulty manipulations, respectively.

### Results

*Manipulation Checks.* An ANOVA with hours of programming in the offer elicited only a main effect of package size ($F(1, 204) = 24.9$, $p < .0001$). Those in the larger package conditions reported a greater number of hours ($M_{large}$ = 520.43 vs. $M_{small}$ = 53.32). An ANOVA with total package cost also elicited only a main effect of package size ($F(1, 204) = 239.28$, $p < .0001$), with those in the larger package conditions reporting higher costs ($M_{large}$ = 254.98 vs. $M_{small}$ = 28.86). Finally, an ANOVA with self-reported ease of calculation as the dependent variable elicited only a main effect of calculation difficulty ($F(1, 204) = 30.49$, $p < .0001$). Calculations were easier in the lower difficulty conditions ($M_{high}$ = 4.58 vs. $M_{low}$ = 5.88).

*Trial Likelihood.* An ANOVA with trial likelihood as the dependent measure elicited a main effect of package size ($F(1, 204) = 11.92$, $p < .001$); participants were less likely to try the offer in the larger package condition ($M_{large}$ = 2.66 vs. $M_{small}$ = 3.48).

A three-way interaction of order × package size × calculation difficulty also emerged ($F(1, 204) = 10.39$, $p < .002$). The means are shown in panel A of figure 1.

As predicted, the order × package size contrast interaction was significant in the higher calculation difficulty condition ($F(1, 204) = 8.23$, $p < .005$) but not in the lower condition ($F(1, 204) = 2.79$, NS). Specifically, in the higher calculation difficulty condition, when package size was larger, price-item elicited lower trial likelihoods than item-price ($M_{p\text{-}i}$ = 1.83 vs. $M_{i\text{-}p}$ = 3.29; $F(1, 204) = 8.63$, $p < .004$). The effect of order was not significant under the other three combinations of package size and calculation difficulty (NS).

*Perceived Value.* An ANOVA with value of the service as the dependent measure elicited a main effect of package size ($F(1, 204) = 6.60$, $p = .01$), suggesting that participants felt that the larger package represented a poorer value ($M_{large}$ = 3.41 vs. $M_{small}$ = 3.89).

The predicted three-way interaction of order × package size × calculation difficulty also emerged ($F(1, 204) = 8.49$, $p < .005$). The means are shown in panel B of figure 1. The order × package size contrast interaction was significant in the higher calculation difficulty condition ($F(1, 204) = 7.88$, $p < .006$) but not in the lower condition ($F(1, 204) = 1.67$, NS). Specifically, in the higher calculation difficulty condition, when package size was larger, price-item elicited lower value perceptions than item-price ($M_{p\text{-}i}$ = 2.77 vs. $M_{i\text{-}p}$ = 3.96; $F(1, 204) = 8.91$, $p < .004$). The effect of order was not significant under the other three combinations of package size and calculation difficulty (NS).

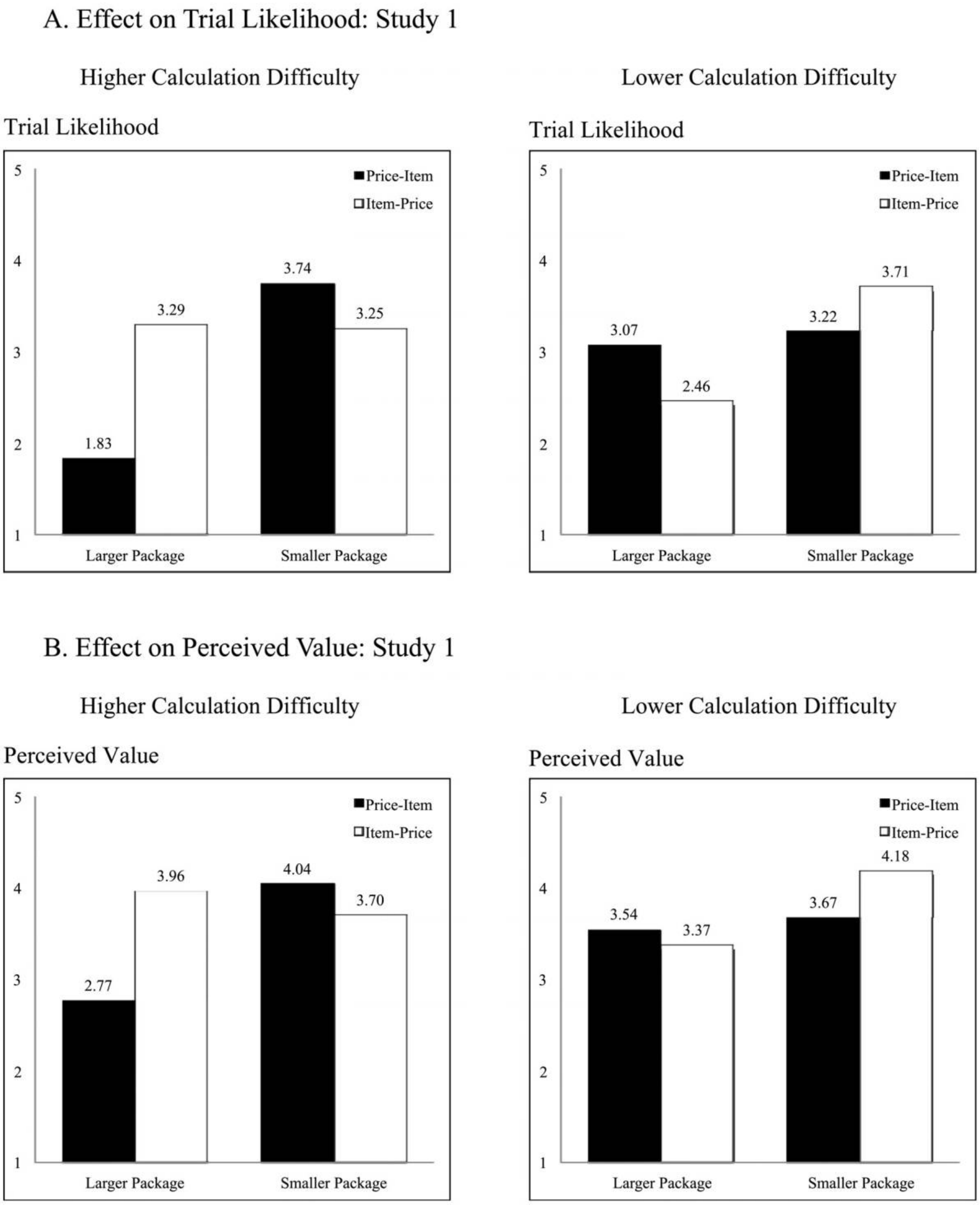
### Discussion

These results fully support our hypothesis. As predicted, when calculation difficulty was higher in the larger package condition, price-item (vs. item-price) led to lower trial likelihood and value perceptions. These differences did not persist in the smaller package condition.

We also replicated these effects on unit price evaluations

**FIGURE 1**

EFFECT OF ORDER, PACKAGE SIZE, AND CALCULATION DIFFICULTY: STUDY 1



in a separate study. We used a music download context (similar to Apple's iTunes) and analyzed data from 228 participants. We manipulated presentation order (price-item [$29 for 70 songs] vs. item-price [70 songs for $29]), package size (larger [70 or 50 songs] vs. smaller [7 or 5 songs]), and calculation difficulty (higher [70 songs cost $29 or 7 songs cost $2.90] vs. lower [50 songs cost $20 or 5 songs cost $2]) between subjects. Therefore, each song cost $0.41 ($0.40) in the higher (lower) calculation difficulty conditions. This price difference is a reversal of those in study 1, where unit price was $0.01 higher in the lower difficulty conditions. Participants assessed the magnitude of unit price (how much money per song; 1 = not much at all, 7 = a lot). An ANOVA with these assessments elicited a three-way interaction of order × package size × calculation difficulty ($F(1, 220) = 6.49$, $p < .02$). The order × package size contrast interaction was significant in the higher calculation difficulty condition ($F(1, 220) = 9.10$, $p < .005$), but not in the lower condition ($F(1, 220) = .30$, NS). As expected, in the higher calculation difficulty condition, when package size was larger, price-item elicited higher subjective unit price assessments than item-price ($M_{p\text{-}i} = 3.18$ vs. $M_{i\text{-}p} = 1.91$; $F(1, 220) = 12.49$, $p = .005$). The effect of order was not significant under the other three combinations of package size and calculation difficulty (NS).

Taken together, these results suggest that with difficult calculations, in the larger package conditions, consumers anchor on the first piece of information and adjust (insufficiently) for the second piece (Epley and Gilovich 2010; Tversky and Kahneman 1974). In these studies we did not explicitly ask participants to compute unit prices. Asking participants to make comparisons with a referent unit price may prompt them to assess unit prices, which could lead to a different pattern of results. Thus, in study 2, we ask participants to make a series of comparisons between a referent unit price and a package price and indicate the one with the lower per-unit price.

Furthermore, we use price and item combinations with low-to-moderate calculation difficulty (pretest average difficulty rating of 2.99 on a 7-point scale). However, in the higher difficulty conditions, we make calculations difficult by constraining time available to make judgments. Extant literature suggests that imposing time constraints increases calculation and decision difficulty (Dhar and Nowlis 1999; Payne and Bettman 2004; Payne, Bettman, and Luce 1996) and leads to heuristic processing (Benson and Beach 1996; Edland and Svenson 1993).

## STUDY 2: CONTEXT-FREE CHOICE STUDY

### Participants, Method, and Design

We recruited 216 participants from an online panel (mTurk.com) for a nominal payment ($M_{age} = 36$ years, 58% female). We excluded responses from seven participants whose answers were 3 or more standard deviations away from the mean. We use the remaining 209 responses.

The scenario indicated that we were interested in perceptions of unit price (e.g., unit price: $1.00) versus package price (e.g., $5 for 5 units). We explained that package pricing is another way to communicate unit price, and consumers can purchase as many units as they wish. The per-unit price from the package price could be higher or lower than the referent unit price. Participants were asked to make a series of comparisons (two practice rounds followed by five experimental rounds) between a unit price and a package price (package prices were higher in three comparisons but lower in two comparisons) and select the option with a lower per-unit price. We randomly ordered these five experimental comparisons and presented them in the same order to all participants. The prices were context independent and were presented as prices of a consumer good. Therefore, participants were only indicating which price presentation resulted in the lowest per-unit price perceptions. Lastly, no outside aids, such as a calculator, were allowed.

We manipulated presentation order, package size, and calculation difficulty (via time pressure) between subjects. We manipulated presentation order by providing either price first (e.g., $73 for 60 units) or quantity first (e.g., 60 units for $73). We also provided a referent unit price (e.g., $1.20). We used either higher numerosities (60 units) or lower numerosities (6 units). In the higher calculation difficulty conditions, participants were provided a 12-second time frame to make their choice. A pretest indicated that this duration would make calculations difficult but provide sufficient time to make a judgment. In the lower difficulty conditions, participants were allowed to take as much time as they needed. An ANOVA with self-reported time sufficiency measure indicating whether or not the time allotted was sufficient to calculate unit prices (1 = not at all sufficient, 7 = completely sufficient) as the dependent variable elicited only a main effect of time pressure ($F(1, 201) = 393.50$, $p < .0001$). Participants did not have sufficient time to perform calculations in the higher (vs. lower) calculation difficulty condition ($M_{high} = 2.53$ vs. $M_{low} = 6.11$). No other effects emerged, suggesting that our manipulations were successful.

Thus, this study used a 2 (order: price-item vs. item-price) × 2 (package size: larger vs. smaller) × 2 (calculation difficulty: higher vs. lower) full factorial between-subjects design with five unit price versus package price comparisons as a within-subject repeated measure.

### Results

Choices were coded as "0" if the participant indicated that the unit price was smaller and as "1" if the package price was judged as smaller. Therefore, higher mean values indicate that a larger proportion of the respondents felt that the package price was lower.

A repeated measures logistic regression analysis with the five pricing comparisons as the within-subject dependent variable elicited a significant two-way interaction of order × package size (Wald $\chi^2(1) = 7.69$, $p < .01$). When package size was larger, more participants judged the unit price to be lower when we used price-item order to present package information relative to when we used item-price order ($M_{p\text{-}i}$ = .41 vs. $M_{i\text{-}p}$ = .52; Wald $\chi^2(1)$ = 5.96, $p < .02$). However, when package size was smaller, order did not affect choice ($M_{p\text{-}i}$ = .48 vs. $M_{i\text{-}p}$ = .42; Wald $\chi^2(1)$ = .50, NS).

The predicted three-way interaction of order × package size × calculation difficulty emerged (Wald $\chi^2(1)$ = 4.03, $p < .05$), as shown in figure 2. The order × package size contrast interaction was significant when calculation difficulty was higher (Wald $\chi^2(1)$ = 8.98, $p < .003$) but not when it was lower (Wald $\chi^2(1)$ = .48, NS). When calculation difficulty was higher, in the larger package conditions, price-item order led more participants to judge the unit price presentation as being lower relative to when item-price order was used ($M_{p\text{-}i}$ = .39 vs. $M_{i\text{-}p}$ = .60; Wald $\chi^2(1)$ = 12.56, $p < .001$). The effect of order was not significant under the other three combinations of package size and calculation difficulty (NS).

## Discussion

As predicted in hypothesis 1, the three-way and the two-way contrast interactions were significant, and our results are consistent with earlier studies. This study also informs our research question in other ways. First, the pattern of results replicates when substituting a process manipulation —time pressure—for the calculation difficulty manipulation. Taken together, these results indicate that participants may be using a heuristic process under certain conditions (larger numerosity and higher calculation difficulty/time pressure), and the order of presentation can significantly influence perceptions under these conditions.

Second, participants were encouraged to make the unit price calculations. A referent unit price was provided, and participants were asked to indicate which of the two—unit price or package price—was lower. Participants were informed that the package price could be more or less expensive on a per-unit basis than the unit price (in three of the five comparisons [60%], package pricing was higher on a per-unit basis). Therefore, participants' motivation to make the unit price calculations should have been high. Finally, this study documents conditions under which package pricing leads to lower price perceptions relative to unit price presentations.

The earlier studies demonstrate that unit price perceptions are influenced by the interactive effect of price presentation order and package size under different levels of calculation difficulty. Given that these effects primarily occur when calculations are difficult, in the next study we focus on these conditions. We show that the independent variables influence a wider range of variables (e.g., trial likelihood, attribute importance, happiness). We also study effects on choice and investigate if relative importance of price or items mediates effects of the independent variables on trial likelihood.

# STUDY 3: ON-DEMAND MOVIES

## Participants, Method, and Design

We recruited 167 undergraduates in return for course credit ($M_{age}$ = 21 years, 73% female). We excluded responses from two participants whose responses were 3 or more standard deviations away from the mean. The analyses reported use 165 responses.

The scenario explained that the participant's cable television provider recently added a large catalog of on-demand movies and was offering a package price (with no expiration date). Participants could purchase as many movies as they wished. We manipulated presentation order by either presenting price first (e.g., $81.50 for 50 movies) or item quantity first (e.g., 50 movies for $81.50). We manipulated package size by using larger numerosities (50 movies) or smaller numerosities (5 movies). We did not manipulate calculation difficulty. Instead, we focused only on the difficult calculation conditions and examined a wider range of dependent variables.

This study used a 2 (order: price-item vs. item-price) × 2 (package size: larger vs. smaller) full factorial between-subjects design. We asked participants to indicate how likely they were to try this offer (1 = not likely at all, 7 = very likely) and whether the number of movies offered or the amount of money paid was more important (−3 = number of movies more important, 3 = amount paid more important). We used the latter variable to measure attribute importance. We also measured happiness with the offering (1 = not at all happy, 7 = very happy), liking for the promotion (1 = not at all, 7 = a lot), and likelihood of recommending the promotion in general and to friends (both: 1 = not likely at all, 7 = very likely). At the end of the survey, participants were shown an alternate per-unit price of $1.63 along with the package price (the unit prices were identical for both) and asked to indicate which alternative they would choose.

## Results

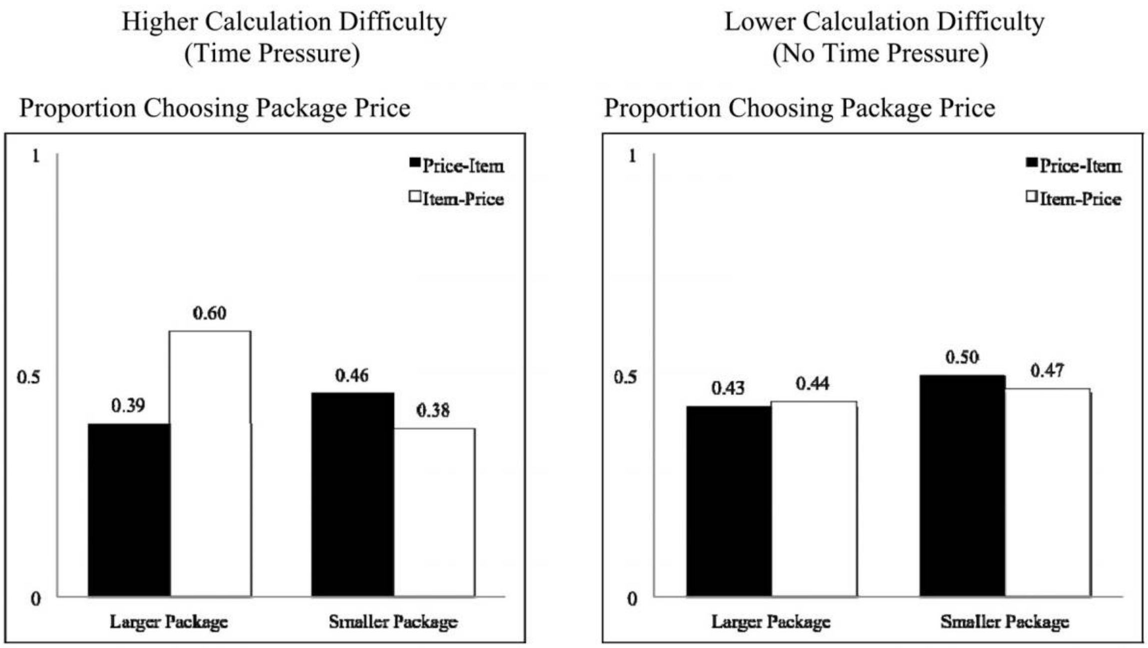
*Trial Likelihood.* An ANOVA with trial likelihood as the dependent measure elicited a marginal main effect of presentation order ($F(1, 161)$ = 2.98, $p < .09$). Trial likelihood was directionally lower when price was presented first relative to number of movies ($M_{p\text{-}i}$ = 3.69 vs. $M_{i\text{-}p}$ = 4.19). A main effect of package size also emerged ($F(1, 161)$ = 15.74, $p < .001$); trial likelihood was lower with larger packages ($M_{large}$ = 3.36 vs. $M_{small}$ = 4.52).

A two-way interaction of order × package size also emerged ($F(1, 161)$ = 5.43, $p < .03$). In the larger package conditions trial likelihood was lower when price was presented first ($M_{p\text{-}i}$ = 2.77 vs. $M_{i\text{-}p}$ = 3.95; $F(1, 161)$ = 7.98, $p < .006$), but no difference emerged in the smaller package conditions (NS).

*Attribute Importance: Number of Movies or Amount Paid.* An ANOVA with participant's rating of what was more important—the number of movies in the offer or the

**FIGURE 2**

EFFECT OF ORDER, PACKAGE SIZE, AND CALCULATION DIFFICULTY: STUDY 2




amount paid—as the dependent variable elicited a main effect of presentation order ($F(1, 161) = 4.34$, $p < .04$); the amount paid was more important when price was presented first relative to number of movies ($M_{\text{p-i}} = 1.74$ vs. $M_{\text{i-p}} = 1.20$). A main effect of package size also emerged ($F(1, 161) = 4.04$, $p < .05$). More importance was placed on the amount paid when the package was larger versus smaller ($M_{\text{large}} = 1.73$ vs. $M_{\text{small}} = 1.21$).

An order × package size interaction also emerged ($F(1, 161) = 8.05$, $p = .005$). In the larger package conditions, participants placed more importance on the amount paid when price was presented first ($M_{\text{p-i}} = 2.36$ vs. $M_{\text{i-p}} = 1.10$; $F(1, 161) = 11.74$, $p < .001$). These differences were not significant in the smaller package conditions (NS).

*Other Variables.* Additional ANOVAs were performed with the other variables—happiness with the offering, liking for the promotion, likelihood of recommending the promotion in general and to friends—as dependent variables. The patterns of the means are consistent with our hypotheses and are presented in table 1 (along with the other variables discussed above).

*Choice.* At the end of the survey, participants were presented with an alternative movie plan where price was presented on a per-unit basis, and participants were asked to choose between the two options. This was a conservative test as the unit prices were identical for the two options ($1.63). A choice of the unit price was coded as "0" and package price was coded as "1"; therefore, means represent the proportion choosing the package option.

Although a logistic regression analysis did not elicit a significant two-way interaction (Wald $\chi^2(1) = 2.12$; $p < .15$), participants in the larger package conditions demonstrated a strong preference for the unit-priced option in the price-item condition ($M_{\text{p-i}} = .20$ vs. $M_{\text{i-p}} = .46$; Wald $\chi^2(1) = 5.71$, $p < .02$). In the smaller package conditions choice proportions do not differ (NS). In larger package conditions when price is presented first, consumers form negative perceptions of the package, and thus the unit-priced option is more appealing relative to when items are presented first.

*Mediation Analysis.* A mediation analysis was conducted to investigate whether the effect of order on trial likelihood is mediated by attribute importance (number of movies or amount paid). We expected presentation order to influence attribute importance and, in turn, attribute importance to influence trial likelihood only when package size was larger. Thus, we predicted moderated mediation where package size moderates both the IV-Mediator and Mediator-DV relationships. We followed the analysis plan for moderated mediation (model 5) recommended by Preacher, Rucker, and Hayes (2007) using their MODMED SPSS macro.

As reported previously, a significant order × package size interaction emerged when attribute importance was the dependent variable, indicating that package size moderated

**TABLE 1**

SUMMARY OF MEANS, INTERACTIONS, AND CONTRASTS: STUDY 3

| | Larger package | | Smaller package | |
|---|---|---|---|---|
| | Price-item (means) | Item-price (means) | Price-item (means) | Item-price (means) |
| Trial likelihood | 2.77 | 3.95 | 4.60 | 4.43 |
| Order × package size interaction | $F = 5.43, p < .03$ | | | |
| Order contrast (by package size) | $F = 7.98, p < .006$ | | $F = .19$, NS | |
| Importance: Movies or amount paid | 2.36 | 1.10 | 1.12 | 1.31 |
| Order × package size interaction | $F = 8.05, p = .005$ | | | |
| Order contrast (by package size) | $F = 11.74, p < .001$ | | $F = .29$, NS | |
| Happiness with the offering | 3.36 | 4.29 | 4.63 | 4.52 |
| Order × package size interaction | $F = 5.07, p < .03$ | | | |
| Order contrast (by package size) | $F = 7.97, p < .006$ | | $F = .11$, NS | |
| Liking for promotion | 2.95 | 4.27 | 4.54 | 4.33 |
| Order × package size interaction | $F = 9.74, p = .002$ | | | |
| Order contrast (by package size) | $F = 14.22, p = .0002$ | | $F = .35$, NS | |
| Recommendation likelihood (general) | 3.28 | 4.09 | 4.46 | 4.52 |
| Order × package size interaction | $F = 3.25, p < .08$ | | | |
| Order contrast (by package size) | $F = 4.68, p < .04$ | | $F = .13$, NS | |
| Recommendation likelihood (friends) | 3.46 | 4.07 | 4.51 | 4.26 |
| Order × package size interaction | $F = 3.11, p = .080$ | | | |
| Order contrast (by package size) | $F = 3.05, p = .08$ | | $F = .54$, NS | |
| Choice (unit price = 0; package price = 1) | .20 | .46 | .49 | .55 |
| Order × package size interaction | Wald $\chi^2 = 2.12, p < .15$ | | | |
| Order contrast (by package size) | Wald $\chi^2 = 5.71, p < .02$ | | Wald $\chi^2 = .30$, NS | |

the effect of order on attribute importance. Of central interest, we observed a significant attribute importance × package size interaction when trial likelihood was the dependent variable (dependent variable model: $b = -0.38$, SE = .18, $t(160) = 2.07$, $p < .05$), indicating that the effect of attribute importance on trial likelihood is also moderated by package size. Probing further, we found that conditional indirect effects occur only in larger packages ($b = -.40$, bootstrapped 95% CI: −0.81 to −0.08) but not in smaller packages ($b = -.01$, bootstrapped 95% CI: −0.22 to 0.12). This provides process evidence consistent with our theorizing that order effects occur when package size is larger but not smaller.

## Discussion

In study 3 we focused on difficult-to-calculate conditions and examined the interaction of presentation order and package size on a wider range of dependent variables, including several marketing variables. The results were consistent with our hypotheses. Additionally, we replicated previously observed effects for choice, but in this study the unit price for both options was identical. While this was a conservative test, in larger package size conditions, an overwhelming majority of participants preferred the unit-priced option when price was presented first relative to when items were presented first. We also found mediational support. Presentation order makes one attribute—price or items—more salient than the other when a package is larger and the calculation is difficult; this predicts differences in trial likelihoods. The results of this study provide additional strong evidence in support of our hypotheses.

# GENERAL DISCUSSION

Three studies provide convergent evidence supporting our hypotheses and contribute primarily to the order effects literature. We find that individuals anchor on the first piece of information presented (price or item) when it is difficult to compute unit pricing in larger packages, and that it changes their perceptions of unit price. It also affects trial likelihoods, value judgments, happiness, liking, recommendation likelihoods, and choice. We also observe effects on which attribute is more important—price or items. This importance mediates the effects of the independent variables on trial likelihood. Constraining time, which induces heuristic processing, leads to similar perceptual outcomes, thus providing further process support. These effects do not manifest when unit price computations are easier or when package size is smaller.

Although we test order effects in a pricing context, our theory should generalize to contexts where two numerical components combine to create a third evaluable component and where per-unit calculations are important—especially when size of the numbers varies and unit calculations are difficult (e.g. miles and gallons in "MPG"). Thus, we also contribute to research on numerosity (Bagchi and Li 2011; Monga and Bagchi 2012; Pandelaere, Briers, and Lembregts 2011; Pelham et al. 1994; Wertenbroch et al. 2007) and computational difficulty (Alter and Oppenheimer 2009; Schwarz 2004; Thomas and Morwitz 2005, 2009a, 2009b) by demonstrating that the difficulty in calculating unit pricing has differential effects on perceptions depending on package sizes and presentation order.

Finally, our findings are likely to be important when consumers bracket their choices (Gourville 1998; Read et al. 1999; Simonson 1990). Choices can be bracketed as being narrow—where the focus is on a few choices (e.g., spending a few pennies a day), or broad—where the focus is on global consequences (e.g., considering the aggregate expenditure incurred). In any such global assessment (e.g., of spending, savings, risks) order effects may play a role when unit cost (price) calculations are difficult.

## Caveats

Several caveats are in order. First, we do not have empirical support for our process explanation of why order effects do not occur with smaller numbers when calculations are difficult. We speculate that respondents approximate the numbers and loosely follow rules of math (e.g., convert the more difficult $2.90 for 7 items to $2.80 for 7 or $3.00 for 10). With larger numbers approximations are difficult (Dehaene and Mehler 1992). A small change in numbers can lead to large differences in outcomes. Furthermore, because analog representations are used to code larger numbers, following rules of math also become harder (Dehaene 1992). Thus, order effects persist with larger numbers when calculations are difficult but not with smaller numbers.

Second, what makes a number large or small? We do not have a conclusive answer. While context will drive perceptions (small in one context can be large in another), familiarity with the context or numbers may also affect perceptions. We speculate that it will be harder to make approximations with numbers that have three or more digits, and so order effects may be more pronounced in such cases (we find effects with some two-digit numbers). Indeed, numerical approximations become harder as numbers become larger (Dehaene and Mehler 1992). We have not tested this empirically.

Third, other factors (e.g., individual differences) may attenuate or moderate these order effects. For instance, price-conscious consumers may pay more attention to price than to items irrespective of presentation order. Environmental factors (e.g., largeness of font or color schema chosen to represent one component) may also influence salience, undermining effects of order.

Finally, participants did not make real choices with monetary investments in our studies. If consumers calculated unit costs using a calculator (e.g., for expensive products), the order effects would be attenuated. However, if such external aids were not available, as is often the case, evaluations of larger packages would be influenced by item-price ordering when calculations are difficult. Trying harder to calculate unit price would not help if the calculations were indeed difficult. Furthermore, if comparisons were between a package price using one order (price-item or item-price) and a unit price, preference may be greater for the unit price, because it is a known entity and, therefore, a safer bet. However, even in this case, relatively, preference for the unit price should be greater with price-item (vs. item-price) ordering.

## Implications and Future Research

*Theoretical Implications.* Researchers often use price and quantity information as stimuli in their research but only examine one ordering. For example, Burson, Larrick, and Lynch (2009) presented cell phone and movie-rental plans using larger package sizes (numerosities) but only considered one presentation order (movies per week or year followed by price/month). Additionally, Wansink, Kent, and Hoch (1998) compared unit and multiple-unit pricing for grocery items but only presented one multiple-item price ordering (item-price). Our findings suggest that an application where the order of presentation is (inadvertently) changed might—under certain conditions—drastically alter the pattern of outcomes. It is possible that many effects found in the literature—where price and quantity information is presented—may be different if an alternate ordering were used. We suggest reinvestigation of these and similar findings in light of our research, thus ensuring that a change in presentation order will not substantially alter the findings.

*Methodological Implications.* As a methodological tool, researchers often counterbalance or randomize presentation order to remove order effects. Consider the price and item combinations that we use. Would pooling across price-item and item-price orders really elicit any meaningful outcomes? Especially when these orders lead to such different patterns of results? This raises several questions. Should researchers then be required to test for order effects? When would counterbalancing make sense? What metrics should one test prior to counterbalancing?

*Managerial Implications.* This also raises an important managerial question. In the real world, it is not possible to control for order effects. Many of our valuable academic contributions might lead to negative consequences in real-world applications if order is inadvertently reversed. How should we tackle this? One suggestion is to caution general readers, when applicable, that order of information presentation should not be varied without testing.

Our findings have other implications. Managers may naively believe that consumers will judge larger packages as a better deal irrespective of how price is presented. However, offering larger packages without understanding consumers' perceptions can be a dangerous proposition, and bigger isn't always better. As we demonstrate, if calculating unit price is difficult, it is best to present quantity before price. These findings may also apply for nondivisible packages. When assessing a deal, if physical size of the package is salient, consumers may use package size as an indicator of amount and adjust insufficiently for price.

*Future Research.* Order effects may play a role in other contexts. For instance, would order of benefits and costs affect product evaluations? Similarly, would order of price and quality affect outcomes? Changing the order might influence which of the two is more salient and could affect evaluations. Would outcomes be different if a product's image is presented first or its price? Such subtle changes may have important consequences not only in fixed-price settings but also in auctions and negotiations. We presented information simultaneously. What would happen if information were presented separately? Would the order effects persist?

*Conclusion.* We study how the effect of price and item quantity ordering on perceptions of packages is moderated by package size and difficulty of unit price calculations. We discuss important theoretical and managerial implications and identify potential areas for future research.

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