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Nocebo effects from negative product information: when information hurts, paying money could heal

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Abstract

Purpose – This research aimed to find whether information about a product can give rise to negative perceptions even in inert situations (nocebo effects), and to understand how price levels impact such judgments.

Design/methodology/approach – In all experiments, participants were exposed to negative product information in the form of potential side-effects. In an initial study, a higher non-discounted versus a discounted price frame was presented for a health drink after customers were exposed to negative aspects. Then, in experiment 1, price (high vs low) and exposure to information (no information vs negative information) was manipulated for skin creams where participants physically evaluated the cream. In experiment 2, price was manipulated at three levels (low, high, discounted) orthogonally with product information (no negative information vs with negative information) to get a more nuanced understanding.

Findings – In the initial study, after exposure to negative information, the non-discounted group had more positive ratings for the drink. Study 1 showed that reading about negative information resulted in a nocebo effect on perception of dryness (side-effect). Moreover, when no information was presented, perception of dryness by low and high price groups were similar but in the face of negative information, perception of dryness by low-price group was more pronounced compared to a high-price group. Study 2 conceptually replicated the effect and also confirmed that not only discounts (commonly linked with product quality), but absolute price levels also show a similar effect.

Practical implications – Nocebo effects have been rarely documented in consumer research. This research showed how simply reading generically about potential side effects gives rise to nocebo effects. In addition, even though marketers might find it tempting to lower prices when there is negative information about certain product categories, such an action could backfire.

Originality/value – To the best of our knowledge, the link between observable nocebo effects and its link with pricing actions is a novel research thread. We were able to show a nocebo effect on product perception after reading about negative information and also find that a higher price can mitigate the nocebo effect to some extent.

Keywords Perception, Evaluation, Pricing, Side effects, Negative information, Nocebo

Paper type Research paper

Maggi, an instant noodle brand, faced an intense phase of negative information in many markets across the world recently. Media coverage, with negative information regarding a range of packaged foods containing trans-fat and monosodium glutamate, created health concerns and fear among consumers. Should Nestle, the firm that makes Maggi, be considering a change in price or a discount? With the advent of multiple available sources of information, potential positive and negative effects of different product categories are at one's fingertips. Reading about positive effects can enhance positive experiences even when the physical product is the same (placebo effect; Price *et al.*, 2008) while reading about negative consequences or side effects can exaggerate negative experiences even in inert situations (nocebo effect; Barsky *et al.*, 2002).

Our first goal was to find whether simple exposure to negative information can give rise to nocebo effects. Our second aim was to understand how price might influence these consumer judgments, which could inform marketers on how to price in the face of negative information. The research findings should help answer the following questions. Is the typical marketing response of using price reductions or discounts an effective approach in the face of negative information? Or, a relatively higher price is more suitable where expectations about potential negative aspects are partly mitigated through a high price?

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It is important to get the answer to these questions because brands face serious struggles after news about negative health hazards circulate in media. With online information sharing, people are exposed to negative information about product categories quite often. Knowledge about negative effects or potential harm from a specific product or brand has a bearing on brand equity (Dawar and Pillutla, 2000), reliability (Kalaiganam *et al.*, 2013) and brand perception (Puzakova *et al.*, 2013). With health related side effects gaining prominence in today's changing consumer markets in an information-rich environment, it is crucial to examine whether exposure through simply reading about negative effects about a product category can actually affect how one evaluates a product.

Both expectations and actual sensory experiences can be modulated by prior beliefs and information (Wager *et al.*, 2004). In general, beyond intrinsic attributes, the utility derived from a product is shaped by extrinsic pre-purchase information (Schmitt, 1999; Krishna, 2012; Litt and Shiv, 2012). Such experiences and associated behaviors can be shaped via additional quality-relevant information. Price has always been an important informative aspect of quality, especially when there is minimal other information (McConnell, 1968; Rao and Monroe, 1989). Hence, price, as a cue can significantly modulate customer experiences and beliefs (Plassmann *et al.*, 2008). Price can sometimes itself work as a placebo. In one study by Shiv *et al.* (2005), people consumed an energy drink and then solved puzzles. The group that consumed the energy drink at the normal price performed better in comparison to the group that consumed the drink at a heavily discounted price. Further, at a neuronal level, a higher price creates higher experienced utility (Plassmann *et al.*, 2008) suggesting that in the face of positive information, a higher price can create a placebo-like effect by enhancing positive attributes.

Would price levels influence the impact of negative information on product perception and evaluation? The current study investigated whether exposure to negative product information would give rise to nocebo effects and how price levels influence such effects.

Conceptual background

Positive information about an inert product that physically has no reason to modulate physiological processes (or impact objective product experience) can sometimes influence the perceived experience and also behaviorally increase the efficacy of the product. This finding has been called a placebo effect (see Price *et al.*, 2008 for a review). Placebo is a term meaning "I shall please". In a typical placebo scenario, a subject is given an inert substance called placebo (such as sugar pills) but told that it is an effective substance with positive consequences (such as an analgesic). When subjects take a placebo and believe that it is an effective substance, they show changes in behavior such as reduction in both expected and reported symptoms (Benedetti *et al.*, 2005). Even when a patient knows that the pill is a placebo, still some people report feeling better for certain medical conditions (Kaptchuk *et al.*, 2010). Specific biochemical pathways have started showing there are real physiological

changes mediated through expectations (Enck *et al.*, 2008), thus linking perception with somato-sensation closely.

A related term is "nocebo", which is seen as an opposite term for placebo, meaning, "I shall harm" (Benedetti *et al.*, 2007). Whereas placebo highlights positive consequences (and hence enhances positive expectations), nocebo highlights negative consequences (that enhances negative expectations). Nocebo is any inert substance that alone has no consequence on the body but when there is a suggestion that the substance would increase unpleasantness, even in inert situations, people report heightened unpleasantness (Flaten, 2013). In medical research, negative expectations about drugs have been found to reduce its seeming physiological efficacy (Meissner *et al.*, 2011). In clinical settings, both placebos and nocebos influence the effectiveness of medical treatments (Kam-Hansen *et al.*, 2014; see Tracey, 2010 for details).

There is some understanding about the underlying mechanisms of these effects. A predominant explanation for placebo and nocebo effects is based on expectancy theory which states that beliefs about the product activate expectations regarding a particular consequence (Stewart-Williams and Podd, 2004) which in turn activate the psycho-physiological pathways even in inert situations. Nocebo effects are observed when such expectancies are built up via verbal suggestions of negative outcomes or through previous conditioning (Benedetti *et al.*, 2007). These expectancy effects are influenced by individual psychological characteristics and personality traits (Bartels *et al.*, 2016).

Expectancies can be influenced by price cues as well and can accordingly alter the outcomes. Price, quality and value are fundamentally and intricately linked in consumer psychology where price often works as a major source of information and as a heuristic cue regarding judgments about products (Dodds, 1991; Zeithaml, 1988). This is in-part because of the common belief that lower-priced goods are of lower quality (Gerstner, 1985; Rao and Monroe, 1988). For placebo effects, Shiv *et al.* (2005) showed that an energy drink advertised to increase cognitive capacity actually affected problem solving in two groups of people depending upon whether the drink was sold at a normal market price (control group) or at a lower discounted price (discounted group). Note that this is a typical placebo effect where instructions about efficacy of the drink were modulated by price levels. Consuming the same drink at a lower discounted price resulted in decreased mental ability to solve mathematical puzzles, showing that price does not only influence expectations of quality or efficacy, but can also influence actual behavior. In a later study, Waber *et al.* (2008) showed that the seeming physiological efficacy of an analgesic drug is reduced when purchased at a largely discounted price. These authors found that when the same analgesic pill was given to two groups of participants but two different prices were stated (actual market price of \$2.50 vs a discounted price of \$0.10), those participants who had the discounted pill reported more pain compared to the other group for similar levels of electric shocks administered to volunteers. In a different domain, Plassmann *et al.* (2008) asked participants to drink wines priced at a low and a high price but unknown to the participants, the same wine was presented at two different price labels to the same participant. Drinking the same wine labeled at a higher price increased reported and experienced

pleasantness measured via higher activations in the emotional and reward areas of the brain as evidenced from functional magnetic resonance imaging (fMRI). In general, knowledge about ingredients or extrinsic attributes such as price can directly influence product perception (Lee *et al.*, 2006). These handful of studies together suggest price-quality relations are codified and have real psycho-physiological placebo-like effects.

While the role of price in placebo conditions have been investigated (Shiv *et al.*, 2005; Waber *et al.*, 2008; Plassmann *et al.*, 2008), there is hardly any research on the role of price in the face of negative information linked with potential nocebo effects. Although one can often observe sellers reducing the price or offering discounts to increase demand when there is negative information, it is important to test whether that is indeed a good pricing practice. We reasoned that while higher priced products can increase positive effects (Shiv *et al.*, 2005; Plassmann *et al.*, 2008), similarly pricing a product higher could decrease negative expectations when there is minimal information available.

Based on the above, we formed the following hypothesis:

- H1.* Compared to a neutral group, exposure to negative information will result in a more negative product perception for the same product, yielding a nocebo effect.
- H2.* After exposure to negative information, a low price label would result in more negative perception compared to a high price label for the same product.

Before proceeding further, we need to discuss an important aspect of price framing. Price has been conceptualized to play a dual role, signaling quality of the product and its associated monetary sacrifice (Monroe, 1990; Zeithaml, 1988). There are important differences in how customers process, judge and respond to these price framings even though the actual price payable is the same. Low and high prices are judged relatively within a range of values or in comparison to some preset reference point. The different price levels can be presented as absolute fixed prices or as price promotions, most often construed as a discount. Fixed and discounted prices give different judgment cues to the customer. Fixed-prices signal that the price is not negotiable and is stable over time while discounted-prices signal that the price is negotiable and the offer is time-limited. Accordingly, the processing mode is different with customers operating in a time-pressure and a sense of potential regret for losing the “best ever” price in a discounted price scenario (Suri *et al.*, 2000). Suri *et al.* (2000) suggested that discount frames would have higher perception of sacrifice while absolute price frames would have higher perception of quality. A fixed price offer could be more desirable than both low and high discount frames (Madan and Suri, 2001). The previous studies (Shiv *et al.*, 2005; Waber *et al.*, 2008) had used a discount frame, which could implicitly signal a lower value directly to participants. A stronger test about differences in perceived nocebo effects with and without exposure to negative information would come from using absolute prices at a low and high level as they do not signal quality a-priori. A preliminary study tested hypothesis *H2* by exposing two groups of participants to negative information

and asking them to think about the product presented at a normal or discounted price. Experiment 1 and 2 tested hypothesis *H1* and *H2* by manipulating information exposure and price level orthogonally. Experiment 1 used absolute low or high price levels. In experiment 2, apart from the low and high prices, we added a third condition of a discounted price to enhance validity and compare low absolute prices with discounted prices.

Preliminary study

Fifty-nine graduate students from an Indian business school who declared that they had consumed health-drinks earlier participated in the study ($M_{\text{age}} = 23.5$, $SD = 1.48$). The experiment was introduced as a product pre-testing study on energy drinks. Respondents were told that there were many energy drinks being sold, with a range of chemical compositions and prices. They were also reminded of the typical price range in the local market by stating that for an approximately 250 ml pack (similar to the can shown to them), the majority of popular brands price the product between 35 INR and 115 INR. It was important to provide a price range because price-quality relationships are mostly piecewise linear within a range (Peterson, 1970) and hence we could manipulate low versus high prices in the same range. Then, respondents were informed that they would be looking at a new energy drink brand to be sold in the Indian market but that the name would not be mentioned to preserve anonymity. This was done so that there was no conflation of price effects with prior brand attitudes or experiences. A 250 ml can of an energy drink was wrapped in a tape and presented in front of the respondents to add credibility to the cover story and also because we wanted them to see the size of the product.

We first exposed participants to negative aspects (potential side effects) by asking them to read a news article (see appendix for the complete article), which suggested that a young girl had died after consuming energy drinks and these drinks can, in general, cause side effects including dehydration. After reading the negative news item, respondents were handed a response sheet about whether they wanted to try the drink, how desirable was the drink for them and whether they would recommend others to try the drink; followed by demographic questions related to gender, age, previous purchases, frequency of purchase and their subjective perception of the price for the drink (1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high). Price was manipulated across two groups where one group of participants was told that the price of the drink was 110 INR (high price group; $n = 30$) and the other group was told that price was 110 INR but the drink was being offered at 40 INR with a 65 per cent discount (low discounted price group; $n = 29$). Offering a discounted versus regular price is common in the literature (Shiv *et al.*, 2005) and also offers clear reference prices. Please note that the actual product presented was the same and only the price frame was manipulated between the two groups. As a manipulation check, those who were allotted to the group that had a market price of 110 INR rated the price to be higher ($M_{\text{high}} = 3.90$, $SD = 0.66$) compared to those who were allotted to the discounted price of 40 INR ($M_{\text{low}} = 2.45$, $SD = 0.69$), $t(57) = 8.27$, $p < 0.001$. A univariate analysis of variance (ANOVA) showed there was a

marginal effect of price on whether they wanted to try the drink ($M_{low} = 4.48$, $SD = 2.45$; $M_{high} = 5.66$, $SD = 2.39$), $F(1, 57) = 3.50$, $p = 0.06$; a significant effect on desirability ($M_{low} = 3.51$, $SD = 2.09$; $M_{high} = 4.93$, $SD = 2.36$), $F(1, 57) = 5.91$, $p = 0.01$ and also a significant effect on recommendation ($M_{low} = 3.27$, $SD = 2.20$; $M_{high} = 4.90$, $SD = 2.61$), $F(1, 57) = 6.62$, $p = 0.01$.

Building on this preliminary study, we did the following two studies. First, we included a neutral group who did not read about any negative information so that we could gauge the effects of reading about negative information (nocebo effects) against a baseline. This was important, as one of our aims was to document a nocebo effect in consumer domain simply by reading about negative aspects, such as potential side-effects. Second, participants in the preliminary study did not actually experience the product that can significantly impact perception of side-effects. For example, it is possible that an experience with the product directly would show subjects reporting different side effects based on price manipulations. Third, a discount frame was presented, as a purpose of the study was to examine the strength of the nocebo effect in the presence of different price levels.

Experiment 1

Customers were exposed to generic information about potential negative side effects about a product category. Price (low vs high) was manipulated orthogonally with exposure to information (negative information vs no information) on a commonly used product (skin cream). As previous experience with products can influence perceptions of placebo-type effects (Shiv *et al.*, 2005), we only included those participants who reported to have used a similar product before.

Participants

One hundred fifty-five graduate students from a business school in Western India participated voluntarily. Thirteen participants mentioned that they did not use skin creams and were hence removed yielding a total of 142 participants (age range was from 21 to 25 years).

Method

The cover story for the experiment was that it was a product testing study for a new skin cream. Respondents were told that the study required participants to have used a skin moisturizing cream earlier. In the study they would be asked to apply a small portion of the new skin cream brand on the upper part of their left palm so that they could tell us about the cream. Participants were randomly allotted to four groups according to a 2 (information: negative information vs no information) \times 2 (price: low vs high) fully factorial between-subject design. In the sign-up forms at the beginning of the experiment, along with demographic information, all participants were asked to rate the level of dryness of their upper left palm [on a scale from 1 (= not at all) to 10 (= very much)]. This served as a co-variate in our analysis to control for individual initial dryness of their skin.

Participants were randomly allocated to four groups: Negative information and low price, negative information and high price, no negative information and low price, no negative

information and high price. As a first step in the experiment, half of the participants (negative information group) read a news item regarding skin moisturizing creams that highlighted potential side-effects, with special emphasis on the skin feeling more dry after application of some skin creams along with potential long term negative side effects (see appendix for the full text). The other half of participants (no information group) was not given this information to read. All participants were then told to try the skin cream and tell us what they thought about the product. One drop of the cream was placed on the upper left palm by the experimenter for each participant and they were asked to rub the cream with their right hand. The cream's container was wrapped with a tape to preserve anonymity of the product. The new cream was purported to be a new day skin cream brand to be sold in the market, which was unisex and odorless. The actual product (priced at INR 300, 118 ml) was an odorless unisex skin moisturizing cream brand used in the market that was not common among participants as revealed in an earlier pretest. To manipulate price, about half of the participants in each group were told that the price of the cream they were testing was 85 INR (low price group) while others were told that the price was 315 INR (high price group). Participants were also given a price range pertaining to common products in that category ranging from 70 INR to 350 INR for a 100-ml pack, as was typical in the local market. Importantly, we used the same cream (the exact same bottle) for all the four groups of participants so that any differences in our data would be because of the manipulated frames and not the physical stimulus.

Participants filled in their responses about the cream using the following measures on a 10-point scale (1 = not at all, 10 = very much):

- whether the skin felt more dry after applying the cream;
- overall quality of the cream;
- desirability of the cream; and
- whether they were likely to purchase that cream.

Then, participants answered questions about previous purchases, frequency of purchase and their subjective perception of the price (1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high).

Results

Out of 142 participants, we excluded 7 participants whose responses were more than 3 SD away from the mean for any dependent measure. An additional 18 participants who either belonged to the low price group but reported the subjective price was high for them (ratings of 4 or 5 on a 5-point scale) or belonged to the high price group but reported the subjective price was low (ratings of 1 or 2 on a 5-point scale) were also removed because these participants reported price perceptions that were not in line with our manipulation. The analysis was thus conducted on 117 participants.

Manipulation check: For those who reported the subjective price, in the negative information group, subjective price by participants in the low price group ($M = 2.64$, $SD = 0.55$) was judged to be lower than the high price group ($M = 4.15$, $SD = 0.73$), $t(56) = 9.10$, $p < 0.001$. Similarly, in the no information group, participants in the low price group ($M = 2.72$,

SD = 0.53) rated the subjective price as lower than the high price group ($M = 3.65, SD = 0.61, t(57) = 6.24, p < 0.001$).

Dependent measures: A Cronbach’s alpha on all the four dependent variables – one for perception of dryness and three for quality, desirability and likely purchase was 0.67, but if perception was removed as an item, the value was 0.88. Further a factor analysis using principal component analysis (PCA) with varimax rotation and preset two factors showed the three items – quality, desirability and likely purchase loading – on one factor and perception on a different factor. (Table I)

The crucial dependent variable of interest was whether participants felt a higher level of dryness on the back of their palms after application of the cream which we call “perception”. The other dependent variables – quality, desirability and likely purchase load as a separate factor, which we treated as “evaluation”. Thus, we report our results separately for perception (how dry did the skin feel after applying the cream) and evaluation (quality, desirability and purchase intention).

Perception: Descriptively, for the low price groups, negative information increased perception of dryness after applying the cream ($M_{\text{negative-lowprice}} = 3.39, SD = 1.98; M_{\text{No-negative-lowprice}} = 1.85, SD = 1.38$) while no such effect was observed for the high price groups ($M_{\text{negative-highprice}} = 2.72, SD = 1.51; M_{\text{No-negative-highprice}} = 2.51, SD = 1.09$). An ANOVA with price (low vs high) and information presented (no-negative vs negative) on perception showed a main effect of negative information, $F(1, 113) = 9.23, p = 0.003, \eta_p^2 = 0.07$. There was no main effect of price ($p > 0.9$) but importantly, an interaction between price and information presented, $F(1, 113) = 5.41, p = 0.02, \eta_p^2 = 0.04$. Adding initial skin dryness as a co-variate, produced the same pattern, showing a main effect of information presented ($F(1, 112) = 6.92, p = 0.01, \eta_p^2 = 0.05$), no effect of price ($p > 0.70$) and an interaction of price with information ($F(1, 112) = 5.52, p = 0.02, \eta_p^2 = 0.04$). Interestingly, note that although we gave the same cream to all participants, reading about negative side effects increased participants’ report of dryness after applying the cream confirming a nocebo effect of negative information. This is important as it shows how simple exposure by reading negative information can give rise to a higher level of negative perceptual experience even for the same product. Moreover, such experiences are influenced by an extrinsic factor such as price.

Evaluation: Ratings for quality, desirability and likely purchase were aggregated into a single score of “evaluation”. There was an overall significant effect of negative information on evaluation, $F(1, 113) = 6.54, p = 0.01, \eta_p^2 = 0.05$ with negative information reducing the evaluation ($M_{\text{negative-lowprice}} = 4.38, SD = 1.42; M_{\text{No-negative-lowprice}} = 5.07, SD = 2.20$ and $M_{\text{negative-highprice}} = 4.78, SD = 1.92; M_{\text{No-negative-$

$\text{highprice}} = 5.74, SD = 1.31$), no significant effect of price, $F(1, 113) = 2.79, p = 0.09, \eta_p^2 = 0.02$ and no interaction, $F(1, 113) = 0.174, p = 0.67$. With initial skin dryness as a co-variate, the results were similar with a main effect of negative information $F(1, 112) = 7.71, p = 0.006, \eta_p^2 = 0.06$; no effect of price, $F(1, 112) = 2.44, p = 0.12, \eta_p^2 = 0.02$ and no interaction, $F(1, 112) = 0.13, p = 0.71$.

These results confirm two things. First, there is a nocebo effect of reading about potential negative information such as side-effects on both perception and product evaluation. Second, it is important to note that only for perception, an interaction showed that the influence of negative information is more salient when the prices are low. No such interaction effects were observed for product evaluation.

To further test the robustness of the effect, we performed another study using similar methods but with one relevant modification to the design. One potential caveat in experiment 1 was that while one group read about negative information, the other group did not. While this is perfectly reasonable in the real market, empirically, it is possible that reading about products can increase product association and impact how one perceives and evaluates a product. In experiment 2, all participants read about skin creams before testing the cream.

Experiment 2

One group of participants read about potential side-effects, and the other group read a similar passage but without any mention of product side-effects (see appendix for text). Three price frames were presented for a low, discounted price and high price. The dependent variables were perception of the cream and evaluations of the cream measured using two items: quality and desirability. The item “intention to purchase” was removed, because conceptually, evaluation of products can be distinct from intentions to purchase.

Participants

One hundred and fifty undergraduate and graduate students from another Indian business school participated voluntarily who self-reported to have been using a skin cream (age range was from 18 to 24 years).

Method

The cover story was the same as before; a product testing study for a new skin cream and the method was similar to experiment 1, except that half of the participants read an excerpt containing negative information while the other half was presented with an excerpt devoid of any negative aspects (instead of not presenting any information). Price was manipulated at three levels to test both absolute and discounted frames. The low price was stated as “125 INR”, high as “250 INR” and discounted as “250 INR but now 125 INR”. We measured perception (feeling of dryness after application of the cream) and evaluation (quality and desirability) Participants were randomly allotted to six groups according to a 2 (information: No negative information vs negative information) \times 3 (price: low vs high vs discounted) fully factorial between-subject design.

Table I Rotated component matrix for measures in study 1

Measures	Component 1	Component 2
More dry after cream	−0.55	0.995
Quality	0.855	0.051
Desirability	0.941	−0.095
Purchase intention	0.893	−0.117

Results

After removing one participant (responses were inconsistent with high rating for both feeling of dryness and quality of the cream), data were analyzed from 149 participants. Perception: The major dependent measure of our interest was how dry people thought their skin to be after applying the cream. There was a significant effect of information, $F(1, 143) = 10.29$, $p = 0.002$, $\eta_p^2 = 0.06$ and no overall effect of price, $F(2, 143) = 1.46$, $p = 0.23$. Importantly, when no negative information was presented, the perception of dryness was almost similar across the three price levels ($M_{\text{No-negative-lowprice}} = 1.55$, $SD = 0.82$; $M_{\text{No-negative-highprice}} = 1.71$, $SD = 0.84$; $M_{\text{No-negative-discountedprice}} = 1.61$, $SD = 0.80$) but when negative information was presented, perception of dryness was higher for low price ($M_{\text{Negative-lowprice}} = 2.88$, $SD = 1.94$; $M_{\text{Negative-highprice}} = 1.80$, $SD = 1.24$; $M_{\text{Negative-discountedprice}} = 2.28$, $SD = 1.44$). This showed up as a marginal interaction effect, $F(2, 143) = 2.69$, $p = 0.07$, $\eta_p^2 = 0.03$. Next, we analyzed the results with initial dryness and gender as co-variables. A significant effect of information was again observed, $F(1, 141) = 6.72$, $p = 0.01$, $\eta_p^2 = 0.04$, no main effect of price levels, $F(2, 141) = 1.13$, $p = 0.32$ and a similar but non-significant trend toward interaction, $F(2, 141) = 1.67$, $p = 0.19$. The pattern of results was thus similar to experiment 1 but note that after negative information, the low price group showed a more pronounced nocebo effect in comparison to the high price group while the discounted group was in-between.

Evaluation: For “evaluation” (sum of quality and desirability) there were no differences between the group that did not read about negative information ($M_{\text{No-negative-lowprice}} = 5.00$, $SD = 1.39$; $M_{\text{No-negative-highprice}} = 4.07$, $SD = 1.59$; $M_{\text{No-negative-discountedprice}} = 4.02$, $SD = 1.27$) and the group that did read about negative side effects ($M_{\text{Negative-lowprice}} = 4.32$, $SD = 1.18$; $M_{\text{Negative-highprice}} = 4.18$, $SD = 1.34$; $M_{\text{Negative-discountedprice}} = 4.10$, $SD = 1.22$). An ANOVA with gender and initial dryness as co-variables did not find any significant effect of information $F(1, 141) = 1.35$, $p = 0.24$; or price, $F(1, 141) = 1.93$, $p = 0.14$ or interaction, $F(1, 141) = 2.41$, $p = 0.09$.

These results show that reading about negative information in comparison to reading similar information (experiment 2) or not reading anything (experiment 1) can have actual negative perceptions about a product, confirming the existence of a nocebo effect in customer evaluation. Please note that previous studies in placebo literature had used discounted prices, but the current experiments showed that even absolute low and high price levels could influence perception. We also find that the (physical) perceptual experience is distinct from evaluation and these are not affected in a similar way[1]. Perception was affected but not evaluation of the product suggesting that judgments about perceptual experiences and product attitudes are distinct in such contexts.

General discussion

Knowledge about aspects of a product such as brands or ingredients (McClure *et al.*, 2004; Lee *et al.*, 2006; Litt and Shiv, 2012) and price (Shiv *et al.*, 2005; Plassmann *et al.*, 2008) can have large influences on perception and evaluation. Our contribution is as follows. First, we document a clear nocebo effect on perception through the reading of information that is

completely extrinsic to the product. Most previous works on nocebo effects has been in the medical domain and there are hardly any reported studies on consumer behavior. Second, we are not aware of studies that have examined the role of price when one is made aware about negative aspects of a product category. In the preliminary study, offering a discount backfired: people had higher preference for a product when sold at a normal market price compared to being offered at a discounted price in the face of negative information. As discounts can signal multiple aspects of a firm, we manipulated the price directly in experiment 1 and found that the same product at a lower price gives rise to a stronger nocebo-type perceptual effect when there is prior knowledge about negative side effects. Thus, the nocebo effect is more vivid at a lower price range than at a higher price range. Experiment 2 showed that even in comparison to a group, which read about a product (but did not read about any negative information), perceptual nocebo effects are observed. In addition, while fixed prices have been thought to convey a higher value than discount prices (Suri *et al.*, 2000), both experiments show that the effects are observable with absolute/fixed prices too. This is important from the marketers’ point-of-view. Not only would it be a questionable strategy to offer a discount when there is generic negative information about a product category, it is better to have a comparatively higher selling price. Thus, our study suggests that initiatives to boost short-term sales by lowering prices can be a bad strategy for the firm. Please note that in all the experiments, the negative information was about a class of products and not of a specific brand. Corrective measures for brand management thus would not be necessarily useful and hence it is important to look at other strategies such as pricing actions. Finally, we do not observe the effects on evaluation of the product measured by judgment of quality and desirability. Recent neuroscientific evidences suggest that perceptual judgments and evaluations are separate cognitive processes. Emotional circuits in the brain such as the insula and amygdala are associated more with perception while cognitive evaluations and actions are mainly codified in the cortical areas such as ventro-medial prefrontal cortex (Fitzgerald *et al.*, 2009). Perception could be an earlier step followed by decision value computations leading to actual choices being implemented in the prefrontal cortex at a later stage (Grabenhorst and Rolls, 2011). Our results suggest while the step of perceptual judgments are affected by negative information, later evaluations leading to decisions might not be as easily affected.

There are important research directions that could be taken beyond what we have demonstrated in this paper. One important aspect is to evaluate this effect for medical drugs. While there is a public and social need for reducing the price of drugs, Waber *et al.* (2008) had found that purchasing a pill at a reduced price resulted in less efficacy of the drug among patients. One direct extension of this research is to examine to what extent does price influence side effects of drugs administered to patients. While we already know a low price can reduce the positive aspects of a drug (Waber *et al.*, 2008), would the known side effects be exaggerated if patients purchase the same drug at a low or a discounted price? Would price enhance or soothe negative experiences of medical procedures? As healthcare is among the largest markets in the world and is closely associated with humane aspects of our

society, it is imperative to delve more into the mechanisms. A second direction would be to see how other extrinsic attributes such as brands influence both short-term evaluations and long-term associations after there is information regarding some negative aspects of a product category. For example, a major soft-drink company and an international food processing company faced public outcry after large-scale information dissemination regarding potential health risks from its products. When products are re-launched by the firm after some time, what would be the optimal pricing strategies for the brand? This is increasingly becoming an important aspect of consumer behavior with significant market implications. Third, Steinhart *et al.* (2013) had found that product warnings about potential harmful side effects reduce immediate intention to purchase but it can increase later purchase intentions. It remains to be seen how such actions are influenced by price. Fourth, we need to explicate the cognitive processes underlying these effects. Finally, with the advent of international marketing, we would also need to understand how culture shapes the price heuristic (Jo and Sarigollu, 2007), especially when a firm intends to launch a new product where there has been some negative information about the product category.

In general, how negative information, from different print and online sources including those from experts (Aqueveque, 2006) interact with prices of the products needs more research. Our results show that although a marketer might be tempted to offer a discount or lower the selling price, it would not be a good marketing strategy; it would lower product perceptions and is not advisable.

Note

- 1 We thank one of the reviewers to point this issue out to us during revisions of this manuscript.

References

- Aqueveque, C. (2006), "Extrinsic cues and perceived risk: the influence of consumption situation", *Journal of Consumer Marketing*, Vol. 23 No. 5, pp. 237-247.
- Barsky, A.J., Saintfort, R., Rogers, M.P. and Borus, J.F. (2002), "Nonspecific medication side effects and the nocebo phenomenon", *Journal of the American Medical Association*, Vol. 287 No. 5, pp. 622-627.
- Bartels, D.J., Laarhoven, A.I., Kerkhof, P. and Evers, A.W. (2016), "Placebo and nocebo effects on itch: effects, mechanisms, and predictors", *European Journal of Pain (London, England)*, Vol. 20 No. 1, pp. 8-13.
- Benedetti, F., Lanotte, M., Lopiano, L. and Colloca, L. (2007), "When words are painful: unraveling the mechanisms of the nocebo effect", *Neuroscience*, Vol. 147 No. 2, pp. 260-271.
- Benedetti, F., Mayberg, H.S., Wager, T.D., Stohler, C.S. and Zubieta, J.K. (2005), "Neurobiological mechanisms of the placebo effect", *The Journal of Neuroscience*, Vol. 25 No. 45, pp. 10390-10402.
- Dawar, N. and Pillutla, M.M. (2000), "Impact of product-harm crises on Brand equity: the moderating role of consumer expectations", *Journal of Marketing Research*, Vol. 37 No. 2, pp. 215-226.
- Dodds, W.B. (1991), "In search of value: how price and store name information influence buyers' product perceptions", *Journal of Services Marketing*, Vol. 5 No. 3, pp. 27-36.
- Enck, P., Benedetti, F. and Schedlowski, M. (2008), "New insights into the placebo and nocebo responses", *Neuron*, Vol. 59 No. 2, pp. 195-206.
- FitzGerald, T.H., Seymour, B. and Dolan, R.J. (2009), "The role of human orbitofrontal cortex in value comparison for incommensurable objects", *Journal of Neuroscience*, Vol. 29 No. 26, pp. 8388-8395.
- Flaten, M.A. (2013), "Nocebo and nocebo effect", in *Encyclopedia of Behavioral Medicine*, Springer, New York, NY, pp. 1340-1341.
- Gerstner, E. (1985), "Do higher prices signal higher quality?", *Journal of Marketing Research*, Vol. 22 No. 2, pp. 209-215.
- Grabenhorst, F. and Rolls, E.T. (2011), "Value, pleasure and choice in the ventral prefrontal cortex", *Trends in Cognitive Sciences*, Vol. 15 No. 2, pp. 56-67.
- Jo, M.S. and Sarigollu, E. (2007), "Cross-cultural differences of price-perceived quality relationships", *Journal of International Consumer Marketing*, Vol. 19 No. 4, pp. 59-74.
- Kalaigianam, K., Kushwaha, T. and Eilert, M. (2013), "The impact of product recalls on future product reliability and future accidents: evidence from the automobile industry", *Journal of Marketing*, Vol. 77 No. 2, pp. 41-57.
- Kam-Hansen, S., Jakubowski, M., Kelley, J.M., Kirsch, I., Hoaglin, D.C., Kaptchuk, T.J. and Burstein, R. (2014), "Altered placebo and drug labeling changes the outcome of episodic migraine attacks", *Science Translational Medicine*, Vol. 6 No. 218, pp. 218ra5-218ra5.
- Kaptchuk, T.J., Friedlander, E., Kelley, J.M., Sanchez, M. N., Kokkotou, E., Singer, J.P., Kowalczykowski, M., Miller, F.G., Kirsch, I., Lembo, A.J. and Boutron, I. (2010), "Placebos without deception: a randomized controlled trial in irritable bowel syndrome", *PLOS One*, Vol. 5 No. 12, p. e15591.
- Krishna, A. (2012), "An integrative review of sensory marketing: engaging the senses to affect perception, judgment and behavior", *Journal of Consumer Psychology*, Vol. 22 No. 3, pp. 332-351.
- Lee, L., Frederick, S. and Ariely, D. (2006), "Try it, you'll like it the influence of expectation, consumption, and revelation on preferences for beer", *Psychological Science*, Vol. 17 No. 12, pp. 1054-1058.
- Litt, A. and Shiv, B. (2012), "Manipulating basic taste perception to explore how product information affects experience", *Journal of Consumer Psychology*, Vol. 22 No. 1, pp. 55-66.
- McClure, S.M., Li, J., Tomlin, D., Cypert, K.S., Montague, L.M. and Montague, P.R. (2004), "Neural correlates of behavioral preference for culturally familiar drinks", *Neuron*, Vol. 44 No. 2, pp. 379-387.
- McConnell, J.D. (1968), "The price-quality relationship in an experimental setting", *Journal of Marketing Research*, Vol. 5 No. 3, pp. 300-303.
- Madan, V. and Suri, R. (2001), "Quality perception and monetary sacrifice: a comparative analysis of discount and

- fixed prices”, *Journal of Product & Brand Management*, Vol. 10 No. 3, pp. 170-184.
- Meissner, K., Bingel, U., Colloca, L., Wager, T.D., Watson, A. and Flaten, M.A. (2011), “The placebo effect: advances from different methodological approaches”, *The Journal of Neuroscience*, Vol. 31 No. 45, pp. 16117-16124.
- Monroe, K.B. (1990), *Pricing: Making Profitable Decisions*, McGraw Hill, New York, NY.
- Peterson, R.A. (1970), “The price-perceived quality relationship: experimental evidence”, *Journal of Marketing Research*, Vol. 7 No. 4, pp. 525-528.
- Plassmann, H., O’Doherty, J., Shiv, B. and Rangel, A. (2008), “Marketing actions can modulate neural representations of experienced pleasantness”, *Proceedings of the National Academy of Sciences*, Vol. 105 No. 3, pp. 1050-1054.
- Price, D.D., Finnis, D.G. and Benedetti, F. (2008), “A comprehensive review of the placebo effect: recent advances and current thought”, *Annual Review of Psychology*, Vol. 59 No. 1, pp. 565-590.
- Puzakova, M., Kwak, H. and Rocereto, J.F. (2013), “When humanizing brands goes wrong: the detrimental effect of brand anthropomorphization amid product wrongdoings”, *Journal of Marketing*, Vol. 77 No. 3, pp. 81-100.
- Rao, A.R. and Monroe, K.B. (1988), “The moderating effect of prior knowledge on cue utilization in product evaluations”, *Journal of Consumer Research*, Vol. 15 No. 2, pp. 253-264.
- Rao, A.R. and Monroe, K.B. (1989), “The effect of price, Brand name, and store name on buyers’ perceptions of product quality: an integrative review”, *Journal of marketing Research*, Vol. 26 No. 3, pp. 351-357.
- Schmitt, B. (1999), “Experiential marketing”, *Journal of Marketing Management*, Vol. 15 No. 1, pp. 53-67.
- Shiv, B., Carmon, Z. and Ariely, D. (2005), “Placebo effects of marketing actions: consumers may get what they pay for”, *Journal of marketing Research*, Vol. 42 No. 4, pp. 383-393.
- Steinhart, Y., Carmon, Z. and Trope, Y. (2013), “Warnings of adverse side effects can backfire over time”, *Psychological Science*, Vol. 24 No. 9, pp. 1842-1847.
- Stewart-Williams, S. and Podd, J. (2004), “The placebo effect: dissolving the expectancy versus conditioning debate”, *Psychological Bulletin*, Vol. 130 No. 2, p. 324.
- Suri, R., Manchanda, R.V. and Kohli, C.S. (2000), “Brand evaluations: a comparison of fixed price and discounted price offers”, *Journal of Product & Brand Management*, Vol. 9 No. 3, pp. 193-207.

- Tracey, I. (2010), “Getting the pain you expect: mechanisms of placebo, nocebo and reappraisal effects in humans”, *Nature Medicine*, Vol. 16 No. 11, pp. 1277-1283.
- Waber, R.L., Shiv, B. and Carmon, Z. (2008), “Commercial features of placebo and therapeutic efficacy”, *Journal of the American Medical Association*, Vol. 299 No. 9, pp. 1016-1017.
- Wager, T.D., Rilling, J.K., Smith, E.E., Sokolik, A., Casey, K.L., Davidson, R.J. and Cohen, J.D. (2004), “Placebo-induced changes in FMRI in the anticipation and experience of pain”, *Science*, Vol. 303 No. 5661, pp. 1162-1167.
- Zeithaml, V.A. (1988), “Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence”, *The Journal of Marketing*, Vol. 52 No. 3, pp. 2-22.

Further reading

- Cheng, L.L. and Monroe, K.B. (2013), “An appraisal of behavioral price research (part 1): price as a physical stimulus”, *AMS Review*, Vol. 3 No. 3, pp. 103-129.

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