Price Inferences for Sacred versus Secular Goods: Changing the Price of Medicine Influences Perceived Health Risk

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The current research examines how the price of a medication influences consumers' beliefs about their own disease risk—a critical question with new laws mandating greater price transparency for health care goods and services. Four studies reveal that consumers believe that lifesaving health goods are priced according to perceived need (i.e., communal-sharing principles) and that price consequently influences risk perceptions and intentions to consume care. Specifically, consumers believe that lower medication prices signal greater accessibility to anyone in need, and such accessibility thus makes them feel that their own self-risk is elevated, increasing consumption. The reverse is true for higher prices. Importantly, these effects are limited to self-relevant health threats and reveal that consumers make inconsistent assumptions about risk, prevalence, and need with price exposure. These findings suggest that while greater price transparency may indeed reduce consumption of higher-priced goods, it may do so for both necessary and unnecessary care.

In an era of consumer-driven health care, people must consider the monetary value of their medical goods and services. As movements toward price transparency gain ground nationwide (Sinaiko and Rosenthal 2011), consumers will become increasingly aware of the costs of their medical care and use this information to make important health consumption decisions. Proponents of price transparency believe that it facilitates "cost-conscious" shopping (Sinaiko and Rosenthal 2011, 892), helping people make better decisions and stimulating competition among suppli-

ers (Pauly and Burns 2008). This reasoning, however, relies on the tenuous assumption that consumers incorporate price information rationally.

Extensive research has shown that consumers draw (often unwarranted) inferences about products and their attributes from price. Price has been shown to affect perceived product quality (see Rao and Monroe 1989, for a review), prestige (Brucks, Zeithaml, and Naylor 2000), product-related effort (Shiv, Carmon, and Ariely 2005), and perceived drug efficacy (Waber et al. 2008). In this research, we examine another crucial aspect of decision making that may be affected by price: health risk perceptions. Perceived risk is a critical dimension of health decisions because it drives subsequent action, such as getting screened for illness, filling a prescription, or getting vaccinated (e.g., Janz and Becker 1984). By examining the role of price information on perceived risk, we highlight the consequences of increased exposure to the actual, and often quite variable, costs of medical care.

Given the inconsistencies in prices charged to patients and insurers (Anderson 2007), price is not necessarily diagnostic of disease risk. However, we propose that consumers have "communal-sharing" expectations of how lifesaving health products should be priced that inform their risk perceptions. That is, because lifesaving health goods protect life, a value of transcendental significance, they are deemed

"sacred" by consumers (Tetlock et al. 2000). This sacred status leads consumers to believe that these goods should be priced according to communal-sharing principles (Mc-Graw, Schwartz, and Tetlock 2012), which mandate need-based accessibility and affordability regardless of ability to pay (Fiske 1991; Fiske and Tetlock 1997). Thus, we suggest that consumers believe that lifesaving medical goods are affordably priced when many people need them. In this manner, lower prices signal a greater need among consumers for that medical good and consequently make people feel that they are more at risk of contracting the associated disease. Higher prices, conversely, signal reduced communal need and hence reduced self-risk. As such, expectations of communally priced health goods can systematically influence self-risk judgments, health behaviors, and consumption intentions.

We begin by highlighting research on consumer price inferences to show how price information drives consumer assumptions and expectations. We then draw from work on relational theory (Fiske 1991, 1992) and health care pricing expectations (McGraw et al. 2012) to introduce the notion that when considering lifesaving, or "sacred," health goods, consumers use price to infer self-risk of contracting disease. We first present a pilot study to establish that consumers have expectations that lifesaving health goods are more likely to be priced on the basis of communal-sharing (vs. market-pricing) principles. We next present three studies in support of the idea that price influences self-risk of illness for sacred goods. Further, we show that these inferences are driven by perceptions of need and have consequences for health information seeking and intentions to consume care. Finally, we identify a boundary condition of this effect, showing that disease information must be self-relevant for perceptions of need to affect self-risk inferences. Across the studies, we draw conclusions about the potential impact of price transparency (i.e., exposure to actual prices) on self-risk and intentions to consume care.

THEORETICAL BACKGROUND

The Informational Value of Price

The notion that price is a cue for more general inferences is well documented. To date, research on the informational value of price has focused largely on product quality and efficacy (e.g., Baumgartner 1995; Bettman, John, and Scott 1986; Kardes et al. 2004; Monroe 1973; Pechmann and Ratneshwar 1992; Rao and Monroe 1988, 1989). Reviews by Monroe and Krishnan (1985) and Rao and Monroe (1988, 1989) suggest a positive price-quality relationship that is particularly strong when people are unfamiliar with a product.

More recent work has examined how these price-related expectations affect product-related behavior, perceived efficacy, and even experienced efficacy. Shiv et al. (2005) find that higher (vs. lower) priced energy drinks improve anagram performance, despite the drinks themselves being the same. Waber and colleagues (2008) find that people expe-

rience more pain relief from an expensive placebo than an inexpensive one.

In sum, price information emerges as a driver of expectations and beliefs that affects real perceptions and experiences. In the next section, we extend this theme to health care, where we propose that strong beliefs about the rules that govern the prices of sacred medical goods may influence self-risk, driving intentions to consume care. We first describe what constitutes a sacred good and next discuss how these types of goods instantiate a communal focus toward care, evident in consumer beliefs and US federal policies. Finally, we discuss how these communal beliefs can influence self-risk and other downstream consequences.

Communal Sharing in the Health Care Marketplace

A sacred value or good is one that a moral community implicitly or explicitly treats as possessing infinite or transcendental significance (e.g., love, justice, life; Tetlock et al. 2000). In a health care context, this most directly applies to lifesaving medical goods, or those that preserve life. The notion of human life as "priceless," or having transcendent value, evokes the communal-sharing notion that, at least with regard to the deservingness of lifesaving care, all people are equivalent and undifferentiated (Fiske 1992). In this manner, we propose that lifesaving medical care falls under a communal-sharing model of social relationships.

Specifically, Fiske's (1991, 1992) relational theory outlines several models that govern our social world. The communal-sharing model depicts a world of equivalent social classes dictating mutual compassion and responsibility, where everyone shares benefits or resources without differentiation (Fiske 1992; Fiske and Tetlock 1997). This model is often contrasted with the market-pricing model (e.g., McGraw et al. 2012), which embodies a social structure driven by forces like supply, demand, and value-based pricing and which ultimately gives preference to those with the greatest ability to pay (Fiske 1991; Fiske and Tetlock 1997). Market pricing is considered most appropriate in the exchanges of secular goods (Fiske 1992; Tetlock et al. 2000), which are not considered to have transcendent value (e.g., nonlifesaving goods such as software or cosmetics). In the current work, we differentiate sacred and secular goods by their lifesaving status—a cancer medication that could prevent death would be considered sacred, while a cosmetic medication that could prevent wrinkles would be considered secular.

The communal notion that lifesaving care should be widely accessible is consistent with work showing that consumers find high health care prices to be particularly unfair because such prices are directly associated with intentions to harm those who need, but cannot afford, care (Campbell 2008). This sentiment also aligns with Sunstein's (2005) observation that people morally condemn those who knowingly engage in acts that could result in human death (536). More broadly, these views are consistent with many US policies that aim to ensure basic services for those in need. The

Emergency Medical Treatment and Active Labor Act (1986) requires hospitals to provide care to anyone needing emergency treatment, regardless of citizenship, legal status, or ability to pay. Childhood vaccines are subsidized by the federal government's Vaccination Assistance Act (1962) and the Vaccines for Children program (Omnibus Budget Reconciliation Act of 1993), and drug development often receives government benefits in the form of tax incentives, enhanced patent protection, or research subsidies (National Cancer Institute Act, 1937; National Cancer Act, 1971; Orphan Drug Act, 1983). In other words, laws exist to ensure that lifesaving health care goods and services are accessible in terms of both availability and cost. Restrictive pricing, tantamount to rationing, deprives access to lifesaving care, which can result in serious harm (even death) and is hence intolerable.

In a recent study, McGraw et al. (2012) tested the belief that health-related goods should be priced according to the rules of communal sharing (vs. market pricing) and found that consumers indeed favor a communal orientation for health care goods and endorsed the view that medical care ought to be priced on the basis of need (vs. ability to pay). Notably, this expectation of need-based pricing was not observed in the secular domain of computer software that, although important for utilitarian purposes, has no lifesaving properties.

In light of this research, we propose that people believe that lifesaving goods and services are affordable because consumers need them. As such, relatively lower prices should signal higher consumer need and, by extension, higher self-risk of affliction, while relatively higher prices should signal the opposite. In the domain of secular (nonlifesaving) goods, such communally oriented expectations do not exist, and so prices do not inform risk.

We examine these ideas across four studies. First, a pilot study establishes that consumers do indeed have expectations that lifesaving products are currently more likely to be priced according to communal-sharing norms than market-pricing norms but have opposite expectations for nonlifesaving products. Next, three studies examine the consequences of these expectations, elaborate on the mechanism, and present a boundary condition of the effect of price on risk. Data across the four studies presented were collected and analyzed by the lead author.

PILOT STUDY

We extend McGraw et al.'s (2012) work to examine whether, beyond desiring communal-sharing policies in the pricing of sacred health goods, consumers actually believe that health care goods are priced on the basis of communal-sharing principles. Given that the US health care system operates under both communal and market-pricing structures, consumers may desire a communal orientation toward care but believe that, in practice, the market-pricing model drives access to lifesaving health goods. We test this with a national online sample.

Participants and Design

In May 2012, 55 Amazon Mechanical Turk participants (51% female, median age = 32, aged 19–70) evaluated 10 different products and services on whether they felt each product's or service's price was based on (1) communal-sharing principles, where prices are based on need, or (2) market-pricing principles, where prices are based on a product's cost-benefit analysis (see app. A). These 10 products included five sacred lifesaving items (e.g., drug treatments to prevent serious illness and death, vaccines) and five secular nonlifesaving items (e.g., cosmetic pharmaceuticals, computer software), presented randomly.

Using a repeated-measures logistic regression analysis, we tested whether individuals felt that the sacred goods were more likely to be priced on the basis of communal-sharing (vs. market-pricing) principles than the secular goods. The independent variable was the type of product, and the dependent variable was the communal-sharing vs. market-pricing choice for each of the 10 products or services. As predicted, consumers were more likely to rate the pricing of lifesaving goods as consistent with communal-sharing rather than market-pricing principles ($B = -2.13$, $Z = -8.58$, $p < .0001$; $M_{ls} = 59\%$ vs. $M_{nonls} = 15\%$; table 1 shows an item-by-item breakdown). This provides evidence that consumers hold communal-sharing expectations for lifesaving medical goods.

Overview of Experiments

Having established a communal-sharing expectation for lifesaving or sacred medical goods, we test our hypotheses

TABLE 1

PILOT STUDY: ITEM-SPECIFIC CHOICE SHARES OF THE TYPE OF MODEL THAT DRIVES PRICING (COMMUNAL SHARING VS. MARKET PRICING)

	% communal	% market
Sacred lifesaving items:		
Vaccines	76.36	23.64
Screening tests to detect serious diseases or injuries (e.g., mammography, colonoscopy, CT scans)	65.45	34.55
Physician's visits	54.55	45.45
Pharmaceutical drug treatments that are used to prevent serious illness and death (e.g., antibiotics, heart and blood pressure medication)	50.91	49.09
Pharmaceutical drug treatments that are used to treat cancer (e.g., chemotherapy, creams to treat skin cancer)	47.27	52.73
Secular nonlifesaving items:		
Tax preparation services	23.64	76.36
Computer software	14.55	85.45
Restaurant menu items	12.73	87.27
Pharmaceutical drug treatments that are used for cosmetic purposes (e.g., special creams for wrinkles, age spots or acne)	10.91	89.09
Home electronics	10.91	89.09

of how this expectation shapes the link among price, perceived self-risk, and other downstream consequences. In study 1, we demonstrate the basic effect that exposure to relatively lower (higher) prices for sacred lifesaving goods increases (decreases) self-risk but that this pattern does not hold for secular or nonlifesaving goods. In study 2, we demonstrate that prices similarly affect health care consumption intentions and information-seeking behaviors related to lifesaving goods. In study 3, we take two steps: we explicitly test our hypothesis that price serves as an indicator of communal need, which in turn drives self-risk perceptions and consumption intentions, and we test a boundary condition for this effect. Consistent with research on message recipient involvement (e.g., Johnson and Eagly 1989; Petty and Cacioppo 1979), information must be self-relevant for price to be seen as indicative of self-risk. When information is other relevant, such as when health messages appeal to the benefits for public health, individuals do not process the implications of price on need sufficiently to influence self-risk. We find mediation evidence to support the notion that when faced with a self-relevant health threat, price affects self-risk through perceptions of communal need and accessibility and, consistent with the health belief model (Janz and Becker 1984), that this risk drives consumption intentions. Across the studies, we draw out the implications for health care consumption in the face of price exposure, while simultaneously ruling out alternative explanations such as emotion, disease severity (death prevalence), consumer demand, medical good efficacy, and emotional discomfort.

STUDY 1

The purpose of study 1 is to establish a basic effect of price on self-risk by holding a health domain (dermatology) constant and varying whether a product has a lifesaving (prevents skin cancer) or cosmetic (prevents age spots) benefit. We use a dermatological context because treatments can be lifesaving or cosmetic. We hold insurance coverage constant across conditions to isolate responses to being merely exposed to low and high prices from those of being expected to pay low and high prices. We also examine whether price affects the perceived likelihood of dying from the illness. Finally, we test the effects of price on mood to rule out the emotion-based alternative explanation that higher prices for sacred goods cause moral outrage that consumers cope with by denying self-risk. We predict that lower (vs. higher) prices should increase perceptions of risk only for the lifesaving skin cancer cream. We do not expect price to affect these variables when the cream ("ProDerma") is described as a cosmetic treatment because consumers do not have expectations of communal pricing for nonlifesaving products.

Method

Participants and Design. In April 2011, 111 adults were recruited from a national Amazon Mechanical Turk sample to participate in an online study (53% female, median age

= 35, aged 19–74). Participants were randomly assigned to the conditions of a 2 (product type: lifesaving vs. cosmetic) × 2 (price: low [$25] vs. high [$250]) between-subjects design.

Procedure. Participants in the lifesaving (cosmetic) conditions were told that a pharmaceutical company had recently developed a skin cream, "ProDerma," which could be applied to moles or other spots on the skin that could become cancerous (unsightly with age; see app. B). The cost was $25 ($250), which was covered by insurance.

Self-Risk. Participants rated their likelihood of being affected by skin cancer/age spots: (1) "How likely are you to have this condition in your lifetime?" (not at all likely = 1, very likely = 7), (2) "How applicable is this issue to you?" (not at all = 1, very much so = 7), and (3) "How serious a threat is this condition to you?" (not at all serious = 1, very serious = 7). These were highly correlated (α = .72) and thus combined to form a self-risk index.

Death Prevalence. To understand how price informed perceptions of the severity or fatality of the disease if left untreated, participants were asked three separate questions: (1) "How common is death due to consequences of this condition?" (not at all common = 1, very common = 7), (2) "To what extent do you believe that using this treatment is a matter of life or death?" (not at all = 1, very much so = 7), and (3) "To what extent do you believe that using this treatment would prevent serious health consequences?" (not at all = 1, very much so = 7). These were highly correlated (α = .92) and thus combined to form a death prevalence index.

Mood Measures. To test whether emotional responses to price drove our results, participants completed a positive and negative affect scale (Watson, Clark, and Tellegen 1988), forming an index of positive (α = .91) and negative emotions (α = .95).

Results

The goal of this study was to establish the basic effect of price on self-risk and to rule out the alternative explanations of death prevalence and mood. We predicted that low price would increase perceptions of self-risk for the skin cancer cream yet not for the cosmetic cream.

Self-Risk. Participants' perceptions of their risk of skin cancer (age spots) were analyzed using a 2 (product type: lifesaving [skin cancer] vs. cosmetic [age spots]) × 2 (price: low [$25] vs. high [$250]) ANOVA. There was no main effect of price ($F(1, 107)$ = 2.55, p = .11, η^2 = .02). There was a marginal effect of product type, whereby participants believed their risk of skin cancer was greater than that of age spots (M_{ls} = 3.87 vs. M_{cos} = 3.37; $F(1, 107)$ = 3.54, p = .06, η^2 = .03). This effect was qualified by a significant product type × price interaction ($F(1, 107)$ = 9.80, p = .002, η^2 = .08; see fig. 1). As predicted, planned contrasts revealed that for the skin cancer conditions, the $25 (vs.

STUDY 1: PERCEIVED SELF-RISK OF AGE SPOTS (SECULAR)/
SKIN CANCER (SACRED) AS A FUNCTION OF PRODUCT
TYPE AND PRICE
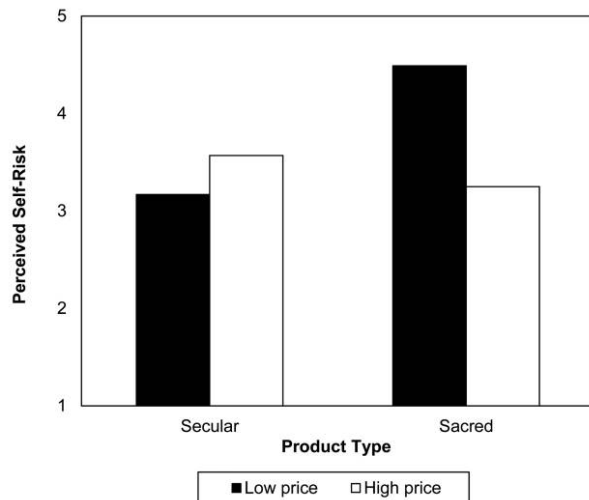
$250) cream increased perceptions of the self-risk of skin cancer ($M_{ls, low} = 4.49$ vs. $M_{ls, high} = 3.25$; $F(1, 107) = 9.85$, $p = .002$, $\eta^2 = .13$). For the secular age spot conditions, there was no significant difference in self-risk on the basis of price ($M_{cos, low} = 3.17$ vs. $M_{cos, high} = 3.57$; $F(1, 107) = 1.34$, $p = .25$). This demonstrates that price influences perceptions of risk only for lifesaving (vs. cosmetic) goods.

Death Prevalence. A 2 × 2 ANOVA on perceptions of death prevalence revealed that skin cancer was seen as more severe relative to age spots ($M_{ls} = 4.29$ vs. $M_{cos} = 2.04$; $F(1, 107) = 103.80$, $p < .0001$, $\eta^2 = .49$). There was no main effect of price ($F(1, 107) = 0.00$, NS), nor was there a significant product type × price interaction ($F(1, 107) = 1.20$, $p = .28$).

Positive and Negative Affect Scale. A 2 × 2 ANOVA on participants' mood did not reveal significant effects. Examining positive mood, there was no main effect of product type ($F(1, 107) = .45$, NS) or price ($F(1, 107) = 1.57$, $p = .22$), nor was there a product type × price interaction ($F(1, 107) = .07$, NS). For negative mood, there was no main effect of product type ($F(1, 107) = .78$, NS) or price ($F(1, 107) = 1.46$, $p = .23$), nor was there a product type × price interaction ($F(1, 107) = .03$, NS).

Discussion

Study 1 examined how individuals interpret price when the same health product is described as having either a lifesaving or a cosmetic benefit. We establish that a lower price

for a lifesaving skin cancer cream increases self-risk, while this effect does not hold for a cosmetic age spot cream. This is consistent with the communal-sharing notion that lower prices for sacred health goods imply greater accessibility due to greater need for these products, which consumers interpret as elevated self-risk. Importantly, this also suggests that relatively higher prices for sacred goods can lead to reduced self-risk, a potentially detrimental effect if lowered self-risk leads to reduced consumption of necessary care. We begin to examine this in study 2.

Study 1 also rules out several alternative explanations to better inform the proposed mechanism. The movement on the self-risk measure but not the disease severity measure reveals that consumers are interpreting price as reflective of their own risk of being afflicted with disease (e.g., contracting it, being affected by it) and not their likelihood of dying from it (i.e., death prevalence). Follow-up factor analyses indeed show that self-risk and death prevalence items load onto two separate factors, supporting this notion that the two dependent variables are distinct. Finally, the lack of change in emotion across price conditions rules out the alternative explanation that outrage over high prices causes denial of self-risk.

Interestingly, study participants reported feeling greater self-risk of skin cancer than age spots, which does not reflect population base rates. Due to its more serious nature and potential to occur at all ages, skin cancer may be more available (Tversky and Kahneman 1973) in the minds of our predominantly young participants (median age = 35) than age-related cosmetic changes.

While we have shown a basic effect of price on estimated self-risk for lifesaving goods, we do not yet know the extent to which these revised risk assessments will affect information seeking or consumption behavior. Thus the goal of study 2 is to explore the effects of price on information-seeking behaviors and consumption intentions.

STUDY 2

In study 2, we examine whether exposure to price influences engagement in preventive health behaviors such as learning more about a treatment, making plans to visit the doctor, and filling a prescription. Consistent with our prior findings, we expect that when ProDerma (the same medication used in study 1) is described as a skin cancer cream, lower (vs. higher) price will increase consumer involvement with a fictitious ProDerma advertisement and intentions to acquire the cream. We do not expect price-based changes when this same medication is described as a cosmetic cream.

Method

Participants and Design. In June 2011, 165 participants from an Amazon Mechanical Turk sample were recruited to participate in a study online (63% female, median age = 43, aged 19–81). Participants were randomly assigned to the conditions of a 2 (product type: lifesaving vs. cosmetic) × 2 (price: low vs. high) between-subjects design.

Procedure. Participants were presented with the same ProDerma skin cream vignette as in study 1, before being asked to review an informational advertisement for Pro-Derma and rate their intentions of consuming it. As in study 1, insurance was stated to cover the cost of ProDerma across all conditions. In this study, the behavior-related measures were taken without a prior explicit risk assessment, which is a more natural reflection of how people respond to advertisements and avoids bias that might be induced by making risk-related attitudes explicit and, hence, more accessible (e.g., Fazio, Powell, and Williams 1989; Williams, Block, and Fitzsimons 2006).

Information Seeking. Upon reading the vignette, participants were told that they would be presented with an advertisement for ProDerma. This text-filled ad was designed to mimic other pharmaceutical advertisements. The lifesaving and cosmetic ads were identical except for the heading ("Treat your skin, Save your life" or "Treat your skin, Save your looks"), and a sentence within the text referencing one's life/looks (see app. C). The time spent reading the ad was measured as a documented component of consumer involvement (e.g., Kapferer and Laurent 1985; Laurent and Kapferer 1985) and consumer search (e.g., Bloch, Sherrell, and Ridgway 1986; Furse, Punj, and Stewart 1984) and served as subtle marker of information seeking.

Intentions to Consume ProDerma. Participants then rated four questions that addressed their likelihood of obtaining the new prescription medication: (1) How interested would you be in trying ProDerma? (not at all = 1, very much so = 7), (2) How likely would you be to talk to your doctor about whether ProDerma is right for you? (3) How likely are you to ask your doctor about getting this medication? and (4) How likely would you be to fill a prescription for this medication, if it were given to you by your doctor? (the last three questions were anchored at not at all likely = 1, very likely = 7; $\alpha = .88$ for all four items).

Results

The goal of study 2 was to demonstrate that stated prices for lifesaving health goods (with third-party coverage) differentially affect information seeking about a product and the intentions to take steps to consume it. Consistent with prior findings, we did not expect price to influence responses to the nonlifesaving cosmetic product.

Information Seeking. The amount of time participants spent reading the ProDerma advertisement was analyzed using a 2 (product type: lifesaving vs. cosmetic) × 2 (price: low vs. high) ANOVA. One participant was removed from the analysis because her time spent reading was more than 3 standard deviations above the mean reading time. There were no main effects of product type or price ($F(1, 160) < 1$, NS). However, as predicted, the product type × price interaction was significant ($F(1, 160) = 4.20, p = .04, \eta^2 = .03$; see fig. 2) and showed that price differentially affected time spent reading the ad across conditions. For the

FIGURE 2

STUDY 2: AMOUNT OF TIME SPENT READING PHARMACEUTICAL ADVERTISEMENT AS A FUNCTION OF PRODUCT TYPE AND PRICE
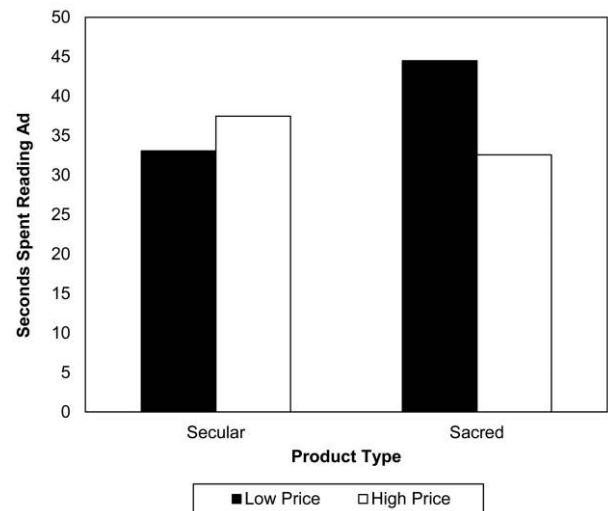
lifesaving conditions, planned contrasts revealed that low (vs. high) price increased time spent reading the ad ($M_{ls, low} = 44.51$ seconds vs. $M_{ls, high} = 32.57$ seconds; $F(1, 160) = 4.09, p < .05, \eta^2 = .03$). For the cosmetic conditions, there were no differences across price ($M_{cos, low} = 33.08$ seconds vs. $M_{cos, high} = 37.48$ seconds; $F(1, 160) < 1$, NS).

Intentions to Consume ProDerma. A 2 × 2 ANOVA revealed a main effect of product type such that individuals were more likely to consume the lifesaving cancer cream than the cosmetic cream ($M_{ls} = 4.29$ vs. $M_{cos} = 3.20$; $F(1, 160) = 17.52, p < .0001, \eta^2 = .10$). There was also a main effect of price whereby people were marginally more likely to take steps to consume the medication when price was low (vs. high) ($M_{low} = 3.98$ vs. $M_{high} = 3.51$; $F(1, 160) = 3.20, p = .08, \eta^2 = .02$). As predicted, the product type × price interaction was significant ($F(1, 160) = 6.32, p = .01, \eta^2 = .03$; see fig. 3). Consistent with the information-seeking results, in the skin cancer conditions, low (vs. high) price increased intentions to use ProDerma ($M_{ls, low} = 4.85$ vs. $M_{ls, high} = 3.73$; $F(1, 160) = 8.44, p < .01, \eta^2 = .05$). In the cosmetic conditions, price had no effect on these intentions ($M_{cos, low} = 3.10$ vs. $M_{cos, high} = 3.29$; $F(1, 160) < 1$, NS).

Discussion

In study 2, we demonstrate that exposing consumers to price information about a lifesaving health care good has behavioral and consumption consequences. Lower price raises the likelihood that people will take more adaptive steps such as information seeking and intentions to consume

FIGURE 3

STUDY 2: INTENTIONS TO CONSUME DRUG AS A FUNCTION
OF PRODUCT TYPE AND PRICE
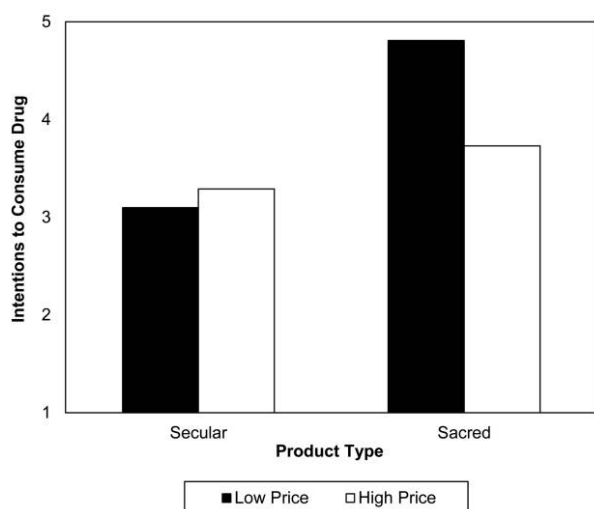
care. As price increases for this type of good, however, people become less involved in pharmaceutical ad information and less inclined to take subsequent purchasing action—even if they are not expected to pay for the good themselves. Importantly, the patterns observed in which price affects behaviors and intentions for sacred but not secular goods are identical to the patterns of self-risk in study 1, suggesting parallel processes across risk, information seeking, and consumption intentions. These results are consistent with the notion that the affordability of lower (vs. higher) priced sacred goods signals high need and makes people consider their own self-risk to be higher.

These results have strong implications for price transparency initiatives. While we have focused on how lower prices increase risk perceptions, health behaviors, and intentions to consume care, the prices for lifesaving medical goods are often high. The past two studies show that even when insurance covers the cost, relatively higher (vs. lower) prices cause individuals to report lower levels of self-risk and be less likely to take steps to consume the skin cancer cream. This suggests that greater awareness of higher prices through price transparency may indeed reduce consumption of care, as intended. Importantly, however, awareness of higher prices has the potential to reduce the likelihood of seeking necessary care. If higher prices signal lower self-risk, causing people to consequently avoid prevention and treatment, this portends detrimental effects on consumers and may ultimately increase future treatment costs.

Thus far we have shown that when people consider lifesaving health goods, exposure to price can influence perceived self-risk, information seeking, and consumption intentions. These effects do not hold for nonlifesaving goods

such as cosmetics and suggest that price information is used differently across consumer product types. We theorize that this pattern of results reflects a widely held belief that sacred or lifesaving health goods are priced according to perceived communal need, and as such, lower prices cue high communal need, which makes people feel they are at greater risk of being affected by disease. Higher prices, which may be viewed as out of reach for many (and, particularly, uninsured) consumers, do not provide a great communal need signal, leading to decreased perceptions of self-risk. In study 3, we focus exclusively on a sacred health product and test our theory by probing consumer beliefs of communal need. We also identify a boundary condition of the effect of price on risk.

STUDY 3

The purpose of study 3 is to test whether beliefs that lifesaving health goods are priced to ensure accessibility to those in need influence self-risk assessments and when they do so. This study was run in the early fall, when people are encouraged to get the seasonal flu vaccine. Flu shots are widely available without a prescription or doctor's visit, so the perennial question of whether to get a flu shot is a timely and realistic context in which to test our hypotheses.

In testing our theory, we take two key steps. First, we explicitly measure the influence of price on perceptions of communal need for a sacred medical good (the flu vaccine) to test its role in driving self-risk and consumption intentions. Second, to identify a boundary condition of the effect of price on risk and consumption of care, we manipulate whether the health message emphasizes self-relevant individual consequences, such as personal illness, missed workdays, or increased health expenditures, or whether it emphasizes public or other-relevant consequences, such as flu transmission to vulnerable populations, a hampered economy, or health system burden (see app. D for study 3 stimuli). Self-relevant, or "involving," information has been shown to increase individuals' motivation to systematically process persuasive messages (Millar and Millar 2000; Petty and Cacioppo 1979; Petty, Cacioppo, and Goldman 1981), creating attitudes that have stronger downstream consequences and are more predictive of behavior (Petty, Haugtvedt, and Smith 1995). Moreover, involvement that highlights important goals or makes outcomes salient facilitates persuasion (Johnson and Eagly 1989). Both individual and public health oriented public service advertisements for the flu are common (e.g., Centers for Disease Control and Prevention 2009; Pharm Fresh Media 2012), so the comparison of these types of campaigns is also informative for public policy.

We propose that in the self-relevant, individual health condition, higher involvement increases respondents' motivation to process information about price and what it signifies about ensuring accessibility to meet communal need (Petty et al. 1995). In this sense, the message in the self-relevant health condition is processed more deeply and, hence, better integrates itself into the message recipient's

cognitive structure, which can be observed in greater price-driven changes in perceptions of communal need for the vaccine, self-risk, and consumption intentions. In the other-relevant public health condition, the message is by definition less self-involving, so the effect of price on perceptions of communal need should be weaker, and the decreased processing of price information should have less influence on downstream perceptions of self-risk and intentions to consume care. In other words, the lack of self-relevance limits consideration of the link among price, communal need, and self-risk. We test this hypothesis with a moderated mediation analysis examining whether the relationship between price and self-risk is mediated by perceptions of need only in the self-relevant conditions and not in the other-relevant conditions. Examining the notion that one's own vulnerability drives action (Janz and Becker 1984), we use this same analysis to test whether self-risk drives consumption intentions only for the self-relevant conditions.

Study 3 also attempts to rule out alternative explanations. To ensure that the communal-sharing notion of need (and not the market-pricing concept of demand) drives our results, we measure perceptions of a consumer demand-based account in two ways. First, we examine the extent to which people believe that many people "want" the flu vaccine. It is possible that consumers believe that low prices reflect a perception that high demand has increased economies of scale and reduced price. As such, the perception of high demand may signal that overall risk is higher, and so self-risk should be as well. In line with this assumption, we also measure flu prevalence perceptions as a base-rate account of demand. Although previous research has widely shown that people are base-rate insensitive (e.g., Tversky and Kahneman 1974), prevalence may be a component of consumer need.

To the extent that prices affect a wide variety of consumer inferences, we also examine whether perceived efficacy drives the results. It is possible that people believe that lower-priced goods have lower efficacy (Waber et al. 2008), which thus puts them at greater risk, but they may infer the opposite from higher-priced goods. Finally, we take more nuanced measures of discomfort (vs. the general negative emotion measured in study 1) to determine whether exposure to higher prices for sacred goods leads to discomfort that consumers may ease by denying they are at risk.

Method

Participants and Design. In October 2011, 81 online participants from a national Amazon Mechanical Turk sample (65% female, median age = 38, aged 19–78) were randomly assigned to the conditions of a 2 (price: low vs. high) × 2 (frame: individual health vs. public health) between-subjects experiment.

Procedure. Participants were presented with information about the seasonal flu framed as either an individual or a public health issue. They were told that the newest vaccine was now available for $25 or $125 and was covered by

insurance. The individual frame stressed the importance of getting the flu shot for oneself, while the public health frame stressed the flu shot's societal importance (see app. D). Participants then rated their self-risk of getting the flu and their intentions to get vaccinated. Next, participants rated the extent to which they believed the price reflected communal need and demand. They then made flu prevalence estimates and rated perceived vaccine efficacy and felt emotional discomfort.

Self-Risk. Participants rated the same self-risk measures ($\alpha = .82$) as in study 1. They were specifically asked their likelihood of getting the flu in the next year.

Consumption Index. Participants next rated two questions that addressed their likelihood of getting the vaccine: (1) "How likely are you to ask your doctor about getting this vaccine?" (2) "How likely are you to get this vaccine?" (not at all likely = 1, very likely = 7; $r = .88$).

Price Inferences. To directly understand participants' inferences about price, they were asked, "What do you think the price of this vaccine reflects?" and asked to rate their agreement with two distinct statements: "That a lot of people need this vaccine" and "That a lot of people want this vaccine" (definitely disagree = 1, definitely agree = 7).

Prevalence. Participants rated their perceptions of prevalence with the measures "How prevalent do you believe that this condition is?" (not at all prevalent = 1, very prevalent = 7) and "How common do you believe that this condition is?" (not at all common = 1, very common = 7). These questions were highly correlated ($r = .72$) and combined to form a prevalence index.

Efficacy. To test for effects of price on perceived vaccine efficacy, participants rated "How effective do you think this vaccine will be?" (not at all effective = 1, very effective = 7).

Discomfort. To examine the role of discomfort due to price, participants were asked to think about whether they would get the flu shot and to then rate the extent they felt three discomfort-related states: disturbed, worried, and uneasy (not at all = 1, very much so = 5; $\alpha = .81$).

Prior Flu Shot Covariate. To control for prior behavior (e.g., Mischel 1968/1996; Ouellette and Wood 1998), participants indicated whether they had ever received a flu shot (yes = 1, no = 0). This covariate did not interact with the independent variables, nor was it affected by the manipulations (data not shown).

Results

In study 3, we tested our hypothesis that when a health promotion message for a lifesaving good is self-relevant (i.e., vaccines specifically benefit me), consumers are more likely to use price as information about communal need that informs their own self-risk and consumption intentions. We also tested the boundary condition that price should not

inform self-risk and consumption intentions when a health issue is not personally involving (i.e., vaccines benefit everyone, not me specifically). In other words, we expect that for the individual health condition, price drives consumer need and consumer need drives self-risk, which drives consumption intentions. For the public health condition, however, lower involvement should lead to attenuated effects of price on consumer need because a lack of self-relevance does not stimulate consumers to process the implications of price on need as extensively. As such, there is no translation of need into perceptions of self-risk. We first present a manipulation check study of involvement across conditions. We then present results testing our hypotheses, followed by a moderated mediation analysis testing the role of communal need in driving self-risk and the role of self-risk in driving consumption intentions for the self-relevant (vs. other-relevant) conditions.

Manipulation Check Study. In June 2012, a separate manipulation check study was conducted to confirm that the frame manipulation (self-relevant individual frame vs. other-relevant public health frame) influenced perceptions of involvement and relevance. Forty-four participants were recruited online and read the same individually or publicly oriented information about the flu (along with the prices listed above). Participants were then asked to answer four manipulation check questions regarding their involvement with the message (Petty and Cacioppo 1979; Petty et al. 1981): (1) "How involving did you find this information?" (not at all = 1, very much so = 7), (2) "How significant do you believe the consequences of the flu are for you personally?" (not at all significant = 1, very significant = 7), (3) "How relevant was this passage to you?" (not at all relevant = 1, very relevant = 7), and (4) "To what extent did the passage highlight the consequences of the flu for you personally?" (not at all = 1, very much so = 7). These four items were strongly correlated and combined to form an index (α = .89). The flu shot covariate was included for completeness but had no effect on involvement ($F(1, 39) <$ 1, NS). As predicted, participants in the individual frame felt that the information was more personally involving and self-relevant relative to the public health frame participants (M_{ind} = 4.97 vs. M_{pub} = 4.05; $F(1, 39) = 4.03$, $p = .05$, $\eta^2 = .10$).

Self-Risk. Shifting to the main study, a 2 (price: low vs. high) × 2 (health frame: individual vs. public) ANCOVA with prior flu shot status as the only covariate examined the effect of price and frame on self-risk. Across all variables, we first report the effect of the covariate. There was a main effect of flu shot status such that those who reported ever receiving a flu shot in the past reported higher self-risk than those who had not (M_{shot} = 4.51 vs. $M_{no\,shot}$ = 2.85; $F(1, 76) = 21.14$, $p < .0001$, $\eta^2 = .21$). There were no main effects of price or frame ($F(1, 76) < 1$, NS). However, as predicted, the price × frame interaction was significant ($F(1, 76) = 4.43$, $p = .04$, $\eta^2 = .04$; see fig. 4). Replicating prior results, in the individual health frames, low (vs. high)

STUDY 3: PERCEIVED SELF-RISK AS A FUNCTION OF HEALTH FRAME AND PRICE
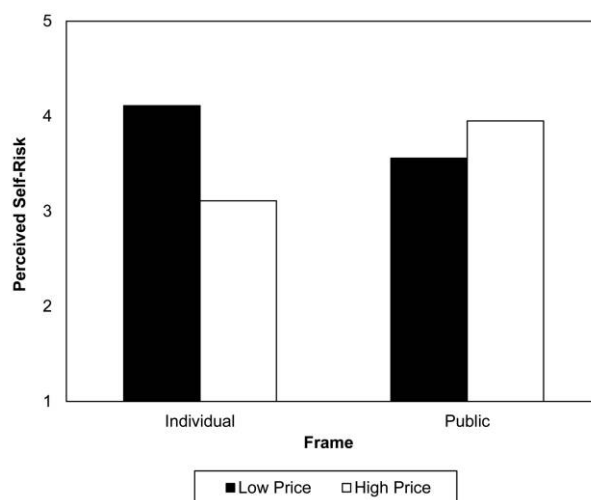
price increased self-risk ($M_{ind,\,low}$ = 4.11 vs. $M_{ind,\,high}$ = 3.11; $F(1, 76) = 3.95$, $p = .05$, $\eta^2 = .04$). There were no differences in self-risk across price in the public health frames ($M_{pub,\,low}$ = 3.56 vs. $M_{pub,\,high}$ = 3.95; $F(1, 76) < 1$, NS).

Consumption of Care. A 2 × 2 ANCOVA revealed that individuals who had previously gotten a flu shot were more likely to intend to get a flu shot (M_{shot} = 4.42 vs. $M_{no\,shot}$ = 1.40; $F(1, 76) = 38.82$, $p < .0001$, $\eta^2 = .32$). This analysis did not reveal main effects of frame ($F(1, 76) = 1.73$, $p = .19$, $\eta^2 = .01$) or price ($F(1, 76) = 2.57$, $p = .11$, $\eta^2 = .02$). However, there was a marginally significant price × frame interaction ($F(1, 76) = 3.44$, $p = .07$, $\eta^2 = .03$; see fig. 5). Planned contrasts revealed that only in the self-relevant individual frames did low price increase intentions to get a seasonal flu vaccine ($M_{ind,\,low}$ = 3.97 vs. $M_{ind,\,high}$ = 2.44; $F(1, 76) = 4.89$, $p = .03$, $\eta^2 = .04$). There were no differences in consumption intentions across price in the public health frames ($M_{pub,\,low}$ = 2.56 vs. $M_{pub,\,high}$ = 2.68; $F(1, 76) < 1$, NS).

Communal Need for Vaccine. A 2 × 2 ANCOVA revealed that individuals who had previously gotten a flu shot were marginally more likely to believe that the price of the vaccine reflected communal need (M_{shot} = 5.03 vs. $M_{no\,shot}$ = 4.38; $F(1, 76) = 3.22$, $p = .08$, $\eta^2 = .03$). There was a main effect of price whereby a lower price increased anticipated need for the vaccine (M_{low} = 5.45 vs. M_{high} = 3.95; $F(1, 76) = 21.76$, $p < .0001$, $\eta^2 = .21$). This was qualified by a significant price × frame interaction ($F(1, 76) = 4.17$, $p < .05$, $\eta^2 = .04$; see fig. 6). Consistent with our theorizing, planned contrasts revealed that in the individual health frames, participants believed that low (vs. high) price reflected greater communal need ($M_{ind,\,low}$ = 5.93

FIGURE 5

STUDY 3: VACCINE CONSUMPTION INTENTIONS AS A
FUNCTION OF HEALTH FRAME AND PRICE
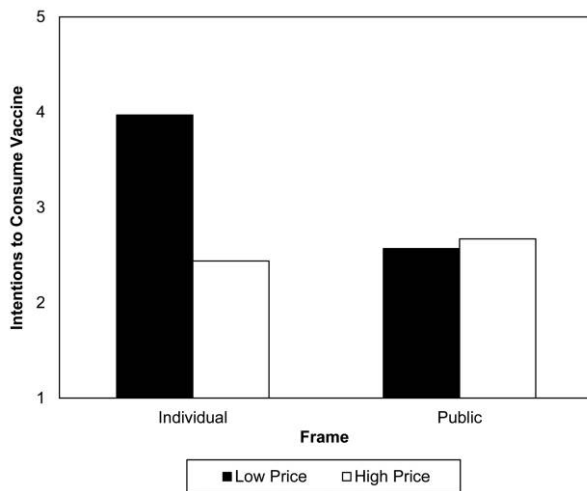
vs. $M_{ind, high}$ = 3.75; $F(1, 76)$ = 16.87, $p < .0001$, η^2 = .19). This pattern was reflected in the public health frame to a much lesser degree ($M_{pub, low}$ = 4.99 vs. $M_{pub, high}$ = 4.14; $F(1, 76) < 3.97$, $p < .05$, η^2 = .04), supporting the notion that increased processing likely took place in the more self-relevant individual health condition.

Demand for the Vaccine. A 2 × 2 ANCOVA did not reveal an effect of flu shot status ($F(1, 76) < .58$, NS). Analyses revealed a main effect of price whereby low (vs. high) price decreased perceptions of demand (M_{low} = 2.32 vs. M_{high} = 3.17; $F(1, 76)$ = 5.23, p = .03, η^2 = .06), contrary to the alternative that low price signaled high demand through greater economies of scale. The price × frame interaction was not significant ($F(1, 76)$ = .01, NS).

Prevalence Composite. The prevalence estimate of flu infection was also analyzed using a 2 × 2 ANCOVA. There was a main effect of flu shot status such that individuals who had previously gotten a flu shot believed that the flu was more prevalent (M_{shot} = 5.21 vs. $M_{no shot}$ = 4.04; $F(1, 76)$ = 11.23, p = .001, η^2 = .12). There was no main effect of frame ($F(1, 76) < 1$, NS), yet there was a marginal main effect of price such that the low-priced vaccine led to increased perceptions of prevalence (M_{low} = 4.91 vs. M_{high} = 4.35; $F(1, 76)$ = 3.12, p = .08, η^2 = .03). The price × frame interaction was not significant ($F(1, 76)$ = .01, NS). Planned contrasts revealed that in neither the individual health nor the public frame conditions was the estimated prevalence of flu significantly different under high relative to low price ($p \geq .20$).

Vaccine Efficacy. A 2 × 2 ANCOVA on perceptions of the vaccine's efficacy revealed a main effect of flu shot status

such that individuals who reported ever getting a flu shot believed that the flu shot was more efficacious (M_{shot} = 5.03 vs. $M_{no shot}$ = 3.89; $F(1, 76)$ = 7.86, p = .006, η^2 = .09). There was no effect of frame ($F(1, 76)$ = 1.02, p = .32) or price ($F(1, 76) < 1$, NS) on efficacy. There also was no price × frame interaction ($F(1, 76) < 1$, NS).

Discomfort Composite. A 2 × 2 ANCOVA on participant discomfort did not reveal an effect of flu shot status ($F(1, 76)$ = .01, NS). Results did not reveal significant effects of frame ($F(1, 76) < 1$, NS) or price ($F(1, 76)$ = 1.35, p = .25). There was no significant price × frame interaction ($F(1, 76)$ = .10, NS).

Moderated Mediation Analysis. To test our prediction that perceptions of consumer need drove perceived self-risk and that this self-risk drove vaccine consumption intentions only in the individual health frame and not in the public health frame, we conducted two tests of moderated mediation using model 8 of the bootstrapping process described by Hayes (2012; also described as model 2 of Preacher, Rucker, and Hayes 2007).

Moderated Mediation of Self-Risk by Perceptions of Consumer Need. We subjected the data to a moderated mediation analysis with 5,000 bootstrapped samples. We present the results by condition: individual health and then public health. In the individual health condition, consumer need did mediate the effect of price on self-risk (est. coefficient of the indirect effect was −.64 with a 95% confidence interval [CI] exclusive of 0 [−1.40, −.08]). For public health, however, consumer need did not mediate the effect of price on risk (est. coefficient of the indirect effect was −.25 with a 95% CI inclusive of 0 [−.65, .001]). In

FIGURE 6

STUDY 3: EXTENT TO WHICH VACCINE PRICE REFLECTS
NEED FOR VACCINE AS A FUNCTION OF
HEALTH FRAME AND PRICE
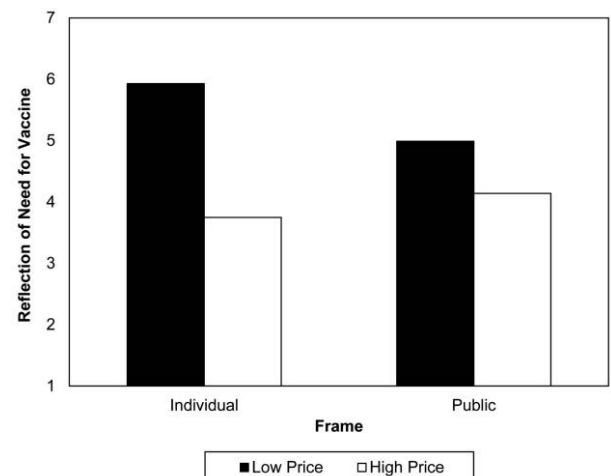
other words, price affected self-risk through perceptions of consumer need only in the individual health condition.

Moderated Mediation of Consumption Intentions by Self-Risk. We expected that self-risk should drive consumption intentions (Janz and Becker 1984)—that is, how at risk someone feels should influence his or her likelihood of getting a flu vaccine. We tested the notion that this should hold only in the individual and not in the public health condition, by performing the moderated mediation analysis above. In the individual health condition, self-risk did mediate the effect of price on consumption intentions (est. coefficient of the indirect effect was −.95 with a 95% CI exclusive of 0 [−1.75, −.24]). For public health, self-risk did not mediate the effect of price on consumption intentions (est. coefficient of the indirect effect was .37 with a 95% CI inclusive of 0 [−.50, 1.30]). In other words, price affected consumption intentions through self-risk only in the individual health condition, consistent with the notion that self-relevant information has stronger and more crystallized downstream consequences on behavior-related attitudes (Petty et al. 1995).

Discussion

Consistent with our theorizing that lifesaving goods are evaluated with an expectation of access and communal sharing, study 3 reveals that price is indeed used as a proxy for consumer need and that this effect is strongest when individuals feel that the consequences of the flu are self-relevant. In the individual health frame conditions, people were significantly more likely to believe that low price reflects high communal need for the vaccine because low prices are consistent with expectations of wide accessibility. Conversely, high prices signal reduced accessibility and hence less need. While the effects of price on need emerged for individual and public health, this likely speaks to the strength of the price inference. Most important, perceptions of need only drove self-risk in the individual conditions, which subsequently drove consumption intentions. When individuals are directed to think about the consequences of the flu for others, the effect of price on self-risk disappears, and participants do not adjust their self-risk on the basis of price or need. The lack of a main effect of health frame on risk shows that it is not that consumers believe that self-risk is lower in the public (vs. individual) health condition but rather that price and need are not processed to inform self-risk in the same manner when the information is about another.

The results here rule out potential alternative explanations. Contrary to a demand or prevalence (base-rate) account, consumers do not appear to be systematically linking their own self-risk to demand (how many people want a flu shot) or prevalence (how many people are likely to get the flu). This is not surprising in light of evidence documenting discrepancies between population estimates of disease prevalence and estimates of personal disease risk (e.g., Gerend et al. 2004; Helzlsouer et al. 1994; Rothman, Klein, and Weinstein 1996) and given that individuals are notoriously

poor at calculating base rates (Tversky and Kahneman 1974). Importantly, factor analyses revealed that self-risk, prevalence, demand, and need were distinct constructs. Consumers make various (and diverging) inferences of what price implies about these factors.

Along this line, it is possible that estimates of prevalence may be particularly susceptible to biases of comparative optimism and social desirability—people generally believe that others are at higher health risk than themselves (Klein and Weinstein 1997), and in the flu context, participants might feel pressured to show their recognition of the seriousness of the flu virus through a higher prevalence estimate. These biases may outweigh the link between self-risk and overall prevalence.

Alternatively, when information is self-relevant, self-risk is linked to need. Consumers view lower price as signaling something of great communal benefit—an item that is accessible because people need it to be healthy, even if they are unaware of who or how many people may want the vaccine or are at risk of getting the flu. In this sense, need and prevalence are distinct: high need for the flu vaccine may imply that many people will be harmed by the flu if they do not receive the vaccine (e.g., the elderly, pregnant women, young children), while high prevalence of the flu only implies that many people will actually contract the flu. It is the construct of need, perhaps because of its more dire implications, that informs self-risk.

In addition to testing prevalence and demand-driven accounts of our results, we also tested for effects of price on consumer discomfort and perceived efficacy. We found no evidence of either—people seemed relatively comfortable with health care prices and did not infer that they were somehow less immunized with a lower-priced vaccine. In sum, study 3 demonstrates that when thinking about the consequences of illness for themselves, consumers interpret price information more extensively, causing low price to form a strong signal of communal accessibility, which in turn informs self-risk and intentions to consume care. This risk assessment is egocentric, functioning only when individuals see information as self-relevant.

GENERAL DISCUSSION

Price is a crucial factor in any consumer purchase—even those said to transcend secular valuations, such as health care. This research adds to a significant body of literature that looks at how price information is used by consumers to determine the value of a product and the decision to consume it. Across two separate health-related contexts, we demonstrate that price information has significant effects on the perceived self-risk of illness and does so in a manner unique to sacred lifesaving goods. In the pilot, we first establish that consumers have expectations that sacred lifesaving goods are more likely to be priced according to the rules of communal sharing (vs. market pricing) than are secular nonlifesaving goods. Next, study 1 establishes that merely being aware of (without having to pay for) lower (vs. higher) priced lifesaving goods increases perceptions of

related self-risk of disease. Study 2 demonstrates that lower (vs. higher) price also increases health care information seeking and consumption intentions. Finally, study 3 demonstrates that the effect of price on risk for sacred goods is driven by perceived consumer need for the product. This study also demonstrates that health information must be self-relevant for price to affect risk; we attenuate the effect of price on risk by manipulating the extent to which the medical product is described as important for the self (individual frame) or for others (public health frame). When providing information about the importance of the product for public health, the lack of self-relevance of the information attenuates the effect of price on consumer need, and processing is insufficient to shape self-risk perceptions or consumption intentions.

Theoretical Implications

This work contributes to research on price inferences, relational theory, and risk perceptions. By demonstrating that consumers make different price inferences on the basis of the type of good or the framing of disease information, we add to the body of work looking at the downstream consequences of price expectations. As such, we introduce a unique set of price inferences and consequences that emerge for lifesaving health care goods. We also demonstrate a novel impact of price in a health care context.

By extending relational theory into the health domain, this work also identifies price as a distinct determinant of health risk and behavioral intentions. Importantly, across the studies, risk changes on the basis of price independently of emotional reactance or disease severity. This is distinct from other work on risk suppression looking at motivational fear-control responses (e.g., Keller and Block 1996; Leventhal 1970; Witte 1994; Witte and Allen 2000), where high fear of disease suppresses perceived risk. The lack of movement on emotion or discomfort measures also suggests that consumers are not viewing the high-priced information for a sacred good as taboo and, hence, unacceptable. Consumers make medical decisions daily, which may make some of these decisions seem mundane and less emotionally charged (Tetlock 2003).

Further informing current theory, we suspect that the current lack of an effect of vaccine price on perceived efficacy may be due to differences in how different medical products are perceived. Waber and colleagues (2008) found placebo effects based on the price of a pain medication, while the current research did not find effects of price on perceived vaccine efficacy. This finding may be seen as consistent with the notion of communal sharing. Because vaccines are perceived to be critical to consumer need and have lifesaving status, they may be seen as also requiring extremely high efficacy before going to market, regardless of price—they would not be made available to consumers unless they had been fully vetted for preventing disease. Pain medication, although important, may not be held to this standard.

More generally, this work contributes to research examining normative versus descriptive accounts of risk perception. In normative terms, the expected value or utility of a health product (e.g., the flu shot) is in part determined by multiplying risk (e.g., the probability of getting the flu) by the price of the vaccine. That is, the expected value of the vaccine is its price weighted by the risk of getting the flu, where any rational incorporation of risk is orthogonal to price. However, we have consistently shown that as the price of a medical good changes, so does the risk estimate. Thus, we demonstrate a descriptive account of risk assessment in which price is in fact correlated with risk, which has implications for public policy and the role of price transparency in improving health care decision making. Price information may lead to biased consumer inferences about risk and subsequent decisions to act.

Marketing Implications

As exposure to health care prices becomes more common, people are more likely to incorporate their assumptions about price into their health beliefs. While price transparency efforts are designed to help consumers make better decisions, the effects of these interventions may cut two ways. First, exposure to lower prices for sacred goods may increase perceptions of risk and intentions to consume care. However, perhaps more critically, exposure to higher prices for these goods may reduce risk and consumption intentions via a risk assessment mechanism that may not reflect actual risk. In this sense, while exposure to actual (often higher) prices may indeed reduce consumption of care relative to exposure to co-pays or nominal prices, this reduction could occur for both necessary and unnecessary care. If price serves as a simple proxy for risk and that proxy is inaccurate, transparency may not ensure overall consumer welfare or reduced costs if treatment is more expensive than prevention. Increased consumer education about actual communal need and objective risk along with price information will more accurately inform risk and consumption intentions.

Another important practical issue is that while seemingly stark, the price differentials across the studies reflect our current health care system. The lower price points (e.g., $25) are reflective of a typical co-pay, while the higher price points reflect actual costs of a drug or vaccine ($250). The finding that exposure to a lower (higher) price increases (reduces) intended care is crucial, as to date, a significant confound has existed in that individuals most aware of high costs tend also to be responsible for them, while individuals least aware of these costs pay relatively small co-pays and are covered by third-party payers (Brook et al. 1984; Newhouse 2004). In this research, we isolate differences in response to low- and high-cost care due solely to the awareness of the cost, as opposed to the notion that one is responsible for paying that cost, and find that exposure to higher (vs. lower) prices does in fact reduce the likelihood of consuming care.

Finally, in our work we demonstrate that perceived need drives self-risk through price egocentrically; price affects self-risk only when health information is self-relevant, and even in this context, individuals do not appear to system-

atically extend their self-risk estimates to broader population prevalence or product demand. Consumer processing appears to stop after deducing what risk information means for the self. This is consistent with prior evidence that discrepancies emerge between personal susceptibility and overall prevalence (e.g., Helzlsouer et al. 1994; Rothman et al. 1996) and reinforces the notion that societal risk has limited influence on self-risk. This suggests that imploring people to get vaccinated for "the greater good"—to create herd immunity and protect those who cannot be vaccinated—falls on deaf ears. Effective messages, even those with social welfare implications, must emphasize personal consequences to motivate action.

Possibilities for Future Work

We believe the current findings have important implications for future work. Price, for example, is not the only cue consumers receive about consumer need or risk. If participants had been told that the flu shot was available at any pharmacy (vs. only through a scheduled visit to the doctor), they may have drawn different inferences about the likelihood of getting the flu due to differences in physical accessibility—it is easier to go to the pharmacy than it is to schedule an appointment at the doctor's. Such accessibility would accordingly make people feel more at risk and provide converging evidence that expectations about how health care ought to be delivered (inexpensively and with great efficiency for the most threatening issues) influence risk perceptions. To the end that these perceptions drive subsequent health behaviors, it is important to understand these signals.

Conclusion

Taken together, these findings have important implications for price communications and transparency in consumer health decisions. Given that upcoming changes in the health care marketplace involve increased price transparency as a means to improve health care consumption and lower costs, it is important to understand how different prices may produce inconsistent risk estimates that, in turn, affect decisions and outcomes.

APPENDIX A

PILOT STIMULI

Organizational Focus

Organizations can use different decision rules to guide the way that they price their offerings. We are interested in your perceptions of how prices are set across different types of goods in the United States today.

Specifically, you will be asked to determine which strategy (listed below) determines the price of different types of goods:

1. Communal Sharing (CS), where prices are based on need and ensuring access to the product (communal and cooperative principles).
2. Market Pricing (MP), where prices are based on a cost-benefit analysis of consumer value of the product (business and economics principles).

You will now be presented with 10 different types of goods. We want you to tell us which focus you believe is most strongly associated with the pricing of each of the products listed on the next screens.

Items

All 10 items were presented one at a time, in a random order.

- Vaccines
- Screening tests to detect serious diseases or injuries (e.g., mammography, colonoscopy, CT scans)
- Physician's visits
- Pharmaceutical drug treatments that are used to prevent serious illness and death (e.g., antibiotics, heart and blood pressure medication)
- Pharmaceutical drug treatments that are used to treat cancer (e.g., chemotherapy, creams to treat skin cancer)
- Tax preparation services
- Computer software
- Restaurant menu items
- Pharmaceutical drug treatments that are used for cosmetic purposes (e.g., special creams for wrinkles, age spots, or acne)
- Home electronics (e.g., televisions, stereo systems)

APPENDIX B

INFORMATION PRESENTED TO RESPONDENTS IN STUDIES 1 AND 2

Sacred Lifesaving Passage: Skin Cancer

A pharmaceutical company has recently developed a skin cream that can be applied to moles or other spots on the skin that may become cancerous. Skin cancer is quite common and can be deadly if left untreated. This medicine works by interfering with cell division and growth to prevent the formation of new cancer cells, and by exfoliating the skin over time to treat current cancerous cells. This cream can both slow the spread of cancer and prevent it from ever happening.

The cost of the cream is $25 ($250) per month and is completely covered by your insurance.

Secular Nonlifesaving Passage: Age Spots

A pharmaceutical company has recently developed a skin cream that can be applied to moles or other spots on the skin that may become unsightly with age. Age spots are

quite common and can become unsightly as people get older. This medicine works by interfering with cell division and growth to prevent the formation of new age spots, and by exfoliating the skin over time to treat current age spots. This

cream can both slow the darkening of existing age spots and prevent them from ever happening.

The cost of the cream is $25 ($250) per month and is completely covered by your insurance.

APPENDIX C

SAMPLE ADVERTISEMENT PRESENTED TO PARTICIPANTS IN STUDY 2

Information across the sacred and the secular conditions was identical except for:

    Sacred lifesaving ad (displayed above):

        Heading: "Treat your skin, Save your life."

        Final sentence of paragraph 1: "It could save your life."

    Secular nonlifesaving ad:

        Heading: "Treat your skin, Save your looks."

        Final sentence of paragraph 1: "It could save your skin."

APPENDIX D

FLU INFORMATION PRESENTED TO RESPONDENTS IN STUDY 3

The 2011–12 Flu Vaccine

The newest seasonal flu vaccine is now available. This vaccine protects against three influenza viruses that biological research predicts will be most common during the upcoming season.

The 2011–12 vaccine protects against influenza A H3N2 virus, an influenza B virus, and the H1N1 virus (i.e., Swine Flu) that caused a pandemic flu outbreak in 2009.

Why Vaccinate?

The flu can be life threatening. While many individuals pass up flu vaccines each year, it is very important to get this vaccine. The flu can cause significant complications including bacterial pneumonia or dehydration. It may also make chronic conditions such as congestive heart failure, asthma, or diabetes much worse. At times, it can even lead to death, as was seen with the H1N1 virus in 2009. The virus kills on average 36,000 Americans annually.

Why Vaccinate?

Individual health frame
    It matters to you. Flu prevention is an important personal

health issue. By immunizing yourself, you lessen the chances you will contract the virus from a child, adult or older person (family member, friend or stranger). You also avoid the large expenditures that can accompany this virus. Finally, missed workdays due to the flu virus or related medical issues can also hamper your productivity and negatively affect your job evaluations.

Public health frame

It matters to society. Flu prevention is an important public health issue. By immunizing yourself, you lessen the chances you will spread the virus to a child, adult or older person (family member, friend or stranger) who might die from it. You also avoid placing a large monetary burden on health system as a whole. Finally, missed workdays due to the flu virus or related medical issues can also hamper productivity and negatively affect the economy.

How Much Does It Cost?

The vaccine is available for $25 ($125) in select drugstores and medical offices and is completely covered by your insurance provider.

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