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# Temporal Reframing of Prices: When Is It Beneficial?

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#### Abstract

Prior studies provide mixed results pertaining to the effectiveness of temporal reframing of prices. This study examines the conditions in which such temporal reframing to a shorter period of time is more or less beneficial than aggregate prices. Investigations of the role of four moderating variables—price endings, price level, time periods, and calculation affinity—show that reframed prices are more beneficial than aggregate prices for high-priced products, especially in combination with even price endings, an aggregate price that normally refers to a comparatively short time period, or customers with poor calculation affinity. Aggregate prices offer more benefits than reframed prices for low-priced products, odd price endings, aggregate prices that refer to longer periods, and customers with excellent calculation affinities. © 2011 Published by Elsevier Inc on behalf of New York University.

Keywords: Pricing tactics; Temporal reframing of prices; Price attractiveness; Feeling of being misled

Consumers prefer products with attractive prices (e.g., Dodds, Monroe, and Grewal 1991; Janiszewski and Lichtenstein 1999; Lichtenstein, Bloch, and Black 1988). Therefore, marketers use different methods to present price information in such a manner that consumers perceive a better deal. One common technique is the temporal reframing of prices, in which the marketer describes the price according to a short period, such as car insurance for "less than \$1 a day," though the charges involve a longer period, such as \$360 per year. Although the price is reframed, the customer still pays the price associated with the normal contract period.

Gourville (1998) and Hardesty, Bearden, and Carlson (2007) refer to this technique as "pennies-a-day," but because this term only covers daily prices, whereas reframed prices can include any shortened time period, we adopt the broader term, "temporally reframed price." In contrast, the "aggregate price" is the normal price paid over the contract period; for most offerings, the consumption process persists for longer periods, defined by the total prices (e.g., car insurance for one year). Health clubs accordingly advertise "memberships for only \$10 a week" but demand customers pay the monthly total.

In several analyses of temporally reframed prices, Gourville (1998, 1999, 2003) finds mainly positive effects, but Bambauer-Sachse and Mangold (2009) indicate negative effects on product evaluations. Furthermore, the concepts of descriptive variance (Tversky, Sattath, and Slovic 1988) and prospect theory (Kahneman and Tversky 1979) both imply the likelihood of no (or even a negative) effect for reframed versus aggregate prices. We examine the boundary conditions that might moderate the role of temporally reframed prices to resolve these conflicts. To include various types of moderator variables, we examine those within the control of the marketer (price ending and price level), industry-specific topics (normal reference period), and individual difference notions (calculation affinity). In turn, our results provide insights regarding the conditions in which retailers can use temporal reframing of prices to their benefit, as well as those in which it is disadvantageous.

## **Background and framework**

We detail four prior studies that examine the effects of temporal price reframing (Table 1) and suggest it may be an effective pricing tactic that influences consumer's evaluations and purchase intentions. In the first study, Gourville (1998) demonstrated that temporally reframed amounts of charitable donations influence the likelihood of donation. A temporal reframing was more effective than an aggregate price level of \$350; however, for very large amounts (over \$1400), aggregate

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Study	Study description	Relevant findings
Gourville (1998)	Examined the effects of temporally reframed amounts of money (need to donate daily or yearly) on people's likelihood of donating	For a price level of \$350 (aggregate price), the likelihood of donation is higher for reframed prices
		For higher price levels (\$1400, \$2500, aggregate price), the likelihood of donation is higher for aggregate prices The likelihood of donation cannot be directly compared with a purchase decision
Gourville (1999)	Examined the effects of temporally reframed versus aggregate prices for continuously versus immediately consumed products on perceived product value	For products that are consumed on an ongoing basis (price level: \$300, \$350), perceived value is higher in the reframed condition if there is no explicit comparison to a daily expenditure
Gourville (2003)	Examined the effects of the dollar magnitude of a transaction (comparatively low versus high dollar amounts) and level of temporal aggregation (daily versus monthly versus fully integrated) on price attractiveness	For a price level of \$300 (aggregate price), the highest preference results for the presentation of a price that is reframed to a day
Bambauer-Sachse and Mangold (2009)	Examined the effects of temporally reframed prices on product evaluation on the basis of a research model adapted from studies on price partitioning effects	Temporal reframing of prices has positive effects through higher price attractiveness but negative effects through higher complexity of the price structure and a stronger feeling of being manipulated by the marketer The overall effect of price presentation on product evaluation was negative, because the negative effects appear stronger than the positive effect

framing was more effective. Gourville (1998) next examined the effects of temporal reframing for continuously versus immediately consumed products, with and without explicit frames. The temporal frame emerged as more effective for continuously consumed products without an explicit frame. Furthermore, Gourville (2003) demonstrated that this frame is particularly effective for shorter periods. However, Bambauer-Sachse and Mangold (2009) offered only mixed effects with regard to temporal reframing.

Research on the phenomenon of temporal discounting (e.g., Green, Myerson, and McFadden 1997; Myerson and Green 1995; Raineri and Rachlin 1993) and temporal construal theory (Trope and Liberman 2003) might provide a theoretical basis for explaining the mixed effects found in the preceding studies. Research into temporal discounting suggests that rewards in more distant periods tend to be associated with lower benefits than do rewards in less distant periods. Thus, people place more value on a near-future reward than a distant-future reward (even if the distant-future reward is larger). In addition, temporal construal theory suggests that distant-future events are less concrete than those associated with near-future events (Trope and Liberman 2003). When considering the cost aspect of temporally reframed prices, consumers similarly might ignore some price components that refer to more distant periods, such that greater temporal distance produced by the temporal reframing of prices could lead simultaneously to both discounted benefits and underestimated costs. Consequently, the total effect of temporal reframing remains unclear if no additional conditions are included.

In Fig. 1, we provide a basic model, adapted from Bambauer-Sachse and Mangold (2009), that integrates the role of various moderator variables and thus offers a potential means to under-

stand the conditions in which a temporal reframing of prices is more or less beneficial than aggregate prices. We further note that prior research already has confirmed the mediating roles of perceived price attractiveness and a consumer's feeling that he or she has been misled by the price presentation (Bambauer-Sachse and Mangold 2009).

Specifically, the effect of the price presentation on product evaluations and purchase intentions depends on price attractiveness (e.g., Dodds, Monroe, and Grewal 1991; Grewal, Monroe, and Krishnan 1998). Research shows that objective price presentation influences price perceptions, which affect perceived product quality, value, and willingness to buy. If temporally reframed prices have a positive effect on perceived price attractiveness, they should indirectly influence product evaluations and purchase intentions. Because consumers often use simplifying heuristics, such as anchoring and adjustment or comparison standards, they do not process price information completely; therefore, they may estimate the price on the basis of the reframed price and predict a lower total price (Bambauer-Sachse and Mangold 2009).

In contrast, if consumers expend the cognitive energy to speculate about the marketer's motives for using a temporally reframed price, they may being to suspect an attempt at manipulation by the marketer (Hamilton and Koukova 2008). This concept therefore captures both complexity and a feeling of being misled (e.g., Bambauer-Sachse and Mangold 2009). The feeling of being misled likely has negative effects on product evaluations and purchase intentions. According to equity theory (Adams 1965; Martins and Monroe 1994), the greater complexity of the temporally reframed price structure likely implies that more cognitive input is required, relative to the output gained from the product. Thus, more complex price structures may



Fig. 1. Guiding framework.

cause consumers to suspect they are being manipulated, prompting comparatively negative product evaluations. Furthermore, according to temporal construal theory (Trope and Liberman 2000, 2003), greater temporal distance from a future event implies less concrete perceptions of price components and thus a stronger feeling of being misled.

# Moderating role of price endings: Study 1

Several studies highlight the role of price endings in the context of consumers' price perceptions, price processing, attitudes, and purchase intentions (Estelami 1999; Gedenk and Sattler 1999; Schindler 2006; Stiving and Winer 1997). Consumers do not process all the numerical information contained in a price but instead process the information digit by digit; thus Western consumers begin with the numerals on the left and frequently ignore right-hand digits (Stiving and Winer 1997). In turn, prices that end in even numbers (e.g., 00) result in more accurate price perceptions than odd price endings (e.g., 99) (Estelami 1999).

With regard to reframed prices, even prices continue to be processed more easily, so they should foster positive effects of reframed prices, through the influence of greater price attractiveness. That is, we predict that even, reframed prices lead to positive product evaluations and heightened purchase intentions. Because odd price endings instead require more arithmetic operations, they are more difficult to evaluate (Estelami 1999). In addition, odd price endings signal price discounts (Gedenk and Sattler 1999) and have been directly associated with low prices (Schindler 2006) or inferior quality (Stiving and Winer 1997). Thus, odd price endings should foster negative effects of temporally reframed prices, because of the comparatively stronger feeling of being misled that they induce. We predict then that reframed, odd prices lead to negative product evaluations and lowered purchase intentions. Accordingly, we hypothesize:

**H1a.** For even price endings, product evaluations are more positive and purchase intentions are higher in the reframed price condition than in the aggregate price condition.

**H1b.** For odd price endings, product evaluations are more positive and purchase intentions are higher in the aggregate price condition than in the reframed price condition.

#### Design

In a study conducted in Germany, four hundred respondents participated in this 2 × 2 between-subject experiment, in which we manipulated the price ending as odd or even and the price as temporally reframed or aggregate (see Table 2). The prices refer to a month (common reference period in marketing practice), reframed to feature either a week or a day.<sup>2</sup> For example, membership in a health club might be  $\in 60$  or  $\in 59.99$  in the aggregate price condition. In line with Gourville's (1999) findings, we consider only products consumed on an ongoing basis, which are more appropriate for temporally reframed prices than are products consumed immediately.

After reviewing an advertisement displaying the product and its price, respondents indicated their product evaluations, purchase intentions, perceptions of price attractiveness, and feelings of being misled. Finally, they provided their age and gender; we used the demographic data to ensure the respondents were comparable across experimental groups.

# Measures

To measure the four constructs, we used multiple items adopted from prior research (Bambauer-Sachse and Gierl 2008; Bambauer-Sachse and Mangold 2009; Dodds, Monroe, and Grewal 1991; Gierl and Bambauer-Sachse 2007; Grewal, Monroe, and Krishnan 1998); we list these items and their scale reliabilities in Table 3. For perceptions of price attractiveness ( $\alpha = .88$ ), we used three items. To measure the feeling of being misled ( $\alpha = .90$ ), we employed a five-item scale. A three item scale was used to measure product evaluation ( $\alpha = .84$ ) and a three item scale was used to measure purchase intention ( $\alpha = .90$ ). Respondents used seven-point scales to assess the model constructs. The factor loadings ( $\lambda$ -coefficients) were high, which indicates that the chosen items are appropriate for measuring the four constructs (Bagozzi, Yi, and Phillips 1991).

 $<sup>^{2}</sup>$  A pretest demonstrated no significant differences between week and day lengths.

# Table 2

Experimental design, test products, and prices.

Study 1: price ending						
Price presentation	Even ending	Odd ending				
Aggregate price per month Price reframed to a week/day	Health club ( $\in 60$ ) Health club ( $\in 15/\in 2$ )	Health club ( $\in$ 59.99) Health club ( $\in$ 14.99/ $\in$	1.99)			
Notes: Controlled variables: price	level (moderate), normal period of tin	ne, calculation affinity (co	ounterbalanced lo	w/high calculation	affinity).	
Study 2: price level						
Price presentation	Low price level	High price leve	1			
Aggregate price per month Price reframed to a week/day	Internet flat rate (€24) Internet flat rate (€6/€0.80)	Car leasing (€ Car leasing (€	240) 60/€8)			
Notes: Controlled variables: norm	al period of time, calculation affinity (	counterbalanced low/high	n calculation affin	ity), price ending	(even).	
Study 3: normal period of time						
Price presentation	Short normal period (month)	Long normal po	eriod (year)			
Aggregate price per month Price reframed to a week/day	Health club (€60) Health club (€15/€2)	Car insurance ( Car insurance (	€720) €15/€2)			
Notes: Controlled variables: price	level (moderate), calculation affinity (	counterbalanced low/high	n calculation affin	ity), price ending	(even).	
Study 4: calculation affinity						
Price presentation	Low calculation	on affinity	High	calculation affinit	у	
Aggregate price per month Price reframed to a week/day	Health club (€ Health club (€	€60) €15/€2)	Healt	th club (€60) th club (€15/€2)		
Notes: Controlled variables: price	level (moderate), normal period of tin	ne per product, price endi	ng (even).			
Table 3   Measures and reliability.						
Construct	Item		Alpha			
			Study 1	Study 2	Study 3	Study 4
Perceived price attractiveness	In general, this product is well-p This price is attractive Compared with similar products a good deal	riced	.88	.86	.85	.86
Feeling of being misled	The presentation of the price is u I cannot understand this price at The price information is quite cc My friends would judge this price This supplier has the intention o customers	unclear a glance omplex ce as an unfair price f misleading	.90	.90	.88	.91
Product evaluation	This offer appeals to me This offer is convincing This offer is worth the money		.84	.77	.85	.86
Purchase intention	I can imagine buying this product I will recommend this product to If I needed a product in this cate this one	ct o my friends gory, I would buy	.90	.86	.92	.91

Notes: Seven-point scales.

# Results

We used a  $2 \times 2$  ANOVA to test H1a and H1b and thereby determine if for odd (even) prices, product evaluations and purchase intentions are higher in the aggregate (reframed) price condition. The interaction of temporal framing and price ending was significant for all four variables (see Table 4). At the even prices, reframed prices led to higher price attractiveness (even prices:  $M_{\text{reframed}} = 4.77$  versus  $M_{\text{aggregate}} = 2.88$ , t(198) = 9.95, p < .001), whereas odd prices prompted higher price attractiveness for aggregate prices (odd prices:  $M_{\text{aggregate}} = 4.12$  versus  $M_{\text{reframed}} = 3.74$ , t(198) = 1.95, p < .10). To explain this find-

.	ce attractiven	ess		Feeling of bein	g mislead		Evaluation			Purchase intenti	ons	
Age	gregate	Reframed	<i>t</i> -Value	Aggregate	Reframed	t-Value	Aggregate	Reframed	t-Value	Aggregate	Reframed	t-Value
Price ending (Study 1)												
Odd price 4.1.	2	3.74	1.95	2.06	4.96	18.2	4.75	2.54	23.38	4.54	2.51	13.7
Even price 2.8	œ	4.77	9.95	2.8	4.68	9.26	2.91	4.94	18.26	2.73	4.54	12.09
Interaction $F$ -value $F$ =	= 70.28***			$F = 15.53^{***}$			$F = 843.46^{***}$			$F = 332.14^{***}$		
Price level (Study 2)												
Low price 4.6.	2	4.16	2.37	1.92	5	18.64	4.67	2.87	18.03	4.63	2.62	13.01
High price 3.3	8	5.01	9.72	3.24	4.77	6.26	2.94	4.79	17.13	2.79	4.47	11.94
Interaction $F$ -value $F =$	= 65.68			$F = 27.71^{***}$			$F = 616.17^{***}$			$F = 311.73^{***}$		
Time period (Study 3)												
Long period 3.8		3.49	1.77	2.17	4.47	12.88	4.68	2.23	23.53	4.44	2.11	16.89
Short period 3.2	<i>L</i>	5.01	10.07	2.85	4.24	7.54	3.01	5.02	18.64	2.69	4.69	13.51
Interaction $F$ -value $F$ =	= 69.37***			$F = 12.42^{***}$			$F = 885.41^{***}$			$F = 457.46^{***}$		
Calculation affinity (Study 4)												
High calculation affinity 4.2.	4	3.38	3.84	1.81	4.57	14.99	4.95	2.5	19.94	4.7	2.44	12.07
Low calculation affinity 3.3.	6	4.91	7.3	2.6	4.54	7.97	3.42	5.22	14.33	3.35	4.76	7.39
Interaction $F$ -value $F=$	:61.29***			$F = 7.27^{***}$			$F = 585.11^{***}$			$F = 188.28^{***}$		

ing, we note that the even price endings are easier to process (Estelami 1999), whereas odd endings appear to ruin any positive effect of reframed prices on price attractiveness. In addition, we find that a feeling of being misled increases for reframed compared with aggregate prices; it grows even stronger when the prices feature odd endings ( $M_{odd} = 4.96$  versus  $M_{even} = 4.68$ , t = 1.94, p < .10).

The pattern of effects is the same for product evaluations and purchase intentions. In the odd price condition, evaluations and intentions are both higher in the aggregate price condition than the reframed condition (odd prices: product evaluation  $M_{aggregate} = 4.75$  versus  $M_{reframed} = 2.54$ , t(198) = 23.38, p < .001; purchase intention  $M_{aggregate} = 4.54$ versus  $M_{reframed} = 2.51$ , t(198) = 12.09, p < .001). That is, the negative effects of reframed prices cancel out their positive effects. However, for even prices, evaluations and intentions increase in the reframed price condition (even prices: product evaluation  $M_{aggregate} = 2.91$  versus  $M_{reframed} = 4.94$ , t(198) = 18.26, p < .001; purchase intention  $M_{aggregate} = 2.73$ versus  $M_{reframed} = 4.54$ , t(198) = 12.09, p < .001), such that the positive effects of temporal reframing outweigh its negative effects. Our findings thus support H1a and H1b.

# Discussion

The effectiveness of temporally reframed prices, compared with aggregate prices, clearly is contingent on the moderator price ending. Thus, at moderate price levels, temporal reframing is effective for even prices, but aggregate prices are more appropriate for odd prices. We next consider another potential moderator: price level.

# Moderating effect of price level: Study 2

Previous research has shown that price level has an important influence on consumer evaluations and purchase intentions (Chen, Monroe, and Lou 1998; Lindsey-Mullikin and Grewal 2006). Specifically, higher price levels lead to increasing price dispersion (Lindsey-Mullikin and Grewal 2006), and consumers engage in less prepurchase searching for higher priced items, because they underestimate the extent of their market price variation (Grewal and Marmorstein 1994). It thus appears that consumers have less price knowledge about higher priced than lower priced products, which makes it likely that they will be influenced positively by a reframed price in this context.

Furthermore, because the purchase of lower priced products tends to be associated with lesser benefits than the purchase of higher priced products (especially for those consumed on an ongoing basis), it may be instructive to address the interaction effect of the price frame and price level from a cost-benefit perspective. Costs correspond to the price to be paid, whereas benefits refer to the experience of consuming the purchased product. The temporal reframing of prices should produce different perceptions of both costs and benefits than would the aggregate price, because temporal reframing produces temporal distance by splitting up the price into several components that refer to more or less distant periods.

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With regard to the cost, reframing a price (instead of indicating the aggregate price) might suggest lower costs, because some price components refer to more distant periods. However, reframing a low price should lead to a less significant perceived cost reduction effect than does reframing a high price. With regard to the benefits, research on temporal discounting (e.g., Green, Myerson, and McFadden 1997; Myerson and Green 1995; Raineri and Rachlin 1993) implies that temporal distance produces greater discounting for small rewards than for large rewards, because larger rewards are associated with a longer consumption experience. Consequently, the benefits associated with the purchase of low-priced products should be discounted more significantly than the rewards associated with high-priced products. Bringing the cost and the benefit arguments together creates the conclusion that in the case of low-priced products, benefits are extremely discounted and thus underestimated, whereas costs are only weakly reduced, which produces negative consumer reactions. However, if the products indicate higher prices, benefits get weakly discounted, and costs are considerably discounted, which produces positive consumer reactions. Thus,

**H2a.** In the case of higher priced products, product evaluations are more positive and purchase intentions are higher in the reframed price condition than in the aggregate price condition.

**H2b.** In the case of lower priced products, product evaluations are more positive and purchase intentions are higher in the aggregate price condition than in the reframed price condition.

#### Design

Three hundred sixty respondents participated in a  $2 \times 2$  between-subject experiment. We manipulated the price levels as low or high, and the framing was either temporal or aggregate (see Table 2). The low price condition involved an Internet flat rate offer; the high price offer instead was a car lease. These products should be familiar to the respondents and often feature temporally reframed and aggregate prices in reality. The procedures and measures were the same as those in Study 1, and we confirm the reliability of the measures in Table 3.

## Results

To test H2a and H2b, regarding whether for low- (high-) priced products, product evaluations and purchase intentions are higher in the aggregate (reframed) price condition, we used a 2 × 2 analysis of variance (ANOVA) with both mediators and two dependent variables. We provide the means and *F*-values of these interactions in Table 4, which shows that both temporal framing and time period are significant for all four variables. With a low price level, aggregate prices lead to higher price attractiveness (low price:  $M_{aggregate} = 4.62$  versus  $M_{reframed} = 4.16$ , t(178) = 2.37, p < .05), but high price levels make reframed prices seem more attractive (high price:  $M_{reframed} = 5.01$  versus  $M_{aggregate} = 3.38$ , t(178) = 9.72, p < .001). In addition, the feeling of being misled is greater in response to reframed than aggregate prices, and this difference is stronger for lower prices. That is, for reframed prices, the feeling of being

misled is stronger when the prices are low ( $M_{\text{low}} = 5.00$  versus  $M_{\text{high}} = 4.77$ , t(178) = 1.30, p < .10).

The interaction results for product evaluation and purchase intentions follow the same pattern. In the low price condition, product evaluations and purchase intentions are higher in the aggregate price condition than the reframed condition (low price: product evaluation  $M_{\text{aggregate}} = 4.67$  versus  $M_{\text{reframed}} = 2.87$ , t(178) = 18.03, p < .001; purchase intention  $M_{aggregate} = 4.63$ versus  $M_{\text{reframed}} = 2.62$ , t(178) = 13.07, p < .001). That is, at low prices, the negative effects of reframed prices cancel out the positive effects. However, if prices are high, product evaluations become more positive, and purchase intentions increase in the reframed price condition compared with the aggregate condition (high price: product evaluation  $M_{reframed} = 4.79$  versus  $M_{\text{aggregate}} = 2.94$ , t(178) = 17.13, p < .001; purchase intention  $M_{\text{reframed}} = 4.199847$  versus  $M_{\text{aggregate}} = 2.79$ , t(178) = 11.94, p < .001). Thus, with high prices, the positive effects of temporal reframing outweigh the negative effects. We therefore find support for H2a and H2b.

## Discussion

The results of the first study provide support for our interaction predictions. Our operationalization of the two price levels includes high prices that are slightly lower than the lowest price used by Gourville (1998, 1999), so our results demonstrate that for very low prices, an aggregate presentation prompts more favorable product evaluations and higher purchase intentions. However, the results reverse for higher prices. We next consider the normal aggregate price period as another potential moderator.

## Moderating role of time period: Study 3

The conventional period of time associated with an aggregate price varies by product categories; it also should have a moderating effect in our study context. Prior studies have demonstrated the considerable influence of timeframes. For example, time affects consumers' attitudes and behavior (Abendroth and Diehl 2006; Bergadaà 1990; Inman and McAlister 1994; Jacoby, Szybillo, and Berning 1976; Krishna and Zhang 1999; Okada and Hoch 2004; Srivastava and Oza 2006). For temporally reframed prices, time should be an important factor because a temporal reframing of a comparatively long aggregate price period might appear more extreme and thus have different effects than temporal reframing associated with a comparatively short normal aggregate price period. These factors accordingly should induce different levels of complexity, such that the complexity of the price information increases when the temporal reframing refers to a longer period of time and requires greater evaluation effort (Estelami 1999, 2003).

Such complexity induced by the temporal reframing of a comparatively long aggregate price period is in line with previous findings in the field of temporal discounting (e.g., Green, Myerson, and McFadden 1997; Myerson and Green 1995; Raineri and Rachlin 1993). Longer periods produce a stronger reward discounting than do shorter periods. Drawing on the

argument presented in the context of the price level study, that temporal reframing (instead of the aggregate price) produces temporal distance, it appears that in the case of a long aggregate price period, the benefits associated with a purchase are significantly more discounted than they would be for a shorter price period. With regard to the cost aspect, for a long aggregate price period, the perceived cost reduction seemingly could produce a considerable cost reduction. However, prospect theory (Kahneman and Tversky 1979) predicts that a large series of single losses is evaluated more negatively than one total loss equal to the sum of the single losses. Because temporal reframing that refers to a comparatively long period requires the division of the price into many single prices, this long series of single losses likely provokes very negative evaluations. The longer period also may induce a stronger feeling of being misled. Therefore, this study predicts a negative overall effect on product evaluations and purchase intentions when reframed prices refer to a comparatively long normal price period.

For a short aggregate price period though, the temporal reframing of a moderate price produces a moderate perceived cost reduction and only weak benefit discounting, because if the normal price period is comparatively short, reframing requires the consideration of a cognitively manageable, shorter series of reframed prices—which implies lesser associated complexity. The temporal reframing of prices that refer to a shorter normal price period therefore should foster positive effects through higher price attractiveness.

**H3a.** If a price normally refers to a short period of time, product evaluations are more positive and purchase intentions are higher in the reframed than in the aggregate price condition.

**H3b.** If a price normally refers to a longer period of time, product evaluations are more positive and purchase intentions are higher in the aggregate than in the reframed price condition.

#### Design

For this  $2 \times 2$  between-subject experiment with 420 respondents, we manipulated the time period as short versus long and the framing as temporally reframed versus aggregate. For the short time period, we used a moderately priced product with monthly prices (health club membership); for the long time period, we included a product for which prices generally are indicated on a yearly basis (car insurance). Similar to previous studies, two levels of framing (reframed versus aggregate) were also manipulated. The procedures and measures were the same as those in Study 1, and we confirm the reliability of the measures in Table 3.

## Results

The interaction of temporal framing and time period was significant for all four variables (see Table 4). With regard to perceived price attractiveness, long periods and aggregate prices increase attractiveness (long period:  $M_{aggregate} = 3.80$  versus  $M_{reframed} = 3.49$ , t(208) = 1.77, p < .10), whereas short periods and reframed prices generate higher price attractiveness (short

period:  $M_{\text{reframed}} = 5.01$  versus  $M_{\text{aggregate}} = 3.27$ , t(208) = 10.07, p < .001). Reframed prices over a longer time period appear to invoke suspicion or an intent to mislead, so they are less attractive. The results for the feeling of being misled variable support this claim: the feeling is stronger for the longer time period than for the shorter time period for reframed prices ( $M_{\text{longer}} = 4.47$  versus  $M_{\text{shorter}} = 4.24$ , t(208) = 1.52, p < .10).

We again find a matching pattern for product evaluations and purchase intentions. For a comparatively short period, product evaluations are more positive and purchase intentions are higher in the reframed price condition (short period: product evaluation  $M_{\text{reframed}} = 5.02$  versus  $M_{\text{aggregate}} = 3.01$ , t(208) = 18.64, p < .001; purchase intention  $M_{\text{reframed}} = 4.69$ versus  $M_{\text{aggregate}} = 2.69$ , t(208) = 13.51, p < .001) but for a longer period, these measures improve in the aggregate price condition (long period: product evaluation  $M_{\text{aggregate}} = 4.68$ versus  $M_{\text{reframed}} = 2.23$ , t(208) = 23.53, p < .001; purchase intention  $M_{\text{aggregate}} = 4.44$  versus  $M_{\text{reframed}} = 2.11$ , t(208) = 16.89, p < .001). Thus, we find support for H3a and H3b.

## Discussion

The results of our third study provide further evidence of moderation of the effectiveness of temporally reframed compared with aggregate prices. Shorter periods support the use of temporal reframing; longer periods require aggregate prices. But the potential moderators of the effectiveness of temporally reframed compared with aggregate prices also might include factors specific to each consumer; therefore, we consider the role of the calculation affinity.

# Moderating role of consumers' calculation affinity: Study 4

Consumers may be more or less motivated to engage in effortful processing of price information, which affects their purchase intentions (Burman and Biswas 2007; Kim and Kramer 2006). It is necessary to perform a calculation to determine the aggregate price when faced with a temporally reframed price, and consumers' calculation affinity represents a specific type of their motivation to engage in effortful processing of price information. Therefore, we derive predictions about the moderating effects of calculation affinity from research into the effects of need for cognition, which has been applied previously in pricing research (Burman and Biswas 2007; Kim and Kramer 2006). Calculation affinity is a form of need for cognition. That is, low need for cognition consumers rely on peripheral cues (Haugtvedt, Petty, and Cacioppo 1992) and are susceptible to the presence of promotion signals (Inman, McAlister, and Hoyer 1990). Accordingly, consumers with a low calculation affinity might not be motivated to calculate the aggregate price when faced with a temporally reframed price but rather should be susceptible to the signal offered by this price presentation-namely, that the temporally reframed price is comparatively less expensive. We predict that reframed prices prompt a positive overall perception among consumers with low calculation affinity.

In contrast, consumers with high need for cognition (e.g., high calculation affinity) react to promotion signals only if they are

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Table 5

Path coefficients for the basic model and tests for mediation.

Path	Study 1	Study 2	Study 3	Study 4
$\overrightarrow{\text{Price presentation}} \rightarrow \text{perceived price attractiveness}$	$\beta = .25$	$\beta = .22$	$\beta = .25$	$\beta = .13$
	(2.61***)	(2.27**)	(2.48 <sup>****</sup> )	(1.31 <sup>*</sup> )
Price presentation $\rightarrow$ feeling of being misled	$\beta = .68$	$\beta = .64$	$\beta = .59$	$\beta = .70$
	(11.86 <sup>***</sup> )	(11.42 <sup>****</sup> )	(9.74***)	(13.06 <sup>***</sup> )
Perceived price attractiveness $\rightarrow$ product evaluation	$\beta = .47$	$\beta = .34$	$\beta = .55$	$\beta = .54$
	(5.27***)	(3.87***)	(6.84***)	(7.29 <sup>****</sup> )
Feeling of being misled $\rightarrow$ product evaluation	$\beta =41$	$\beta =54$	$\beta =32$	$\beta =30$
	(-3.31***)	(-5.02***)	(-3.17***)	(-2.37***)
Product evaluation $\rightarrow$ purchase intention	$\beta = .85$	$\beta = .77$	$\beta = .86$	$\beta = .83$
	(21.97 <sup>***</sup> )	(14.55 <sup>***</sup> )	(19.85 <sup>***</sup> )	(19.41 <sup>***</sup> )
Price presentation $\rightarrow$ perceived price attractiveness $\rightarrow$ product evaluation	$z = 2.36^{**}$	$z = 1.95^*$	$z = 2.33^{**}$	z = 1.17
Price presentation $\rightarrow$ feeling of being misled $\rightarrow$ product evaluation	$z = 3.22^{***}$	$z = 4.67^{***}$	$z = 3.01^{***}$	$z = 2.31^{**}$

<sup>\*</sup> *p* < .10. *p* < .05.

accompanied by substantive price reductions (Inman, McAlister, and Hoyer 1990). Because temporal reframing does not mean an actual price reduction, consumers with high calculation affinity, who calculate the aggregate price for the normal period of time, likely suspect manipulation by the marketer, develop comparatively strong feelings of being misled, and experience a negative overall effect of temporal reframing. We thus predict:

**H4a.** If consumers have low calculation affinity, their product evaluations are more positive and purchase intentions are higher in the reframed than in the aggregate price condition.

**H4b.** If consumers have high calculation affinity, their product evaluations are more positive and purchase intentions are higher in the aggregate than in the reframed price condition.

## Design

For the 272 participants, we measured calculation affinity with two items (e.g., "Mental arithmetic does not pose a problem for me") that proved highly correlated (r = .56). Therefore, we summed the two items and assigned participants to low or high calculation affinity groups. As in our previous studies, we manipulated the two levels of framing (reframed versus aggregate) and used the same procedures and measures. As we show in Table 3, the measures were reliable.

## Results

The interaction of temporal framing and calculation affinity was significant for all four variables (see Table 4). In the case of a high calculation affinity, aggregate prices led to higher price attractiveness (high calculation affinity:  $M_{aggregate} = 4.24$ versus  $M_{reframed} = 3.38$ , t(134) = 3.84, p < .001), but with low calculation affinity, reframed prices generated higher price attractiveness (low calculation affinity:  $M_{reframed} = 4.91$  versus  $M_{aggregate} = 3.33$ , t(134) = 7.30, p < .001). It appears that consumers with high calculation affinity calculate the aggregate price using the reframed price and do not evaluate reframed prices as more attractive. In addition, they feel more misled when they confront reframed rather than aggregate prices.

The results also support our hypothesis that customers with less calculation affinity provide more positive product evaluations and higher purchase intentions in the reframed price condition (low calculation affinity: product evaluation  $M_{\text{reframed}} = 5.22$  versus  $M_{\text{aggregate}} = 3.42$ , t(134) = 14.33, p < .001; purchase intention  $M_{\text{reframed}} = 4.76$  versus  $M_{\text{aggregate}} = 3.35$ , t(134) = 7.39, p < .001). If consumers have a higher calculation affinity though, their product evaluations and purchase intentions are higher in the aggregate price condition (high calculation affinity: product evaluation  $M_{\text{aggregate}} = 4.95$  versus  $M_{\text{reframed}} = 2.50$ , t(134) = 19.90, p < .001; purchase intention  $M_{\text{aggregate}} = 4.70$  versus  $M_{\text{reframed}} = 2.44$ , t(134) = 12.07, p < .001), in support of H4a and H4b.

Finally, we wanted to test the structures assumed by our basic model (Fig. 1) and therefore estimated partial least squares (PLS) path coefficients and performed Sobel tests for mediation (Baron and Kenny 1986) with the data from each study (see Table 5). The path coefficients show that nearly all model structures are significant, and the Sobel *z*-values indicate that in almost all cases, perceived price attractiveness and the feeling of being misled significantly mediate the relation between price presentation and product evaluation.

#### **Discussion and conclusions**

Our article summarizes the results of four studies conducted to test the effects of possible moderator variables. The results of these four studies support the basic framework presented in Fig. 1. More specifically, the effectiveness of temporal reframing on evaluations and intentions are mediated by both perceived price attractiveness and consumer's feeling that he or she has been misled by the price presentation. The four studies provide insights into the moderating roles of four potential moderators.

p < .05.

p < .01.

Specifically, with Study 1, we confirm that for even price endings, reframed prices are more advantageous, whereas for odd price endings, aggregate prices are better. Again, in the case of odd price endings, reframing leads to comparatively low price attractiveness and a very strong feeling of being misled.

In a similar test in Study 2, we show that, at low price levels, aggregate prices are more beneficial, whereas for high price levels, reframed prices are more beneficial in terms of product evaluations and purchase intentions. When consumers confront low, reframed prices, they consider them less attractive while also suspecting attempts to mislead by the marketer.

With Study 3, we consider whether the span of time associated with the product category (e.g., year-long car lease versus month-long club membership) affects the use of reframed prices. When the conventional period is shorter, reframed prices are more beneficial, whereas if it is longer, aggregate prices are better. The explanation of this result relies on similar reasoning: If a price normally refers to a comparatively long period of time, reframing leads to lower price attractiveness and strong suspicions of being misled.

Finally, with Study 4 we show that people with low calculation affinity are more susceptible to reframed prices, whereas those with high calculation affinity prefer aggregate prices. Again, for those with high calculation affinity, reframing leads to comparatively low price attractiveness and a slightly stronger feeling of being misled.

These collected results offer detailed pricing guidelines for retailers that sell products consumed over time (e.g., insurance, car rentals, telecommunication services, Netflix). In their marketing communications, these retailers should cite aggregate prices for low-priced products but temporally reframed ones for high-priced products. However, these temporal reframes should only include products with even price endings and those that relate to a comparatively short period of time. Retailers should turn to aggregate prices if they need to use an odd price ending or if prices in this product category usually refer to a comparatively long period of time.

Another key consideration that may be somewhat more difficult for retailers to obtain is the calculation affinity of their target group. However, they might gather such information through personal sales. A customer seeking car insurance or a health club membership, for example, often has a conversation with a salesperson, and during these interactions, the salesperson should test the customer's calculation affinity and then communicate price information accordingly. For example, the salesperson might mention another reframed price and notice the customer's reaction; if he or she immediately tries to calculate the aggregate price, the retailer is dealing with a high calculation affinity consumer, so the salesperson should talk about the aggregate price of the focal product.

Our starting point for these studies is our observation that the temporal reframing of prices seemingly is becoming more and more popular. The widespread use of a certain pricing tactic in marketing practice usually implies its advantages outweigh its disadvantages. Yet previous research has clearly demonstrated that any pricing tactics that aim to make prices seem lower than they are also can have negative effects that cancel out their positive effects. Therefore, we needed to identify the conditions in which temporal reframing of prices is more or less beneficial, which offers the possibility of improving pricing strategies through more precise planning. We thus derived relevant moderator variables from existing pricing research and integrated them into a model of the effects of temporal reframing and price partitioning.

We consider each moderator separately; further research should analyze their effects simultaneously and consider their potential second-order interaction effects. It also would be interesting to investigate whether brand image influences the effectiveness of temporal reframing. For example, consumers might be less skeptical of temporally reframed prices if the company using them has a very good reputation. We also wonder whether different effects of temporal reframing might exist if the prices refer to emotional versus rational products. Another interesting approach would assess the effects of time pressure on evaluations of temporally reframed prices. Moreover, it might be interesting to examine the effects of combinations of different pricing tactics, such temporally reframed and partitioned prices, together. Finally, it might be interesting to transfer the price presentation technique of temporal reframing to a business to business context and to analyze its effects for very low, moderate, and very high price levels.

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