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## Lifting the Veil: The Benefits of Cost Transparency

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# **Lifting the Veil: The Benefits of Cost Transparency**

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**Working Paper**

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# Lifting the Veil: The Benefits of Cost Transparency

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A firm's costs are typically tightly-guarded secrets. However, across six laboratory experiments and a field study we identify when and why firms benefit from revealing cost information to consumers. Disclosing the variable costs associated with a product's production heightens consumers' attraction to the firm, which in turn increases purchase interest (Experiments 1-3). In fact, cost transparency has a stronger impact on purchase interest than emphasizing the firm's personal relationship with the consumer - a much more involved marketing tactic (Experiment 4). Further experiments explore boundary conditions and suggest that the benefit of cost transparency weakens as firms increase price relative to costs, and when markups are made salient (Experiments 5-6). Consistent with our lab findings, a natural experiment with an online retailer demonstrates that cost transparency improves sales. In particular, cost transparency led to a 44.0% increase in daily unit sales. This research implies that by revealing costs - typically tightly-guarded secrets - managers can potentially improve both brand attraction and sales.

*Key words:* cost transparency; operational transparency; purchase intentions; brand attraction; customers

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## 1. Introduction

Research in operations and marketing has primarily defined cost transparency in the context of a supplier-firm relationship - the two-way sharing of cost information between a firm and its suppliers, with the goal of collaborating to reduce costs (Lamming et al. 2002, Zhu 2004). By contrast, we examine cost transparency in the context of a customer-firm relationship - the one-way sharing of cost information from a firm to its customers. As in supplier-firm relationships, we suggest that disclosing costs in customer-firm relationships can be beneficial to the firm.

In this paper, we explore what happens when firms voluntarily disclose their variable costs explicitly and directly to consumers. We suggest, and our results indicate, that this practice increases consumers' attraction to the brand, in turn increasing their willingness to buy (Experiments 1-3). In fact, cost transparency is more effective at increasing purchase interest than the (typically more involved) marketing tactic of emphasizing a firm's personal relationship with its customer (Experiment 4). Further experiments explore boundary conditions and suggest that the benefit of cost transparency weakens as profit margins increase (Experiment 5) and reverses when markups are so high that they violate market norms (Experiment 6). Consistent with these six lab experiments, a

natural experiment conducted in the field with an online retailer confirmed that cost transparency boosts purchases. Specifically, the introduction of cost transparency led to a 44.0% increase in daily unit sales for the target products. We argue, and our results suggest, that by revealing costs - typically tightly-guarded secrets - managers can improve brand attraction, and in turn, sales.

## **2. Operational, Price, and Cost Transparency**

Cost transparency refers to the disclosure of the variable costs associated with a product's production process. It is therefore related to, but distinct from, the constructs of operational transparency and price transparency.

Operational transparency refers to how a firm reveals its operating processes to its customer (Buell et al. 2014). Research suggests that consumers prefer service web sites that are operationally transparent relative to those that are not (Buell and Norton 2011). For example, the travel site Kayak.com is beloved in part because of its operational transparency - it discloses which airline is being searched and updates the results throughout the search process. Such transparency increases consumers' perception of the effort required to create the product, in turn heightening their sense of gratitude and willingness to pay (Gershoff et al. 2012, Morales 2005, Buell and Norton 2011). Voluntary disclosure of social and environmental impacts - such as greenhouse gas emissions - can boost a firm's market share (Kalkanici et al. 2013). And information on production processes can affect product customer satisfaction; for example, fudge tastes better when consumers are told that it was produced using an expensive (as opposed to inexpensive) machine (Chinander and Schweitzer 2003).

Relative to operational transparency, cost transparency is a more intimate form of disclosure: it entails disclosing the variable costs to produce a good. There are multiple ways of operationalizing cost transparency (which we test in this paper). In its strong form, cost transparency entails divulging the variable costs associated with each component of producing a good; a weaker form entails simply divulging the total variable costs to produce the good.

Price transparency refers to the practice of revealing the beneficiaries of a product's revenues - for example, by dividing a price into gross retail proceeds, royalties, and taxes (Carter and Curry, 2010). While they are related constructs, in cost transparency, a highly sensitive piece of information is explicitly revealed: the costs to produce the good.

Similarly, price partitioning refers to the practice of revealing the price of the component parts of a product - for example, dividing a product's price into base price and shipping and handling fees (Bertini and Wathieu 2008, Morwitz et al. 1998). Price partitioning increases consumer purchase intentions via a cognitive process - consumers recall smaller numbers when prices are partitioned, creating the illusion of a low price (Morwitz et al. 1998). On the other hand, as we will show, the effect of cost transparency on purchase intent is driven by an affective process.

### 3. Cost Transparency as Intimate Firm Disclosure

We suggest that cost transparency is a form of intimate disclosure by a firm to the consumer, since cost breakdowns are usually confidential, proprietary knowledge. A substantial body of work on the social psychology of disclosure suggests that intimate disclosure heightens relationship quality (Laurenceau et al. 1998). Those who disclose intimate information are generally seen as likable (Collins and Porras 1994, Wortman et al. 1976) and attractive (Collins and Porras 1994, Laurenceau et al. 1998).

Self-disclosure has been studied not only in the context of interpersonal relationships, but also in the context of relationships between humans and computers. For one, the mere look and feel of a website has been found to affect consumers' willingness to disclose (John et al. 2011). Moreover, people are more "attracted" to computers that disclose intimate information relative to those that do not. For example, Moon (2000) demonstrated that people were more interested in using a computer that had "divulged" something sensitive - that it "rarely gets to use its full potential" - relative to a computer that had merely "divulged" that when it "doesn't have any work to do, it usually just runs a screensaver program" (Moon, 2000). We posit that if an inanimate object can engender attraction through intimate disclosure, a firm is likely to also benefit from the same strategy.

Of course, not all disclosure leads to attraction. Intimate disclosure that is too personal does not elicit attraction. Rather, disclosure and liking appear to have a curvilinear relationship - those who disclose at medium intimacy levels are liked more than those who disclose at very high or low levels (Cozby 1972). The intimacy of disclosure is negatively correlated with valence - generally speaking, the more unsavory the information, the more intimate the disclosure is perceived to be (Sedikides et al. 1999). Thus, we predict that the effectiveness of cost transparency in bolstering purchase intentions will be dampened when the firm discloses unsavory, and hence, highly intimate information - that prices are high relative to costs (Experiment 5).

When might cost transparency backfire? Although consumers understand and accept that firms must make profits (Bolton et al. 2003, Kahneman et al. 1986), they punish firms that violate established norms of price fairness (Campbell 1999, Xia et al. 2004). For example, most consumers react extremely negatively to a firm that dramatically increases the price, and hence, profit margins of snow shovels during a winter storm (Kahneman et al. 1986). Therefore, we predict that consumers' purchase interest will decrease when a firm explicitly discloses that its profit margins are very high relative to market norms - i.e., relative to those of its competitors (Experiment 6).

### 4. Overview of Experiments

Across six laboratory experiments and a field study with an online retailer, we examine the effect of cost transparency - revealing a firm's variable costs of production - on consumer purchase behavior.

We begin by presenting the results of six laboratory experiments in which participants interacted with the simulated website of a fashion retailer selling t-shirts. We find that cost transparency is more effective at boosting purchase interest than operational transparency (Experiments 1-2). This effect persists even when variable costs that are strongly disliked by consumers - such as transportation costs - are high relative to those that consumers find more palatable - such as those associated with raw materials (Experiment 3). We also find that cost transparency is more effective than emphasizing existing consumer-firm relationships in promoting purchase intentions (Experiment 4).

Further experiments explore boundary conditions and suggest that the benefits of cost transparency weaken, but do not reverse, as firms increase prices relative to costs (Experiment 5). Only when a firm's profit margins violate market norms does cost transparency backfire (Experiment 6).

Finally, in a natural experiment conducted in the field with an online retailer, cost transparency improves sales. Cost transparency led to an 44.0% increase in unit sales for the target products. We conclude with a discussion of the implications of these findings for managers, as well as limitations and opportunities for future research.

#### **4.1. Experiment 1: Cost Transparency and Willingness to Buy**

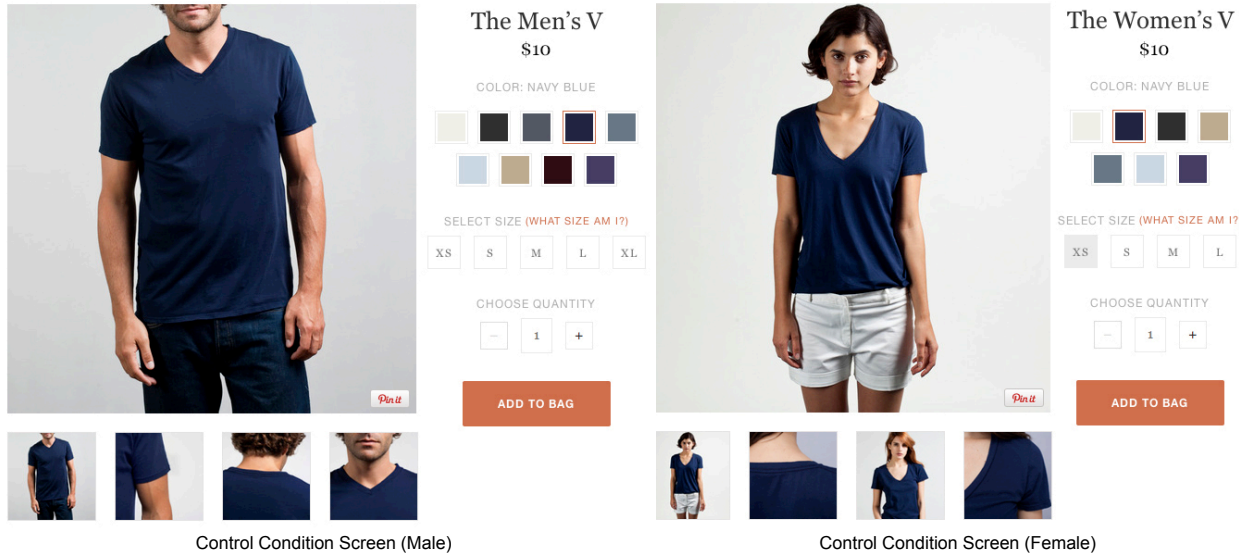
Experiment 1 tests the effect of cost transparency on customers' willingness to buy in a simulated online retail environment. Several burgeoning fashion retailers have some level of cost transparency embedded in their retail websites, revealing not only their steps of production, but also the costs associated with each of these steps (Everlane 2012, Neilson and Mistry 2013). We modeled our stimuli after such retailers.

##### **4.1.1. Method**

*Design and Procedure* Participants ( $N = 272$ ,  $M_{age} = 31.5$ , 62% male) completed this online experiment in exchange for \$0.25. Participants first indicated their gender. Then, they were told that they would see a simulated retail website page for a product and would be asked to indicate their interest in purchasing the product.

Participants were randomly assigned to one of nine experimental conditions, of a 3 (Price: \$10, \$15, \$20) x 3 (Transparency: Control, Operational, Cost) between-subjects design. The prices were comparable to other designer t-shirts found online at the time of the experiment (Everlane 2012).

In the no transparency (control) condition, participants saw a baseline interface which featured an image of a model (same gender as participant) wearing the t-shirt, and included the name of the product, its price, alternate colors and sizes, and a mechanism for selecting the desired quantity

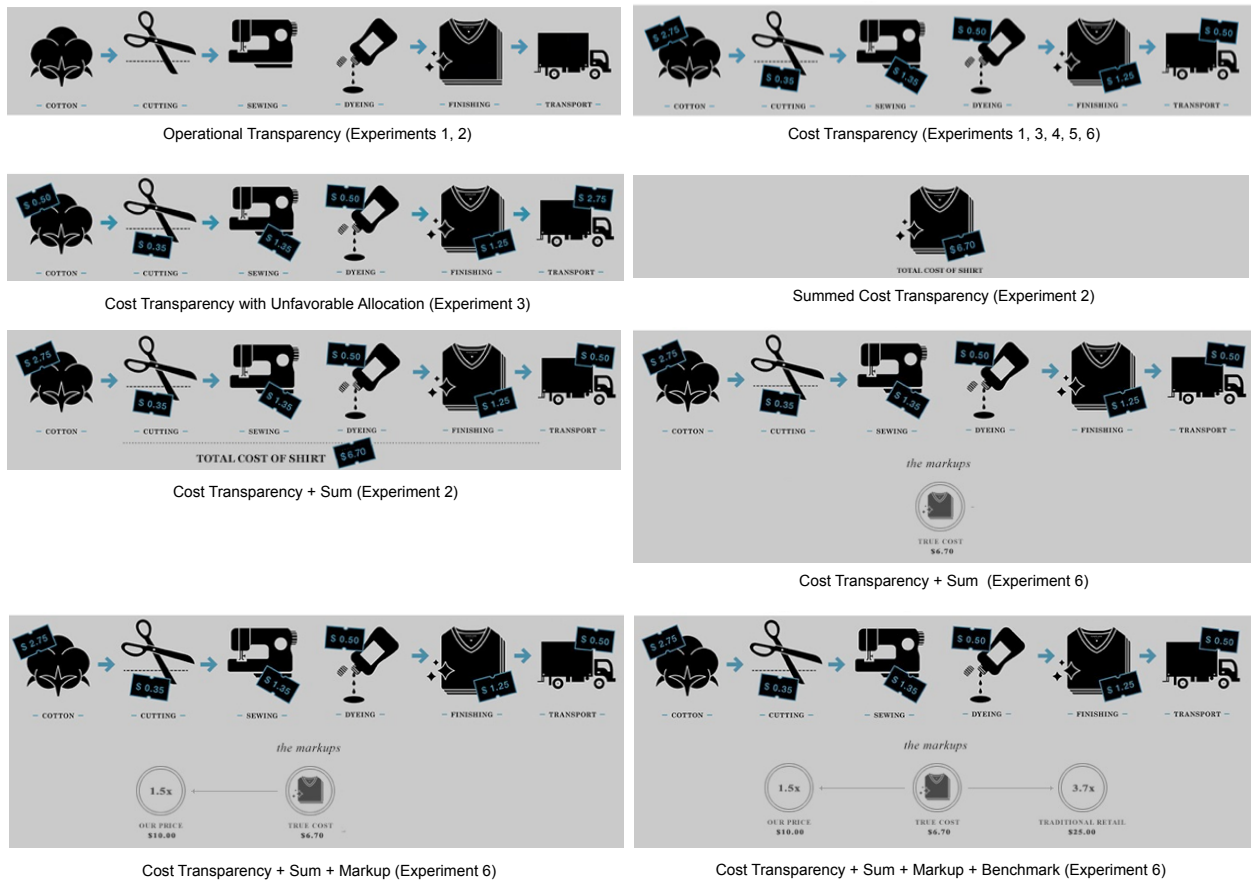


Control Condition Screen (Male)

Control Condition Screen (Female)

**Figure 1 Control Condition Screens**

Note: Screens were matched to the gender of the participant.



Cost Transparency + Sum + Markup (Experiment 6)

Cost Transparency + Sum + Markup + Benchmark (Experiment 6)

**Figure 2 Experimental Manipulations**

The experimental conditions included the control information, plus the infographic depicted above.

for purchase (Figure 1). Unless indicated otherwise, this basic interface served as the baseline in all experiments.

In the operational transparency condition, an infographic was added to the bottom of the baseline interface. The graphic was entitled ‘What goes into the production of our Women’s[Men’s] V?’ and depicted six operational steps - cotton, cutting, sewing, dyeing, finishing, and transport. In the cost transparency condition, the (true) cost of each of the six operational steps was also provided, i.e., \$2.75, \$0.35, \$1.35, \$0.50, \$1.25, and \$0.50 respectively (Figure 2).

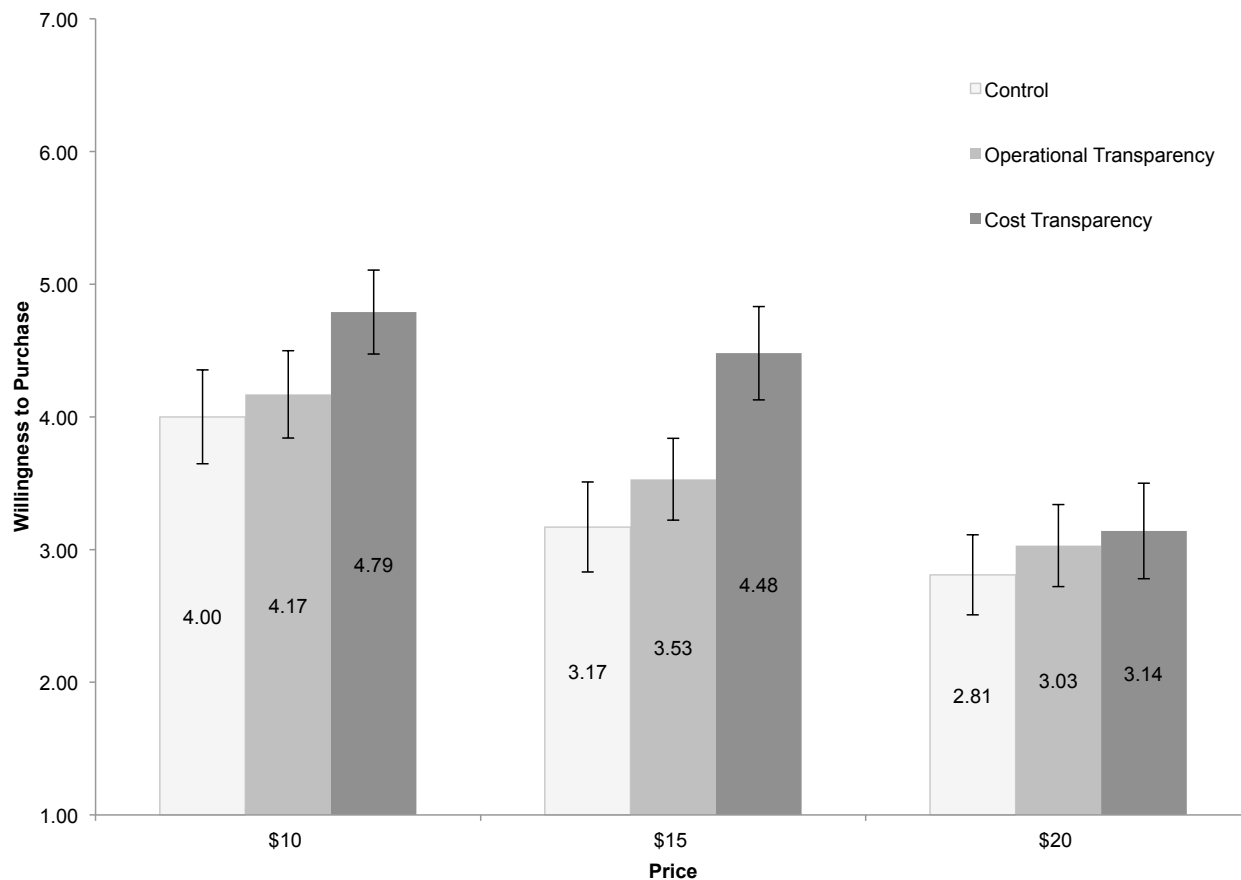
1. How likely would you be to purchase from this website in general, either this item or another?
2. What was the price of the product you saw?
3. How much do you think it cost to make this shirt?
4. How attractive do you find this product?
5. How reasonable is the price of this product?
6. My feelings toward this retailer can best be described as: (very unsatisfied - unsatisfied).
7. If it were made available to me, over the next year, my use of this retailer would be: (very infrequent - very frequent).
8. This item is well made.
9. This item is one that would make me feel good.
10. This item is a good product for the price.
11. This item would make a good impression on other people.
12. This item is too expensive.
13. This item has consistent quality.
14. This item would not last a long time.
15. This site appears more trustworthy than other sites I’ve visited.
16. The site represents a company or organization that will deliver on promises made.
17. My overall trust in this product website is: (very low - very high).
18. My overall believability of the information on this site is: (very low - very high).
19. This site represents a company that engages in ethical business practices.
20. This site represents a company that pays its workers a fair wage.

**Table 1    Additional Measures (Experiments 1, 4, 5, and 6)**

*Dependent Measures* Participants indicated their willingness to buy the t-shirt by responding to the item: “Given the opportunity, how likely would you be to purchase this product?” (7-point response scale; 1 = Not at all likely - 7 = Very likely). Participants then provided their age,



highest level of education, and monthly household income. Finally, in this, and Experiments 4-6, participants also answered a series of secondary questions assessing their purchase experience (Table 1).<sup>1</sup> All experiments concluded with demographic questions, unless otherwise noted. We set the desired number of participants at the outset of each experiment and did not analyze the data until that number was reached. No data were excluded and we report all manipulations and measures.



**Figure 3** Experiment 1. Cost transparency increases willingness to buy versus control more than operational transparency alone.

**4.1.2. Results** We conducted a 3 (Price: \$10, \$15, \$20) x 3 (Transparency: Control, Operational, Cost) analysis of variance (ANOVA) on willingness to buy (Figure 3). Not surprisingly, there was a main effect of price: willingness to buy decreased as price increased ( $F(2, 263) = 12.29, p <$

<sup>1</sup> We note that reported results in this paper are substantively similar after controlling for individual items listed in Table 1. As such, while individual covariates listed in Table 1 surfaced as significant in some models, for parsimony, we do not describe them further in subsequent sections. Covariates seldom reduced the significance of the focal independent variables, no more than would be expected by chance due to multiple comparisons.

0.01). More importantly, there was a main effect of transparency ( $F(2, 263) = 4.69, p = 0.01$ ). Specifically, willingness to buy was greater in the cost transparency condition relative to both the control condition ( $M_{cost} = 4.16, SD = 1.98; M_{none} = 3.31, SD = 1.87; t(177) = 2.95, p < 0.01$ ) and the operational transparency condition ( $M_{ops} = 3.57, SD = 1.80; t(180) = 2.10, p = 0.04$ ). Willingness to buy was not significantly different between the operational transparency and control conditions ( $t(181) = 0.96, p = 0.34$ ). The interaction between the transparency condition and price was not significant,  $F(4, 263) = 0.64, p = 0.64$ . Gender, education, age, and income were all non-significant when added to the model as covariates ( $p > 0.26$ ). Throughout the rest of our experiments all reported results remain substantively the same when controlling for demographic variables (gender, education, age, and income).

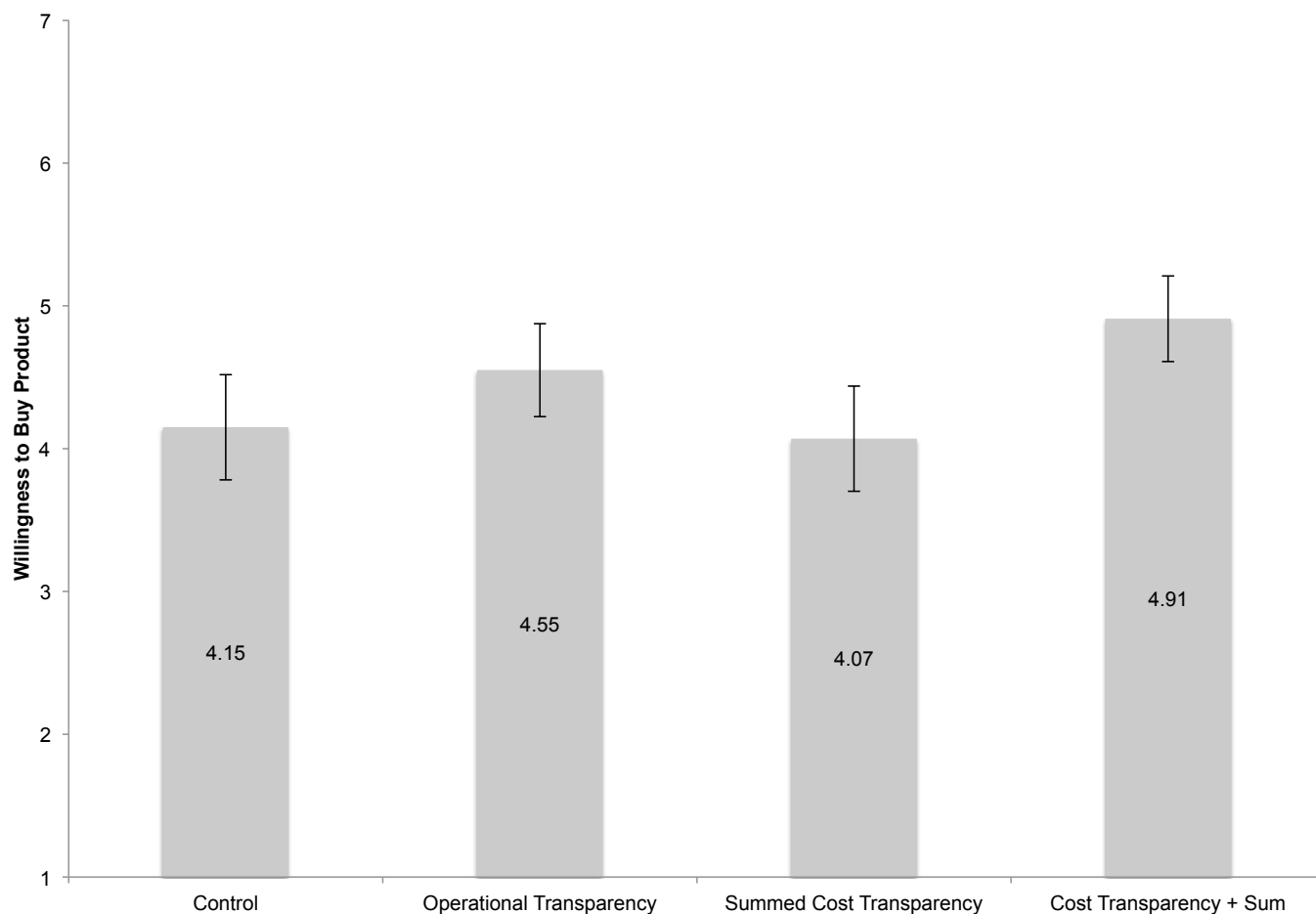
#### 4.2. Experiment 2: Cost Component Transparency versus Aggregated Cost Transparency

In Experiment 1, we explored how the depth of disclosure afforded by cost transparency influences consumers' willingness to buy. Cost transparency was more effective at boosting purchase interest than both the control and operational transparency conditions. Experiment 2 replicates this basic beneficial effect of cost transparency and provides evidence of the process underlying it. Specifically, we test whether the effect of cost transparency on willingness to buy is mediated by consumers' attraction to the firm (Moon 2000). Experiment 2 also tests whether a weak form of cost transparency - simply divulging the total summed cost to produce the product - is sufficient to be beneficial.

##### 4.2.1. Method

*Design and Procedure* Participants ( $N = 402, M_{age} = 31.3, 68\%$  male) completed this online experiment in exchange for \$0.40 and were randomly assigned to one of four experimental conditions varying in transparency: no transparency, operational transparency, cost transparency with sum, (i.e., divulging the cost of each component and the sum total of all components), and summed cost transparency (i.e., only revealing the total sum of all components) (Figure 2). To maximize the salience of our manipulations, we used a streamlined version of our shopping interface, excluding alternate colors and sizes, and setting the t-shirt price at \$10. For both cost transparency conditions, we noted that the aggregate cost of producing the t-shirt was \$6.70.

*Dependent Measures* We measured willingness to buy using the same scale as Experiment 1. We also measured a potential mediator: attraction to the firm, using a modified version of Moon's (2000) scale. Specifically, participants indicated the extent to which they agreed with each of the following four statements on a 7 point scale (1 = strongly disagree - 7 = strongly agree): this website represents a brand that is likable; this website represents a kind brand; this website represents a helpful brand; this website represents a friendly brand. We summed participants' responses to these items to create a composite measure of brand attraction (Cronbach's  $\alpha = .93$ ).

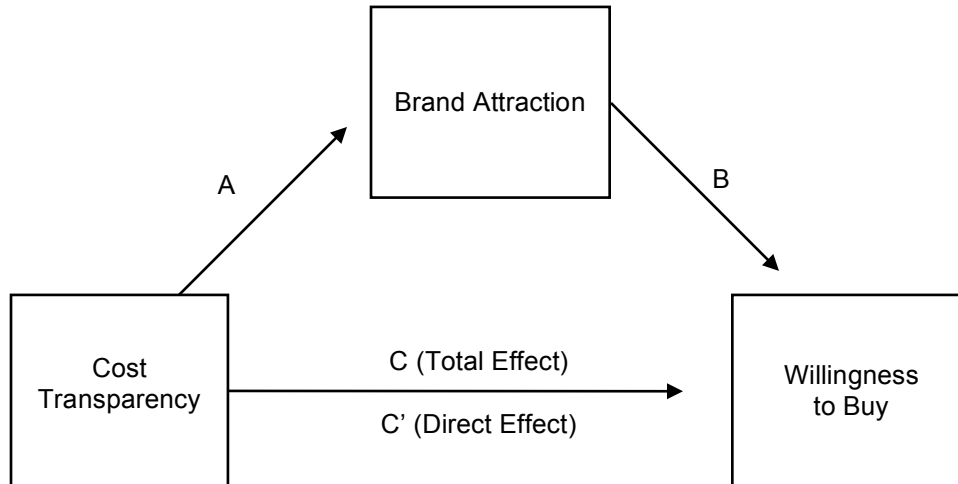


**Figure 4** Experiment 2. Cost transparency with the sum of all costs increases willingness to buy more than alternative treatments.

#### 4.2.2. Results

*Willingness to buy* A one way ANOVA revealed significant differences in willingness to buy as a function of the transparency manipulation ( $F(3, 398) = 5.02, p < 0.01$ ; Figure 4). Willingness to buy was greater in the cost transparency with sum condition, relative to the control ( $M_{c+s} = 4.91, SD = 1.54; M_{none} = 4.15, SD = 1.88; t(201) = 3.14, p < 0.01$ ). However, relative to the control condition, willingness to buy was not significantly higher in either the operational transparency ( $M_{ops} = 4.55, SD = 1.54; t(199) = 1.61, p = 0.11$ ) or summed cost transparency condition ( $M_{sum} = 4.07, SD = 1.87; t(197) = 0.77, p = 0.90$ ).

*Attraction to brand* A one way ANOVA revealed significant differences in attraction to brand as a function of the transparency manipulation ( $F(3, 398) = 13.34, p < 0.01$ ). Relative to control, brand attraction was significantly higher in the cost transparency with sum condition ( $M_{c+s} = 5.40, SD = 1.05; M_{none} = 4.86, SD = 1.34; t(200) = -5.33, p < 0.01$ ) and the operational transparency condition ( $M_{ops} = 4.96, SD = 1.09; t(199) = 2.63, p < 0.01$ ), but not in the summed transparency condition



Experiment	A	B	C	C'	CI
2	$\beta = 0.69^{***}$	$\beta = 0.76^{***}$	$\beta = 0.65^{***}$	$\beta = 0.13$	(0.32, 0.81)
3	$\beta = 0.32^{***}$	$\beta = 0.81^{***}$	$\beta = 0.24^{***}$	$\beta = -0.01$	(0.16, 0.36)
4	$\beta = 0.51^{***}$	$\beta = 0.92^{***}$	$\beta = 0.55^{**}$	$\beta = 0.08$	(0.23, 0.82)
5	$\beta = 0.20^{**}$	$\beta = 0.92^{**}$	$\beta = 0.61^{***}$	$\beta = 0.11$	(0.02, 0.23)

**Figure 5 Experiments 2, 3, 4, and 5. Brand attraction mediates the relationship between cost transparency and willingness to buy across multiple experiments. 'CI' indicates the bias-corrected confidence intervals of the size of the indirect effect (a x b) based on 5000 resamples.**

Note: In Experiment 2, the cost transparency condition also included the total cost. \* $p < 0.10$  \*\* $p < 0.05$  \*\*\* $p < 0.01$

( $M_{sum} = 4.67, SD = 1.46; t(197) = 0.74, p = 0.46$ ). Moreover, brand attraction was significantly higher in the cost transparency with total condition than in the operational transparency condition ( $t(201) = 2.89, p < 0.01$ ).

*Mediation Analysis* We tested whether attraction mediates willingness to buy. First, as reported above, participants in the cost transparency with total condition reported higher willingness to buy ( $\beta = 0.65, p < 0.01$ ), as well as higher brand attraction ( $\beta = 0.69, p < 0.01$ ). When brand attraction and the cost transparency with total condition were included in the regression model predicting willingness to buy, the effect of attraction remained significant ( $\beta = 0.76, p < 0.01$ ), but the effect of the cost transparency with total condition was reduced to insignificance ( $\beta = 0.13, p = 0.45$ ). Following the procedures outlined by Zhao et al. (2010), we used a bootstrap procedure to construct bias-corrected confidence intervals for the indirect effect based on 5000 resamples. The 95% bias-corrected confidence interval excluded zero (0.32, 0.81), providing support for full mediation (Figure 5).

### 4.3. Experiment 3: Varying Cost Allocation

Revealing the firm's variable costs of production in addition to total cost was more effective at boosting purchase interest than aggregate cost transparency or operational transparency alone.

Experiment 2 also explored the process underlying the beneficial effect of cost transparency. Consistent with previous research on disclosure and attraction, the effectiveness of cost transparency on willingness to buy was mediated by consumers' attraction to the disclosing firm (Moon 2000).

It is possible that the beneficial effect of cost transparency was driven by the specific allocation of costs among the different cost components. Costs for intangible components such as transportation (\$0.50) and labor (\$1.35) were low relative to those for raw materials (\$2.75). It is plausible that consumers more strongly dislike costs of intangible components - perhaps judging them to be wasteful or superfluous - relative to those of tangible components (i.e., raw materials) (Gneezy et al. 2014). In Experiment 3, we test whether the results of Experiments 1 and 2 generalize to cost allocations that consumers find undesirable. Experiment 3 also further explores the process underlying the beneficial effect of cost transparency.

#### 4.3.1. Method

*Pretest* We conducted a pretest ( $N = 100$ ,  $M_{age} = 30.4$ , 60% male) to understand how consumers assess the allocation of costs. Participants were presented with the control stimuli from Experiment 1 - a t-shirt priced at \$10. They were told that the shirt cost \$6.70 to make, and asked "What do you estimate each of the following steps cost?" for each of the six steps - cotton, cutting, sewing, dyeing, finishing, and transport. The estimates for cotton spending ( $M = \$1.68$ ,  $SD = 0.98$ ) and transport spending ( $M = \$1.35$ ,  $SD = 0.73$ ) were significantly different from the cost allocations from Experiment 1 (cotton vs. \$2.75:  $t(99) = 10.91$ ,  $p < 0.01$ ; transport vs. \$0.50:  $t(99) = 11.64$ ,  $p < 0.01$ ).

Next, participants indicated which step the company should spend more and less money on. Participants were most likely to choose 'cotton' as the step to spend more on (42%), and 'transport' as the step to spend less on (52%).

Therefore, this pre-test suggests that indeed, the cost allocation used in Experiments 1 and 2 was relatively favorable in consumers' eyes. In Experiment 3, we therefore manipulated the favorability of the cost allocation to test whether the first two experiments' findings generalize to situations in which the costs of intangible components - such as transportation - are relatively high and hence, undesirable.

*Design and Procedure* Participants ( $N = 456$ , 57% male<sup>2</sup>) completed this online experiment in exchange for \$0.25. Participants were randomly assigned to one of three experimental conditions varying in cost transparency: no transparency, cost transparency with a favorable cost allocation, and cost transparency with an unfavorable cost allocation (Figure 2). The no transparency (control)

<sup>2</sup> Due to an error, age data were not collected for this experiment, though subjects were recruited through the same platform and using the same methodology as the other experiments, so average age is likely similar.

and favorable allocation conditions were the same as the control and cost transparency conditions from Experiment 1, respectively. In the unfavorable allocation condition, the cost associated with cotton was reduced from \$2.75 to \$0.50, while the cost associated with transport was increased from \$0.50 to \$2.75. The other costs were the same as those in the favorable allocation condition. Therefore, we shifted costs from the favored production step (procuring raw materials) to the step on which pretest participants wanted the company to spend less (transportation).

*Dependent Measures* The willingness to buy and composite brand attraction (Cronbach's  $\alpha = .90$ ) measures were administered as in Experiment 2.

### 4.3.2. Results

*Willingness to buy* A one way ANOVA revealed significant differences in willingness to buy as a function of the transparency manipulation ( $F(2, 453) = 3.58, p = 0.03$ ; Figure 4). Relative to control, willingness to buy was significantly higher in both the favorable cost transparency condition ( $M_{fav} = 4.90, SD = 1.59; M_{none} = 4.41, SD = 1.99; t(299) = 2.35, p = 0.02$ ) and the unfavorable cost transparency condition ( $M_{unf} = 4.86, SD = 1.69; t(303) = 2.14, p = 0.03$ ). The difference between favorable and unfavorable cost transparency was not significant ( $t(304) = 0.19, p = 0.60$ ).

*Attraction to brand* A one way ANOVA revealed significant differences in brand attraction as a function of the transparency manipulation ( $F(2, 453) = 13.34, p < 0.01$ ). Relative to control, brand attraction was significantly higher in both the favorable cost transparency condition ( $M_{fav} = 5.49, SD = 0.89; M_{control} = 4.86, SD = 1.15; t(299) = 3.77, p < 0.01$ ) and the unfavorable cost transparency condition ( $M_{unf} = 5.34; SD = 1.24; t(303) = 3.48, p < 0.01$ ). The difference between favorable and unfavorable cost transparency was not significant ( $t(304) = 1.24, p = 0.90$ ).

*Mediation Analysis* We again tested whether attraction mediates willingness to buy. We indexed each of the conditions to create a continuous measure of cost transparency, coded as follows: 0 (control), 1(unfavorable allocation), and 2(favorable allocation). The continuous cost transparency measure predicted both brand attraction ( $\beta = 0.32, p < 0.01$ ) and willingness to buy ( $\beta = 0.24, p = 0.02$ ). When brand attraction and both cost transparency conditions were included in the regression model predicting willingness to buy, the effect of attraction remained significant ( $\beta = 0.81, p < 0.01$ ), but the effect of cost transparency was reduced to insignificance ( $\beta = -0.01, p = 0.89$ ) providing support for full mediation. We again used a bootstrap procedure to construct bias-corrected confidence intervals for the indirect effect based on 5000 resamples (Zhao et al. 2010). The 95% bias-corrected confidence interval excluded zero (0.16, 0.36), suggesting a significant mediation effect (Figure 5).

#### 4.4. Experiment 4: Cost Transparency versus Personalized Brand Relationships

Experiment 3 suggests that the capacity for cost transparency to boost willingness to buy persists even when costs are allocated in an undesirable way. To the extent that brand attraction accounts for the benefit of cost transparency, it is interesting to measure the effects of cost transparency after priming a prior personal relationship with a brand. Thus, Experiment 4 tests whether the effect of cost transparency is affected by priming prior consumer-brand relationships.

##### 4.4.1. Method

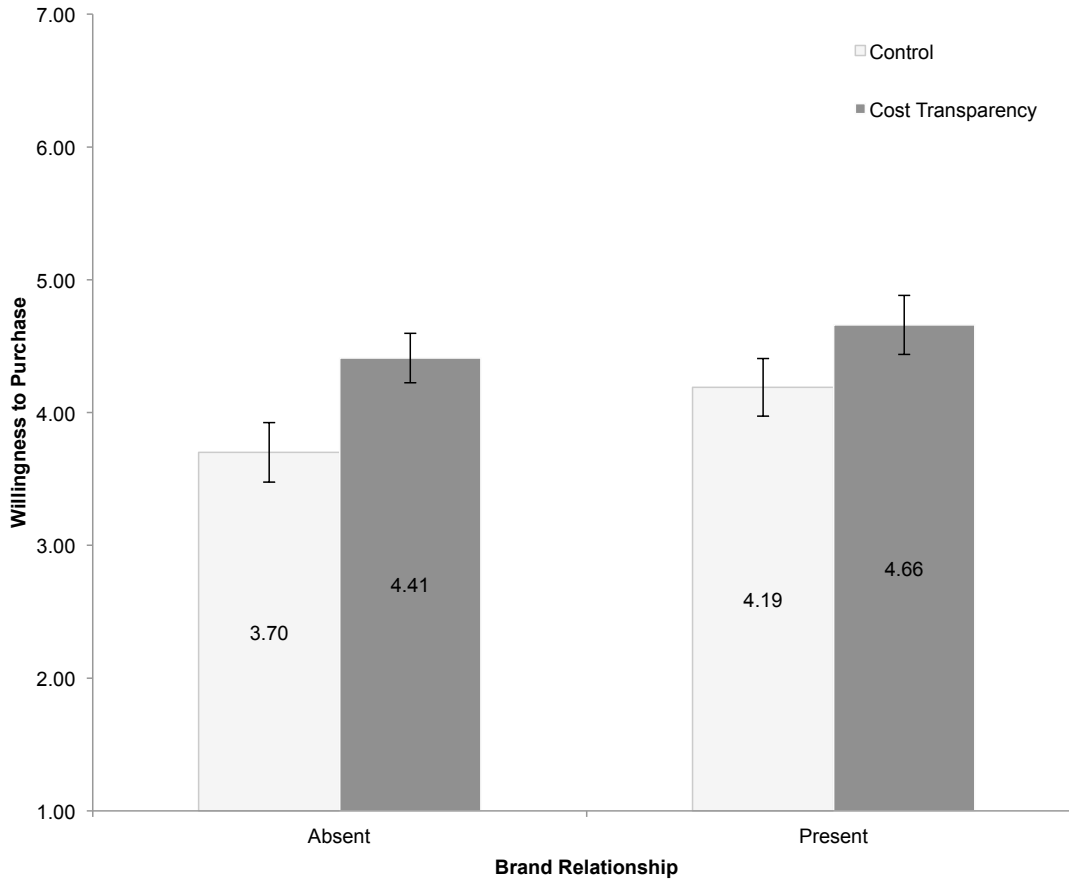
*Design and Procedure* Participants ( $N = 329$ ,  $M_{age} = 30.7$ , 59% Male) completed this online experiment in exchange for \$0.25. Participants were randomly assigned to one of four conditions, of a 2 (Transparency: Control, Cost) x 2 (Brand Relationship: Absent, Present) between-subjects design. The control and cost transparency conditions were the same as Experiment 1. Brand relationship was manipulated in the introduction of the experiment. In the relationship absent condition, participants were told to “Imagine that this is a brand that you are encountering for the very first time. You encounter this product page on the company’s public website.” In the relationship present condition, participants were told to “Imagine that this is a brand that you are familiar with. You encounter this product page in a private section of the company’s public website, to which you have been given a personalized login.”

*Dependent Measures* The willingness to buy and composite brand attraction (Cronbach’s  $\alpha = .93$ ) measures were administered as in Experiments 1-3.

##### 4.4.2. Results

*Willingness to buy* We conducted a 2 (Transparency: None, Cost) x 2 (Brand Relationship: Absent, Present) ANOVA on willingness to buy (Figure 6). Consistent with the previous experiments, there was a main effect of cost transparency ( $F(1, 325) = 7.79, p < 0.01$ ). Relative to the control, willingness to buy was significantly higher in the cost transparency condition ( $M_{cost} = 4.52, SD = 1.87; M_{control} = 3.96, SD = 1.96; t(327) = 2.65, p < 0.01$ ). In addition, willingness to buy was marginally greater when a relationship was present versus absent ( $M_{present} = 4.42, SD = 1.98; M_{absent} = 4.10, SD = 1.88; (F(1, 325) = 3.07, p = 0.08)$ ). There was no interaction between personalization and transparency ( $F(1, 325) = 0.32, p = 0.57$ ). Thus, the positive effect of transparency on willingness to buy held regardless of the relationship between the firm and the brand, suggesting the effects are complementary.

*Attraction to brand* Replicating the findings of Experiments 2 and 3, brand attraction mediated the effect of cost transparency on willingness to buy. First, cost transparency predicted willingness to buy ( $\beta = 0.55, p = 0.01$ ), as well as brand attraction ( $\beta = 0.51, p < 0.01$ ). When brand attraction and cost transparency were included in the regression model predicting willingness to buy, the



**Figure 6** Experiment 4. Cost transparency increases propensity to purchase more versus the control than brand relationship.

effect of attraction remained significant ( $\beta = 0.92, p < 0.01$ ), but the effect of cost transparency was reduced to insignificance ( $\beta = 0.08, p = 0.65$ ). We again used a bootstrap procedure to construct bias-corrected confidence intervals of the size of the indirect effect based on 5000 resamples (Zhao et al. 2010). The 95% bias-corrected confidence interval excluded zero (0.23, 0.82), suggesting a significant mediation effect (Figure 5).

#### 4.5. Experiment 5: Cost Transparency and Profit Margins

Experiment 4 suggests that priming a brand relationship does not moderate the effect of cost transparency on willingness to buy. In Experiment 5, we explore how profit margins (i.e., price relative to cost) moderate the effects of cost transparency on willingness to buy. Given the curvilinear relationship between disclosure intimacy and liking (Cozby 1972), we predicted that the effect of cost transparency on willingness to buy would weaken, but not reverse, when the firm discloses high profit margins - i.e., a particularly unsavory, and hence also intimate, piece of information.

##### 4.5.1. Method



*Design and Procedure* Participants ( $N = 958$ ,  $M_{age} = 31.4$ , 61% Male) completed this online experiment in exchange for \$0.25. They were randomly assigned to one of 28 experimental conditions of a 14 (Price level: \$10, \$15, \$20, \$25, \$30, \$35, \$40, \$45, \$50, \$60, \$70, \$80, \$90, \$100) x 2 (Transparency: Control, Cost) between-subjects design. With the exception of the price manipulation, the control and cost transparency conditions were the same as in Experiment 1. We used the online website of a popular department store to determine a relevant range of product prices (\$8-\$78). Thus, the price manipulation reflected the varying price points a consumer might encounter in the marketplace.

*Dependent Measures* The willingness to buy and composite brand attraction (Cronbach's  $\alpha = .93$ ) measures were administered as in Experiments 1-4.

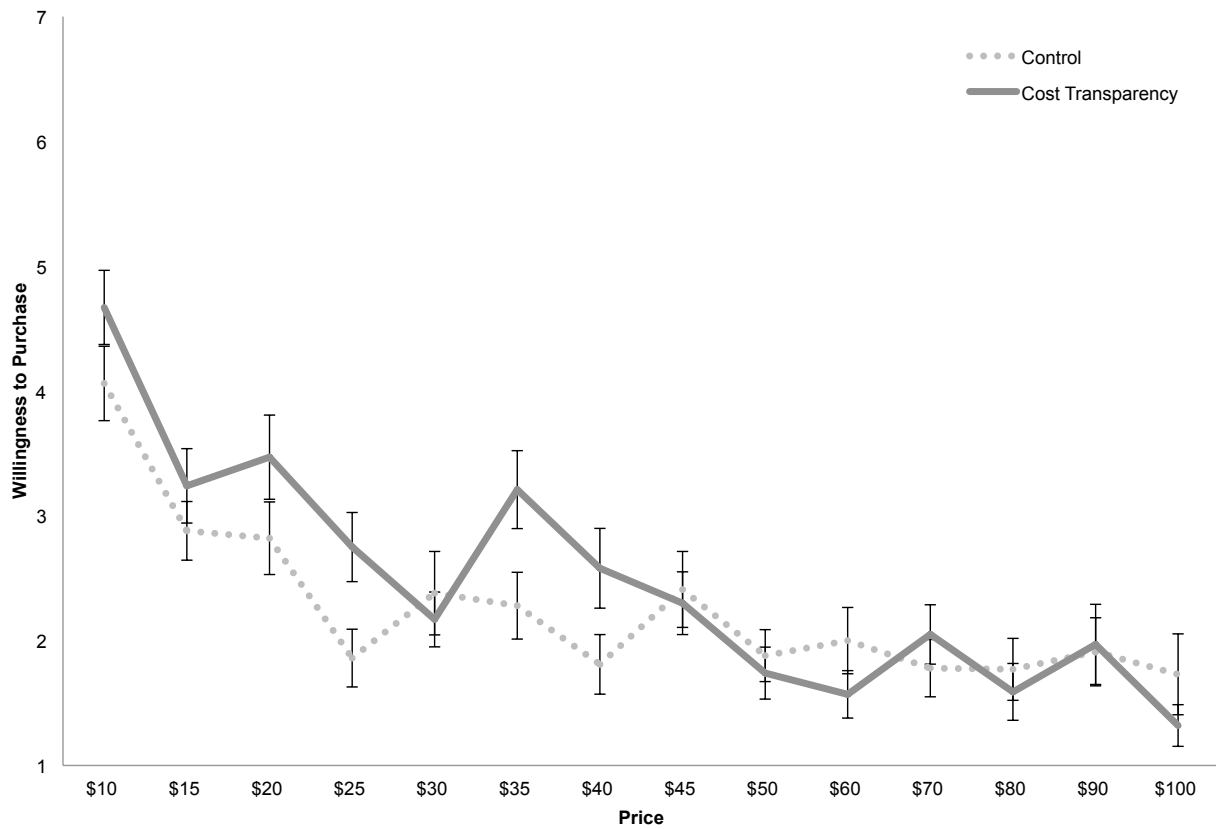
#### 4.5.2. Results

*Willingness to buy* We conducted a 14 (Price level: \$10, \$15, \$20, \$25, \$30, \$35, \$40, \$45, \$50, \$60, \$70, \$80, \$90, \$100) x 2 (Transparency: Control, Cost) ANOVA on willingness to buy, with price as a continuous variable (Figure 7). Not surprisingly, willingness to buy decreased as price increased ( $F(1, 954) = 121.2, p < 0.01$ ). More interestingly, cost transparency increased willingness to buy, regardless of price ( $M_{none} = 2.26, SD = 1.65; M_{cost} = 2.48, SD = 1.79; F(1, 954) = 10.80, p < 0.01$ ). There was also a significant interaction between price and transparency on willingness to buy ( $F(1, 954) = 6.05, p = 0.01$ ); the benefit of cost transparency decreased - but did not reverse - as price increased.

We conducted a follow-up analysis in which we split the sample at the median price. For the 479 participants in the below median price conditions ( $< \$45.00$ ), there was a significant main effect of cost transparency on willingness to buy ( $F(1, 477) = 10.73, p < 0.01$ ). However, for the 479 participants in the above median price conditions above ( $\$45.00$  and above), there was no significant main effect of cost transparency ( $F(1, 477) = 0.91, p = 0.34$ ). This analysis provides additional support for the notion that the benefit of cost transparency is greater when profit margins are relatively small.

*Brand attraction* This measure produced a similar pattern of results. A 14 (Price level: \$10, \$15, \$20, \$25, \$30, \$35, \$40, \$45, \$50, \$60, \$70, \$80, \$90, \$100) x 2 (Transparency: Control, Cost) ANOVA revealed both a significant main effect of price ( $F(1, 941) = 74.34, p < 0.01$ ) and cost transparency ( $F(1, 941) = 9.61, p < 0.01$ ). There was also a significant interaction ( $F(1, 941) = 5.12, p = 0.02$ ) such that cost transparency increased brand attraction most at low prices.

*Mediation* Replicating the findings of Experiments 2-4, brand attraction again mediated the effect of cost transparency on willingness to buy. Controlling for price, cost transparency predicted both willingness to buy ( $\beta = 0.24, p = 0.02$ ) and brand attraction ( $\beta = 0.20, p = 0.02$ ). When brand



**Figure 7 Experiment 5. The effectiveness of cost transparency decreases - but does not reverse - as price increases relative to cost.**

attraction and cost transparency were included in the regression model predicting willingness to buy, the effect of attraction remained significant ( $\beta = 0.61, p < 0.01$ ), but the effect of cost transparency was reduced to insignificance ( $\beta = 0.11, p = 0.21$ ). We again used a bootstrap procedure to construct bias-corrected confidence intervals of the size of the indirect effect based on 5000 resamples (Zhao et al. 2010). The 95% bias-corrected confidence interval excluded zero, (0.02, 0.23), suggesting a significant mediation effect (Figure 5).

#### 4.6. Experiment 6: Cost Transparency and Markup Salience

The previous experiment suggests that, holding cost constant, price is a boundary condition for the effectiveness of cost transparency in boosting purchase intent. However, our results suggest that even with an extremely high markup, cost transparency does not reduce purchase intent. One possible explanation for this pattern is that when a firm exposes its costs, its markup may not be especially salient. In Experiment 6, we test whether making markups more salient will reverse the effectiveness of cost transparency.

There are several ways a retailer can make its markup salient. For one, a retailer can calculate and publish its markup. A retailer can also estimate and publish its competitor's markups - comparing

one's prices to those of a competitor is a common marketing practice (Grewal et al. 1998, Kahneman et al. 1986, Li Miao and Mattila 2007). We anticipate that if a firm reveals that its own markup is higher than that of its competitors, this will decrease purchase propensity, since this action is a direct violation of social norms. Violating social norms breaks down the positive effects of disclosure on liking (Collins and Porras 1994).

#### 4.6.1. Method

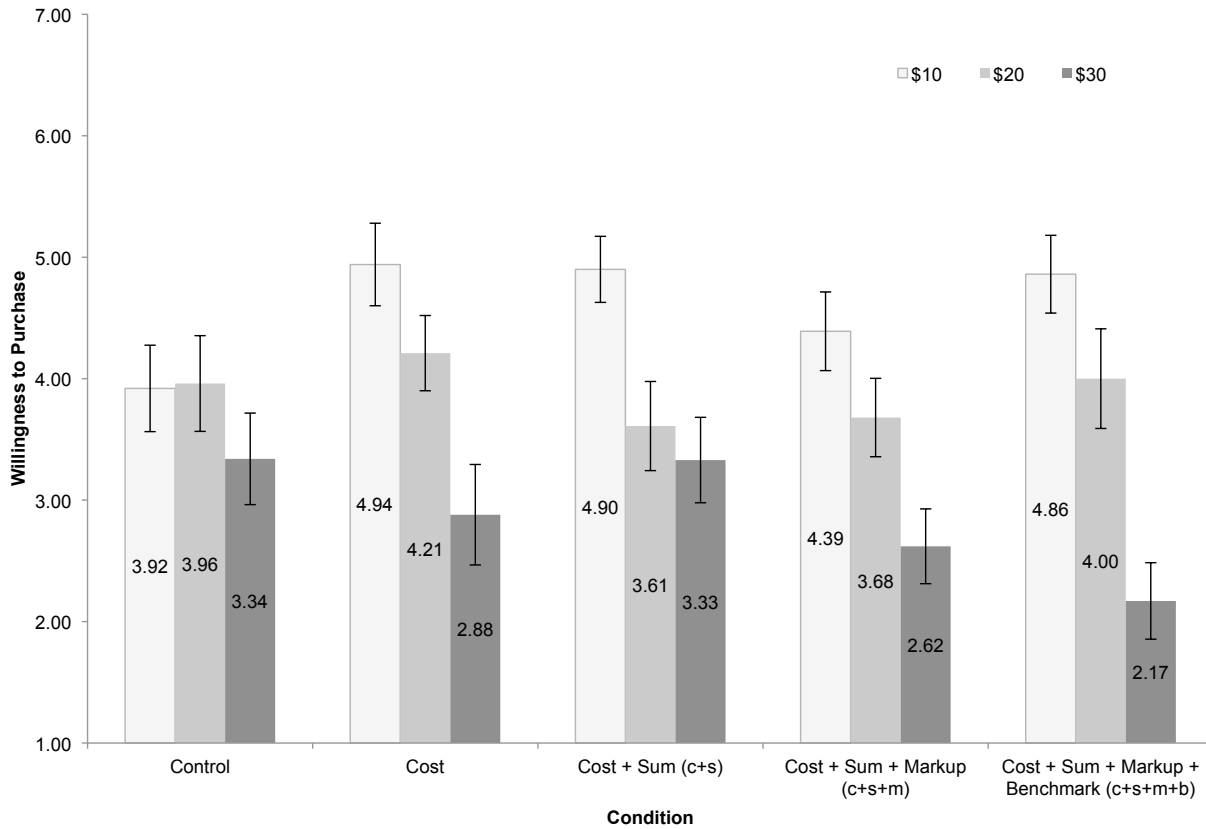
*Design and Procedures* Participants ( $N = 453$ ,  $M_{age} = 31.3$ , 59% Male) completed this online experiment in exchange for \$0.25. Participants were randomly assigned to 1 of 15 experimental conditions, of a 3 (Price: \$10, \$20, \$30) x 5 (Transparency: Control, Cost, Cost + Sum, Cost + Sum + Markup, Cost + Sum + Markup + Benchmark). The former two conditions were identical to the conditions used in Experiments 1 - 5. The latter three conditions progressively increased markup salience. The "Cost + Sum" graphic connoted the same information as in Experiment 2, with a different graphic design denoting total cost (Figure 2). In the "Cost + Sum + Markup" condition, we added the firm's markup relative to cost - noting for instance, that \$30 corresponded with a 4.5X price markup (relative to the total cost of \$6.70). Note that the markup conditions further emphasize the firm's profit margin - a conservative design choice (i.e., is likely to bias against finding a benefit of cost transparency). Finally, in the "Cost + Total + Markup + Benchmark" condition, we further noted that a similar shirt at a 'traditional retailer' is priced at \$25, a 3.7X markup over the estimated cost of production. Thus, at the \$10 and \$20 price points, the firm's markup was lower, and therefore, more desirable than that of its' competitor, and vice versa for the \$30 price point.

*Dependent Measure* The willingness to buy measure was administered as in Experiments 1-5.

#### 4.6.2. Results

*Willingness to Buy* We conducted a 3 (Price: \$10, \$20, \$30) x 5 (Transparency: Control, Cost, Cost + Sum, Cost + Sum + Markup, Cost + Sum + Markup + Benchmark) ANOVA on willingness to buy (Figure 7). As expected, we observed a significant main effect of price,  $F(1, 443) = 61.6, p < 0.01$ : as price increased, willingness to buy decreased. Overall, we found a marginally significant main effect of transparency,  $F(4, 443) = 1.98, p = 0.10$ , as well as a marginally significant interaction between price and transparency condition,  $F(4, 443) = 8.37, p = 0.06$ .

To better understand the relationship between price and markup salience, we indexed each of the five transparency conditions to create a continuous measure of markup salience, coded as follows: 0 (control), 1 (cost), 2 (cost + sum), 3 (cost + sum + markup), and 4 (cost + sum + markup + benchmark). As price increased, so did the negative implications of greater markup salience. We then regressed the continuous measure of markup salience, price, and the 2-way interaction of



**Figure 8 Experiment 6. Making the markup more salient diminishes the effectiveness of higher cost transparency, particularly at higher price points.**

markup salience and price on willingness to buy. As expected, the main effect of price is significant ( $\beta = -0.05, p = 0.01$ ). The main effect of the markup salience variable is marginally significant ( $\beta = 0.30, p = 0.08$ ), and most importantly, the interaction between markup salience and price has a significant negative coefficient ( $\beta = -0.02, p = 0.02$ ). This suggests that the level of markup salience negatively moderates the relationship between price and transparency (Figure 8).

Furthermore, willingness to buy was marginally higher in the \$10 condition when competitor markups were revealed relative to the control ( $M_{c+s+m+b} = 4.86, SD = 1.69; M_{control} = 3.92, SD = 1.78; t(51) = 1.97, p = 0.05$ ). However, relative to the control, willingness to buy was significantly lower in the \$30 condition when competitor markups were revealed ( $M_{c+s+m+b} = 2.17, SD = 1.72; M_{control} = 3.34, SD = 2.13; t(60) = 2.37, p = 0.02$ ). This suggests that by making it salient that markups are counter-normatively high, cost transparency can decrease customer purchase intentions.

#### 4.7. Field Evidence

On December 2, 2013, a privately-held online retailer launched a holiday gift shop with a single email to its mailing list, promoting a leather wallet, offered in 5 colors (burgundy, black, grey, bone,

and tan), and priced at \$115.00. At the end of January, in an effort to boost post-holiday sales, the retailer prepared to add a cost transparency infographic to its retail website on the product detail pages that corresponded with each of the wallet’s five color combinations. While the company had published similar infographics for other products on its site in the past (for example, on its blog), this was the first time it had used such a graphic on a product detail page (the page from which a customer adds a product to her shopping cart). As the wallets differed only in color, the company intended to use the same infographic for every wallet in the line.

The infographic detailed the materials and processes involved in the production of the wallet, as well as the costs associated with each component - leather (\$14.68), construction (\$38.56), duties (\$4.26) and transportation (\$1.00). It also denoted the total cost (\$58.50), the fact the wallet was priced with a 1.9x markup, and the statement that a comparable wallet would be sold with a 6x markup by a competitor. Notably, this manipulation is identical in features to the “cost + sum + markup + benchmark” treatment in Experiment 6 (in which the price is relatively low and hence, the markup is not counter-normatively high) (Figure 2).

**4.7.1. Data and Empirical Approach** Our field evidence takes advantage of an error in the implementation of this infographic. While managers had intended for the infographic to be introduced for all five wallet color combinations, it was accidentally only implemented for three of them (burgundy, black, and grey) and omitted for the other two (bone and tan). This mistake was overlooked for a five-week period, creating a natural experiment.

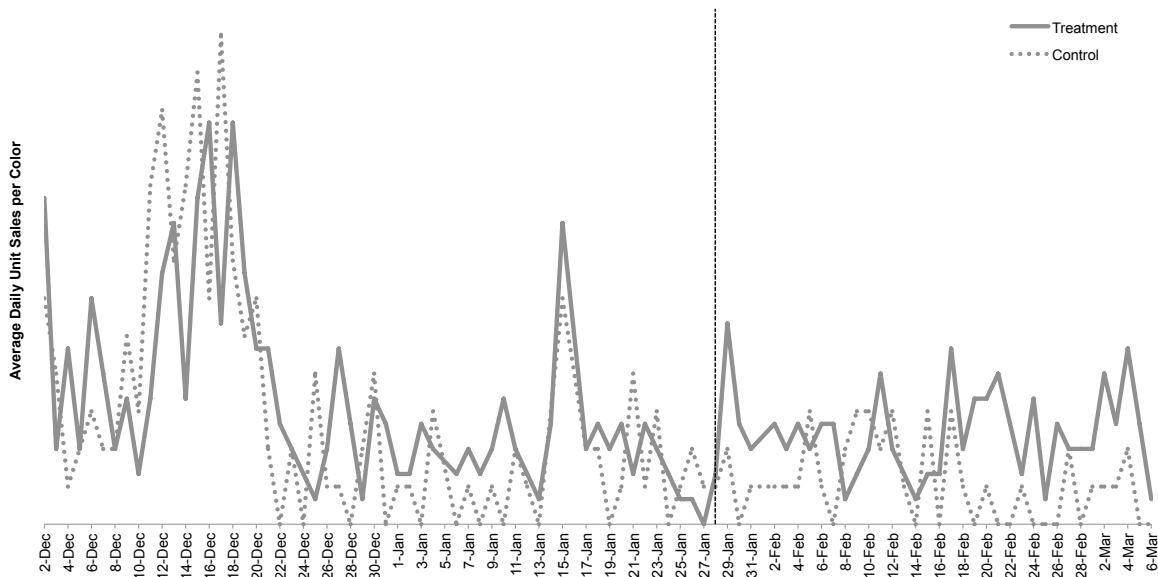
Our empirical strategy leverages the partial introduction of the cost transparency infographic as an exogenous shock that creates sets of comparable treatment (cost transparency) and control (blind) products. This treatment provides a conservative test of the effects of cost transparency, since customers browsing multiple wallet colors may have been exposed to the infographic and (correctly) inferred that the process and costs it depicted applied across color combinations. While the benefits of the infographic likely accrued to both groups, our identification comes from the fact that every customer who browsed wallets in the treatment group was exposed to the infographic, while customers who browsed wallets in the control group may not have been.

We use a difference-in-differences approach to compare how the difference in daily sales between the treatment and control groups changed before and after the introduction of the infographic. By doing so, we isolate the effect of cost transparency on the daily count of wallets sold in each category. We analyze the sales performance of five color combinations over a 92-day period ( $n = 460$ ), starting with the launch of the holiday gift shop on December 2, 2013 and ending on March 6, 2014. The infographic was introduced on January 28, 2014. We estimate the following linear fixed effect specification, using a Newey West estimator for standard errors that accounts

for autocorrelation within colors and heteroskedasticity with a small number of products (Newey et al. 1987, Schaffer 2010).

$$\begin{aligned}
 COUNT_{c,t} = f(\alpha_0 + \alpha_1 POST_t + \alpha_2 POST \times TREATMENT_c + \alpha_3 VISITS_{c,t} + \\
 \alpha_4 VISITS_{c,t}^2 + \alpha_5 NOVISITS_{c,t} + \alpha_6 NOVISITS_{c,t-1} + \\
 \alpha_7 NOSALE_{c,t-1} + \beta_c + \epsilon_{c,t})
 \end{aligned}
 \tag{1}$$

In the specification above,  $COUNT_{c,t}$  represents the count of items sold for color  $c$  on day  $t$ .  $POST_t$  is a dummy variable denoting observations after the introduction of the infographic. While the cost transparency treatment is subsumed by the color fixed effect,  $\beta_c$ ,  $POST_t \times TREATMENT_c$  is a dummy variable that specifically highlights observations in the cost transparency treatment conditions after the introduction of the infographic and is the focal independent variable of our analysis.  $VISITS_{c,t}$  and  $VISITS_{c,t}^2$  control for daily differences in visits to the product detail pages for each wallet.

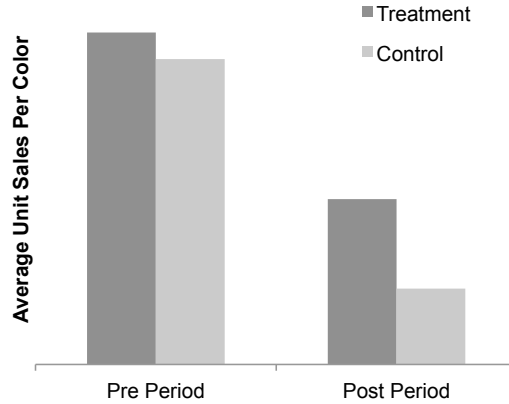


**Figure 9 Field Evidence. Average Daily Unit Sales per Treatment and Control Color.**

Note: Dashed vertical line indicates the date the infographic was added. Values withheld to protect confidential company information.

A limitation of our analysis is that we were not given data on inventory levels. While the assignment of the treatment was quasi-random as described above, given the low number of products in the treatment and control groups, a stockout could materially influence sales. To address this concern, we introduce several additional control variables. When the product is out of stock on the

company’s website, a “SOLD OUT” message blacks out the product on search results pages, though the product page remains accessible.  $NOVISITS_{c,t}$  is a dummy variable indicating whether no visits to the product page occurred for a specific color on a given day.  $NOVISITS_{c,t-1}$  represents whether there were no visits on the preceding day. As a final proxy for stockouts, we also introduce  $NOSALE_{c,t-1}$ , which is a dummy variable indicating whether there were no sales of a particular product on the preceding day.



**Figure 10** Field Evidence. Average Daily Unit Sales per Treatment and Control Color.

Note: Values withheld to protect confidential company information.

**4.7.2. Results and Discussion** Figure 9 graphically depicts the pattern of average daily unit sales per color, over the period of analysis, and Figure 10 displays the pattern in aggregate. Units were withheld from both figures to protect confidential company data, though the patterns are illustrative. Notably, while the sales trend declines over the period, reflecting diminished demand in the post-holiday season, wallets in the treatment condition, where the cost transparency infographic was introduced, exhibited less of a decline and sold more units after the introduction of the infographic, relative to wallets where the infographic was not introduced.

Table 3, Column (1) presents our base specification, in which we model the daily number of units sold per color combination as a function of the time period and treatment classification of the product group. While the focal variable is insignificant (coefficient = 0.523;  $p = 0.12$  two-tailed), the difference becomes marginally significant in Column (2) after controlling for the number of visits (coefficient = 0.579;  $p < 0.10$  two-tailed). In Column (3), we introduce controls for whether no customers visited the product on a given day, and the results intensify (coefficient = 0.660;  $p < 0.05$  two-tailed). In Column (4), we introduce an additional control, noting whether there were no sales the prior day, and results remain marginally significant (coefficient = 0.582;  $p < 0.10$  two-tailed). Finally, in Column (5), we increment the bandwidth selection in the fully specified model. While

	(1)	(2)	(3)	(4)	(5)
	Units Sold	Units Sold	Units Sold	Units Sold	Units Sold
Post	-0.945*** (0.273)	-0.921*** (0.258)	-0.959*** (0.257)	-0.850*** (0.238)	-0.850*** (0.262)
Post × Treatment	0.523 (0.331)	0.579* (0.330)	0.660** (0.328)	0.582* (0.311)	0.582* (0.340)
Visits		0.0591* (0.0312)	0.0488 (0.0316)	0.0451 (0.0302)	0.0451 (0.0312)
Visits <sup>2</sup>		-0.0002* (0.0001)	-0.0002 (0.0001)	-0.0002 (0.0001)	-0.0002 (0.0001)
No visit			-0.321** (0.153)	-0.300** (0.152)	-0.300** (0.153)
Lagged no visit			-0.158 (0.180)	-0.113 (0.183)	-0.113 (0.187)
Lagged no sale				-0.460*** (0.142)	-0.460*** (0.150)
Observations	460	460	460	460	460
Adjusted R-squared	0.044	0.050	0.052	0.067	0.067
Bandwidth selection	2	2	2	2	3

**Table 2 Field Evidence. Units Sold on a Daily Basis, by Transparency Condition.**

Treatment variable subsumed by Fixed Effects Estimation. Fixed Effect Coefficients withheld to protect confidential company information. Robust Newey West standard errors in parentheses. \* $p < 0.10$ \*\* $p < 0.05$ \*\*\* $p < 0.01$ .

the standard errors inflate, the results remain unchanged (coefficient = 0.582;  $p < 0.10$  two-tailed). Using the estimates from the fully-specified model, we calculate that the introduction of the cost transparency infographic increased daily unit sales on a per-color basis by 44.0% relative to average unit sales across the entire period of observation.

## 5. General Discussion

We demonstrated that cost transparency - revealing a firm's variable costs of production - can improve customer perceptions and firm performance. Cost transparency significantly increased purchase intent relative to operational transparency or margin transparency alone (Experiment 1-2). Consistent with previous research on disclosure and attraction, the effect of cost transparency on willingness to buy is mediated by consumers' attraction to the disclosing firm (Moon 2000). Moreover, the capacity for cost transparency to boost willingness to buy persists even when costs are allocated in an undesirable way (Experiment 3). Brand relationship does not moderate the effect of cost transparency on willingness to buy - the disclosure of sensitive cost information is



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appealing to consumers regardless of their prior relationship with a brand (Experiment 4). We then demonstrated that the extent of the profit margin serves as a boundary condition: the benefits of cost transparency weakened - but did not reverse - when a firm disclosed higher prices relative to cost (Experiment 5). Finally, we demonstrated that when markups are counter-normatively high compared to competitors, cost transparency diminishes purchase intentions (Experiment 6). Our final study was a field experiment with an online accessories retailer. The addition of a ‘cost transparency’ graphic denoting the costs of producing a wallet significantly increased sales over a five-week period. This research implies that by revealing costs - typically tightly-guarded secrets - managers can potentially improve both brand attraction and sales. Relative to other marketing tactics, cost transparency might be an innovative and inexpensive way to build brand attraction and sales.

### **5.1. Limitations**

Our experimental design presented operational transparency and cost transparency in a very stylized way. The effectiveness of disclosing cost information is likely affected by the presentation of information, and the source of the information. The stimuli could be potentially strengthened if animation or other website design changes are used to make the manipulation more salient (Buell and Norton 2011).

All participants were American, with costs presented in US dollars. It is possible that the evaluability of different currencies could moderate consumer choices when faced with cost transparency (Raghubir and Srivastava 2002, Hsee 1996). Customers may also make negative inferences if costs are presented in other currencies that indicate low wages and poor working conditions (i.e. Bangladeshi Taka) (Paharia et al. 2013).

From a practical standpoint, there are important caveats a retailer would need to consider before making the decision to reveal its costs. Firms may not want to disclose their costs if their cost structure is a competitive advantage (Porter 1985). Moreover, a firm’s suppliers may not allow the firm to make the costs associated with certain components public information. Thus, there could be strategic risks or contractual barriers to disclosure.

Even if firms want and are able to disclose their costs, they might not have the knowledge to do so. Disclosing the variable costs associated with the production of a single good could be particularly difficult for retailers that are not vertically integrated. While a retailer might be transparent about certain aspects of price such as taxes (Carter and Curry 2010), it might not be feasible or even possible to reveal costs for goods produced by a wide range of manufacturers. Moreover, for goods and services that are dependent on high fixed costs (R&D, overhead, constant labor costs), just presenting variable costs may not portray an accurate picture to the customer. In our research,

we focus only on variable costs, and do not reveal the fixed costs incurred by a firm - therefore, we systematically underrepresent the true costs associated with producing a good in each of our studies.

## 5.2. Open Questions

Although we examined profit margin as a boundary condition (Experiment 5), future work could further explore the relationship between price and cost. For instance, it would be useful to disentangle whether consumers respond to changes in the absolute cost basis versus changes in price relative to total cost.

Our research examines the effects of cost transparency for a single firm in a single industry. Future research could explore what would happen if consumers evaluated two or more products sold by the same firm, with varying levels of transparency. Cost transparency might also seem less intimate in competitive environments when other firms disclose their costs. Thus, future research could further explore the competitive ramifications of cost transparency, to better understand what happens in markets when multiple players reveal their costs for similar products.

Thus, there is still much to explore about the benefits and potential pitfalls of cost transparency.

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