Placebo Effects of Marketing Actions:

Consumers May Get What They Pay For

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OCTOBER 2006, PAPER NUMBER 26

The Occasional Papers of the School of Social Science are versions of talks given at the School's weekly Thursday Seminar. At these seminars, Members present work-in-progress and then take questions. There is often lively conversation and debate, some of which will be included with the papers. We have chosen papers we thought would be of interest to a broad audience. Our aim is to capture some part of the cross-disciplinary conversations that are the mark of the School's programs. While Members are drawn from specific disciplines of the social sciences—anthropology, economics, sociology and political science—as well as history, philosophy, literature and law, the School encourages new approaches that arise from exposure to different forms of interpretation. The papers in this series differ widely in their topics, methods, and disciplines. Yet they concur in a broadly humanistic attempt to understand how, and under what conditions, the concepts that order experience in different cultures and societies are produced, and how they change.

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As a behavioral economist, Dr. Ariely studies how people actually act in the marketplace, as opposed to how they should or would perform if they were completely rational. His specific interests are in understanding the role of various factors—such as the range of options individuals face, the prices that they see, the pricing mechanisms that are used, the time that they have to make the decisions, the incentives for success and others—on consumers' choices. Dan has examined how these factors shape behavior in general and also in electronic marketplaces such as online auctions, web shopping, and online dating.

This paper was presented by Dan Ariely to a School of Social Science Thursday lunch seminar on March 16, 2006. It first appeared in the *Journal of Marketing Research* in December 2005. We have edited the paper to remove some of its more technical aspects (figures and formulas). Those who wish to have that information may consult the published article.

Placebo Effects of Marketing Actions: Consumers May Get What They Pay For

Pro tali numismate tales merces (one gets what one pays for)—Gabriel Biel
(Dictionary of Clichés, Rogers, 1985)

Consumers' beliefs and expectations, shaped by experiences in their daily lives, often influence their judgments of products and services. For example, consumers often believe, and consequently judge, lower priced items to be of lower quality (see, e.g., Gerstner 1985; Huber and McCann 1982; Rao and Monroe 1989). Consumers' beliefs and expectations can also affect their subjective experiences. For instance, drinks taste better if they carry a favorite brand's label versus than when the same drinks are unlabeled (Allison and Uhl 1964; McClure *et al.* 2004). Similarly, meat labeled 75% fat free tastes better than the same meat that is labeled as containing 25% fat (Levin and Gaeth 1988). The question that we address in this research is whether beliefs and expectations evoked by marketing actions can affect more than judgments and subjective consumption experiences. Specifically, can they also influence the actual efficacy of the marketed product? For example, can consuming an energy drink that is purchased at a discount lead not only to judgments of lower quality or to a less favorable consumption experience, but also to diminished performance in say a cardiovascular workout or a puzzle-solving task?

We began exploring these questions in a preliminary study in which thirty-eight members of a fitness center who exercised regularly (at least 3 times a week) consumed Twinlab® Ultra Fuel™ before and during a workout session. Before consuming the energy drink, participants were shown the list of its ingredients and were told that the drink was from the most recent batch manufactured. One group of participants was told that the drink was purchased at a regular price of $2.89; another group was told that the regular price of the drink was $2.89, but we had purchased the drink at a discounted price of $.89 because we bought it in bulk as an institutional purchase. After exercising, participants rated the intensity of their workout on a -3 (not at all intense) to +3 (very intense) scale, and how fatigued they felt on a 1 (not at all) to 7 (very) scale. The results show that participants in the reduced price condition rated their workout intensity as lower ($M = -.4$) than those in the regular price condition ($M = .6$; $F(1, 36) = 7.5$; $p < .01$), and indicated that they were more fatigued ($M = 4.5$) than those in the regular-price condition ($M = 3.7$; $F(1, 36) = 3.5$; $p < .10$). Finally, when asked during debriefing if the price of the drink affected their workout, not a single participant answered affirmatively.

The findings of our preliminary study resemble the well-known placebo phenomenon in the medical domain (see Stewart-Williams and Podd 2004). Specifically, patients' beliefs and expectations about the treatment they are receiving (e.g., an anti-depression medication) can yield real changes to their health, even if the compound of the medication has no inherent powers to produce health effects (e.g., a sugar pill that looks like the anti-depression medication). A large body of research has shown effects of aspects that are inherent to a placebo such as beliefs about the efficacy of a drug for which the placebo substitutes (e.g., Kirsch *et al.* 2002) or about the form in which the placebo is received (e.g., Kaptchuk *et al.*

2000). The results of our preliminary study suggest that features that are not inherent to a product, such as its price, can also trigger a placebo effect.

The results of the preliminary study suggest that price discounts may give rise to a behavioral effect (that we refer to as a placebo effect in this research) and that this effect may occur beyond conscious awareness. But several criticisms can be leveled against this study. First, our dependent measure in this study was our participants' perceptions of their behavior (e.g., perceived workout intensity) rather than the behavior itself. Further, our study did not include a no-treatment control group. Therefore, we cannot distinguish between a desirable placebo effect (the regular-price fitness-drink boosted the efficacy of the drink) and an undesirable placebo effect, (the sale-price detracted from the efficacy of the energy-drink).[1] A third criticism is that participants did not actually pay for the drink but were merely informed of the prices. Finally, and most importantly, this study gives no indication of what underlies the effect. We address all these criticisms in our subsequent studies and also explore whether the effect is non-conscious, as the preliminary study suggests.

In the next section, we draw on research on the placebo effect and on the price-quality association to predict how beliefs and expectations arising from marketing actions such as price promotions may produce effects on behavior. Following this, we present three experiments that document undesirable placebo effects resulting from price discounts. In the third experiment, we also document a desirable placebo effect ignited by advertising claims. In all three experiments, we find support for the role of expectations in producing this effect, and we rule out alternative accounts.

THEORETICAL BACKGROUND

Voluminous research on placebo effects has shown that successfully conveying the false belief that patients received a particular treatment can bestow some of the benefits of the genuine treatment (see Stewart-Williams and Podd 2004 for a review). Credible placebos can help relieve and sometimes even cure physical and mental ills such as pain (e.g., Montgomery and Kirsch 1996), cardiovascular disease (e.g., Bienenfeld, Frishman, and Glasser 1996) and depression (Kirsch *et al.* 2002). Placebo effects have also been detected with functional magnetic resonance imaging (fMRI; Wager *et al.* 2004).

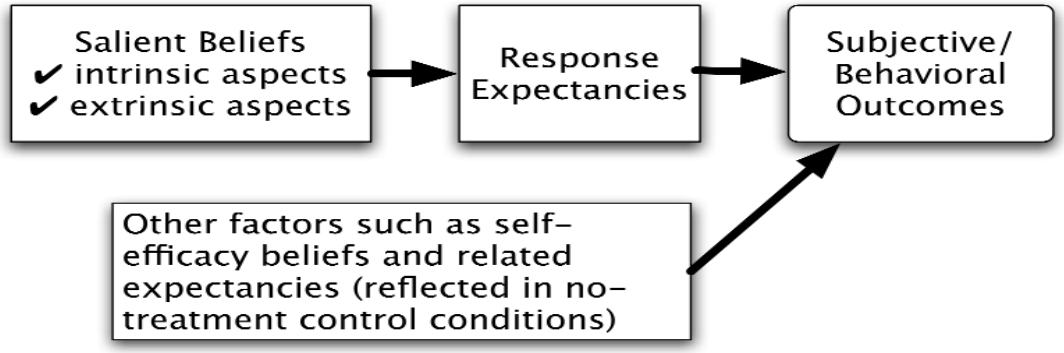
Two notions are believed to account for placebo effects: expectancy theory and classical conditioning. According to the former, placebo effects arise because beliefs about a substance/procedure serving as a placebo activate expectations that a particular effect will occur, which then impact the subsequent effectiveness of the substance/procedure. The classical conditioning view considers consuming substances with known therapeutic effects to be conditioning trials. The active substances giving rise to these effects serve as unconditioned stimuli (UCs) and the vehicles via which they are delivered (pills, capsules, drinks, etc.) serve as the conditioned stimuli (CSs). Pairing the UCs and the CSs over time endows the vehicles with a capacity to evoke therapeutic effects in the form of conditioned responses (CRs). These two views have been contrasted and debated, but an emerging view is that expectancies mediate all placebo effects and conditioning is one means by which expectancies are initially formed and then activated (Kirsch 2004; Rescorla 1988). The growing acceptance of expectations as the basic mechanism for placebo effects has led to an increased interest in how beliefs give rise to placebo effects, and the role of expectancies in mediating this effect.

The Mediating Role of Expectancies

Figure 1 highlights the process associated with placebo effects, a framework that we draw from work in the medical domain (Kirsch 1999; Kirsch and Lynn 1999; Kirsch and Sapirstein 1998; Stewart-Williams and Podd 2004), but should also represent factors expected to influence placebo effects of marketing actions. Briefly, when one receives what is purportedly an active substance or treatment, one's salient beliefs about the substance or treatment activate response expectancies—anticipations of subjective and/or behavioral consequences of using the substance or being treated. These response expectancies, together with contextual factors unrelated to the substance or treatment, then give rise to the subjective and behavioral outcomes—placebo effects.

Several aspects of this process warrant elucidation. First, critical to the placebo effect are specific beliefs that are salient when one receives the purportedly active substance or treatment. These beliefs, for example, could relate to intrinsic aspects of the active substance or treatment such as its potential therapeutic effects or deleterious side-effects, yielding a desirable placebo effect in the former case and an undesirable placebo effect in the latter case (cf. Hahn 1997). Similarly, extrinsic aspects can shape salient beliefs about the substance or treatment and, thereby, give rise to stronger (weaker) placebo effects. An example is whether one receives a medication through injections or capsules (Kaptchuk *et al.* 2000). Second, the magnitude of the subjective and/or behavioral consequences depends on the strength of the activated response expectancies, which can, in turn, be influenced by a variety of factors. For example, encouraging individuals to elaborate on their expectations may enhance the magnitude of the placebo effect (Fillmore and Vogel-Sprott 1992). Similarly, the magnitude of the placebo effect may be influenced by the strength of one's salient beliefs about the active substance or treatment. This, in turn, can be enhanced by greater familiarity through prior usage (Kirsch 1985), for example. The strength of these beliefs and, therefore, the magnitude of the placebo effect may also be diminished by instructions that cast doubts about these beliefs. For example, alerting individuals that they are participating in a double-blind study and that the substance they are receiving may be inert gives rise to diminished placebo effects (Kirsch and Weixel 1988). Third, the subjective and behavioral outcomes can be shaped by self-efficacy beliefs (Kirsch 1985), which together with other extraneous factors are reflected in outcomes of no-treatment control conditions that are sometimes included in placebo studies. Finally, the process by which expectancies are elicited to give rise to the placebo effect can either be conscious or non-conscious. Consistent with one aim of our research, Stewart-Williams and Podd (2004) call for research on placebo effects that will identify situations in which the mediating role of expectancies occurs non-consciously. Next, we examine implications of the framework for placebo effects that may arise from marketing actions such as price discounts.

Figure 1:
FRAMEWORK FOR PLACEBO EFFECTS



Marketing Actions and the Placebo Effect

If marketing actions such as price discounts give rise to a placebo effect, as our preliminary study suggests, what might be the nature of beliefs that trigger response expectancies that, in turn, give rise to the placebo effect? Further, how will contextual factors influence the strength of the expectancies and thus the magnitude of the effect? To answer these questions, consider the context of the preliminary study. Recall that participants in that study received an energy drink, Twinlab® Ultra Fuel™, saw a list of its ingredients, and were informed that we purchased the drink at either its regular price or a discounted price. The stimulus materials could have made several beliefs salient. For example, intrinsic aspects relating to the ingredients could have activated beliefs about their effects. In addition, the brand name (an extrinsic cue) could have activated beliefs about the product's superior quality (Rao and Monroe 1989). Further, given that consumers often believe that price-levels tend to reflect quality (e.g., Huber and McCann 1982; Rao and Monroe 1988, 1989), the price discount (another extrinsic cue) may have triggered beliefs that the product's quality is inferior. According to the framework presented above, all these beliefs could have been salient, triggering various types of response expectancies. These response expectancies, together with other factors such as non-product-related beliefs (e.g., self-efficacy beliefs, such as how good one is at fitness workouts) and participants' abilities could have affected respondents' performance in their fitness workout. But, since price was the only manipulated factor in the preliminary experiment and since participants were randomly assigned to the two levels of this factor (thereby controlling for other factors such as beliefs about the ingredients, the brand name, or one's self-efficacy), the difference we observed in participants' performance is likely to have been due to the salient beliefs relating to price, that is, a placebo effect of price discounts. Participants' performance in a no-treatment control condition (if we had such a condition), on the other hand, would have reflected effects of the other factors such as non-product related beliefs or participants' abilities, etc.

Next, consider the implications of other aspects of the framework as they relate to our preliminary study and allow us to draw predictions for similar studies we will present shortly. The magnitude of the placebo effect could be affected by a host of factors. First, encouraging participants to elaborate on their expectations would increase the strength of those expectations and hence, the magnitude of the observed placebo effect. We test this prediction in our first study. Second, beliefs relating to the brand name and/or the ingredients would be stronger with greater (rather than lower) frequency of prior usage. Hence, in addition to the

observed price effect, we would expect frequency of prior usage to influence the behavioral outcome. We provide evidence relating to prior usage in our first two studies. Third, if we were to draw participants' attention to their price-quality beliefs, many would realize that the price-quality relationship may not be applicable, which would weaken the impact of such beliefs and, consequently, the magnitude of the placebo effect. We test this prediction in our second study. Finally, consider what might happen if we presented advertising claims that either strengthened or weakened participants' beliefs in the efficacy of the ingredients (an intrinsic cue). This manipulation would likely have independent effects on participants' performance, in addition to the observed placebo effect of price discounts. We examine this in the third study.

The discussion in the previous section also suggests that placebo effects of price discounts can be either conscious or non-conscious (cf. Kirsch 2004; Stewart-Williams and Podd 2004). Rao and Monroe (1988) argue that the price and perceived quality relationship is a belief that is activated and used when individuals make rapid judgments regarding a product's quality. Research by Adaval and Monroe (2002) suggests that price-quality beliefs are activated and impact judgments at a non-conscious level.

Building on the ideas presented above, we conducted three experiments, which we describe next. In these experiments, we investigated the possibility that price discounts give rise to placebo effects by activating response expectations, and that the process by which these activated expectations give rise to this placebo effect is in line with the predictions made above.

EXPERIMENT ONE

The purpose of experiment one was to (1) document evidence of a placebo effect caused by price discounts, (2) explore what underlies the placebo effect by examining whether the observed effects are mediated by expectancies, in line with findings in the medical domain, and (3) determine whether the impact of expectancies on the observed placebo effect occurs non-consciously.

In this experiment, participants first consumed SoBe® Adrenaline Rush™ (a drink that claims on its package to help increase mental acuity) and then solved a series of puzzles. Note that such drinks are familiar to the student population from which our sample is derived. Indeed, in response to measures we collected at the end of this experiment, 92% of the participants stated that they had heard of SoBe® before and 48% stated that they had consumed this drink before. To accomplish the first goal of this experiment, we collected a measure of performance, namely the number of puzzles solved correctly. To accomplish the second goal, we adapted a procedure used by Fillmore and Vogel-Sprott (1992) to vary the strength of activated response expectancies. Specifically, one group of participants elaborated on their expectancies by rating the expected efficacy of the drink before solving the puzzles while a second group did not engage in this rating task. If expectancies indeed mediate an observed placebo effect, then strengthening response expectancies ought to amplify the basic effects. To accomplish the third objective, we used a straightforward dependent variable approach adapted from previous work on non-conscious processes (see, e.g., Fitzsimons, Chartrand, and Fitzsimons 2004). After participants completed the puzzle task, we asked them to rate how effective SoBe® was at improving their puzzle-solving performance on a 1 (not at all effective) to 7 (very effective) scale. If participants were not conscious of the impact of expectancies relating to the efficacy of SoBe® on their subsequent performance, then this measure should (not) mediate the effects of the independent variables on the

number of puzzles solved. Note that the underlying process has two components: (1) activation of expectancies, and (2) subsequent impact of those expectancies on participants' performance in the puzzle task. Even if the first component occurs at a non-conscious level, the procedure we used to strengthen expectancies would make expectancies conscious (in conditions where participants were asked to rate the efficacy of the drink). Thus, lack of mediation would only suggest that the second component occurs non-consciously. We explore the nature of the first component in experiment two, as our approach in experiment one does not enable us to test for it.

Design and Procedure

We used a 2 (price: regular versus discounted) by 2 (expectancy-strength: high versus low) between-subjects design. One hundred and twenty five participants were randomly assigned to the four conditions. At the beginning of the session, participants were told that as part of the study they would consume SoBe®. As in the preliminary study, they were shown the packaging and the ingredients it contained and were told that the drink was from the most recent batch manufactured. To reinforce the sense that the energy drink would influence their performance, participants were then told that they would watch a video for about ten minutes purportedly to allow the ingredients to have their effects. They were also told that after watching the video, they would solve a series of word-jumble puzzles (e.g., TUPPIL, the solution for which is PULPIT), their goal being to solve as many puzzles as possible in the allotted thirty minutes. Before distributing the drink, participants were given a form authorizing us to charge their university billing account for the drink they were to consume. For some participants (regular-price conditions), the form stated that they would be charged $1.89 and that this was the regular price of the drink in retail outlets. For other participants (discounted-price conditions), the form stated that the regular price of the drink at retail outlets was $1.89, but they would be charged $.89, since we purchased the drink at a discount because we were making an institutional purchase.

Participants consumed the drink and then watched a video for about ten minutes. They then received a booklet that contained instructions on the cover page, followed by the puzzles. The instructions on the cover sheet stated that participants would have thirty minutes to solve fifteen puzzles. Following the cover page, respondents in the high expectancy-strength conditions were shown a page that indicated the following: "I feel that SoBe® is very bad (1)/very good (7) at improving concentration, and very bad (1)/very good (7) at improving mental performance." Respondents in the low expectancy-strength conditions were not asked these questions. Subsequently, participants engaged in the puzzle task, then responded to a series of measures, and were finally debriefed.

Other Measures

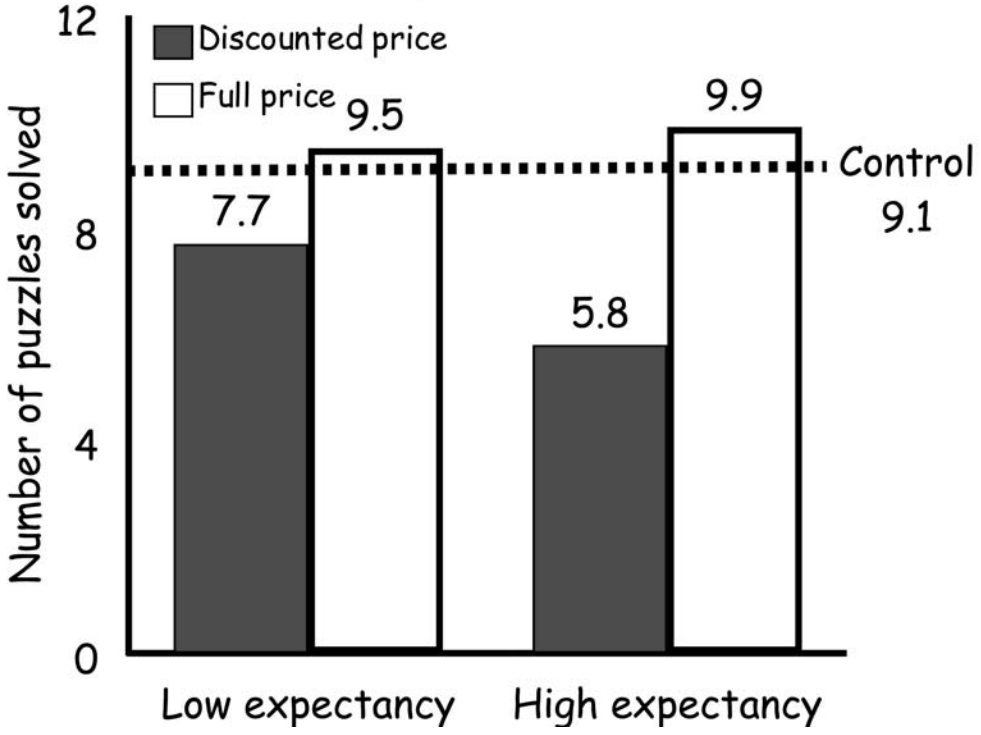
After solving the puzzles, participants indicated their gender, if they were familiar with SoBe®, if they had consumed this drink before, and how good and how experienced they were, in general, at solving puzzles such as word-jumbles. These measures served as covariates in the various analyses. At the end of the instrument, we asked participants to recall the price they had paid for the drink (in this, and in our other experiments, all participants in the treatment conditions recalled the price they had paid within a range of +/-11% accuracy, and there were no differences in recall across the various treatment conditions). After the experiment, an independent coder determined the number of puzzles that each respondent solved correctly.

Results

Pilot Study. We first conducted a pilot study to assess participants' performance in a no-treatment (control) condition. Thirty-one participants drawn from the same population took part in this pilot study. The procedure closely followed the one we used in the main experiment except that the participants were not told about the SoBe® drink, did not consume it, and merely solved the puzzles and responded to a relevant subset of the measures.

As can be seen in Figure 2, the overall results showed that consuming the drink at a discount led to a lower performance in the puzzle-solving task. Moreover, by comparing the differences between the low and high expectancy conditions we see that the magnitude of the placebo effect is larger when the expectations from the drink were higher. It is also interesting to note that in this experiment the performance of the full price and the control condition was about the same and the effect is driven by the reduction of performance in the discounted price condition and in particular when the drink was on discount and the expectations were high.

Figure 2
Experiment 1



The results showed a few other important points. Prior consumption of SoBe® had a positive effect on the amounts of puzzles that were solved such that people with more prior experience with the drink solved about 1 more puzzle, as predicted by our framework. In terms of whether the underlying process was conscious or not, the analysis of the self reports regarding how effective participants thought SoBe® to be at improving their puzzle-solving performance, showed no effect, suggesting that expectancies based on the price discounts may not have been conscious when participants were solving the puzzles.

Discussion

The results of experiment one support our basic prediction that price discounts can give rise to an undesirable placebo effect. Offering a price-discount on a product that claims to be beneficial for mental acuity negatively affected performance on a subsequent task, namely the number of puzzles solved correctly. The performance of those who consumed the discounted drink was worse than that of participants who consumed the regular-priced drink and of those who were in the no-treatment control condition (and did not consume the drink). This detrimental effect was accentuated when expectations regarding the efficacy of the product were reinforced. Further, on average, participants who had consumed the energy drink before solved more puzzles than those who had not. This variable, however, did not interact with any of the other independent variables. Finally, the results suggest that the underlying process giving rise to our observed placebo effect may have occurred non-consciously.

A noteworthy finding in experiment one was that we only observed an undesirable placebo effect in the discounted-price conditions. The results in the regular-price conditions were no different than in the no-treatment control condition (administered as a pretest). In the next experiment, we examine whether the findings of experiment one replicate and shed more light on the cause of the observed placebo effect.

EXPERIMENT TWO

One goal of experiment two was to examine why we did not observe a desirable placebo effect of the regularly-priced drink in experiment one. A second goal was to rule out two alternative accounts—(1) that participants paying regular-price might have worked harder on the puzzle task to reduce the greater dissonance they might have experienced due to the regular price they paid, and (2) that compared to participants in the regular-price condition, those in the reduced price conditions concentrated less on the puzzle task as a result of entertaining distracting thoughts about getting the drink at a lower price. A third goal of experiment two was to examine whether drawing attention to price-quality beliefs would affect the observed placebo effect. This allows us to test several predictions. First, drawing participants' attention to price-efficacy beliefs is likely to help them realize that these beliefs may not be applicable to all contexts. This, in turn, should weaken their response expectations[2] and thus, the magnitude of the placebo effect (see, Kirsch and Weixel 1988). Second, the procedure enables us to shed more light on whether the underlying process is non-conscious. Research has consistently shown that if the activation of information in memory occurs non-consciously, then drawing attention to the priming source (in our case the relationship between price and expected efficacy), reduces subsequent effects of this information (e.g., Strack *et al.* 1993). This attenuating effect is likely to occur when drawing attention to the priming source casts doubts about the relevance of the priming source. On the other hand, if the activation of the information occurs consciously, then drawing attention to the priming source enhances subsequent effects of the information. Third, if drawing participants' attention to the price-efficacy beliefs reduced the magnitude of the observed placebo effect, it would reduce the viability of the alternative cognitive-dissonance account. According to the dissonance explanation, drawing attention to the price of the drink ought to increase dissonance in the regular-price condition, thereby enhancing rather than attenuating the magnitude of the basic effect.

To accomplish the third goal (examining if drawing attention to price-quality beliefs affects the placebo effect), we modified the procedure that we used in experiment one to

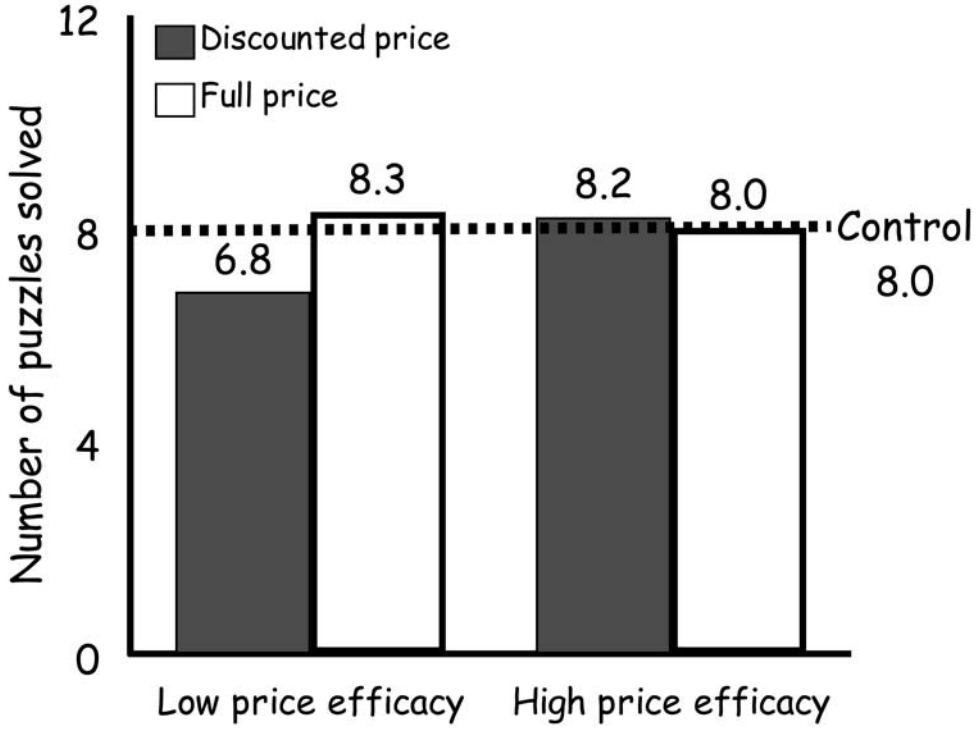
strengthen expectancies prior to the puzzle task. Recall that in experiment one, we manipulated the strength of expectancies by having one group of participants respond to the following question prior to the puzzle task: "I feel that SoBe® is very bad (1)/very good (7) at improving concentration" and "... very bad (1)/very good (7) at improving mental performance." In experiment two, one group of participants did the same, except that their attention was also drawn to the price-efficacy link by reading the following words that appeared just before the questions: "Given the price I was charged for SoBe®."

To summarize, experiment two used a 2 (price: regular versus discounted) by 2 (price-efficacy salience: low versus high) between-subjects design, as well as a control condition. Apart from modifying the task to incorporate the price-efficacy salience factor, adding measures to serve as covariates, and conducting experiment two using computers, the procedure paralleled the one we used in experiment one (our using a computerized rather than a paper-and-pencil task as in experiment one may account for some differences in the performance levels across experiments one and two). One hundred and ninety three undergraduate students participated in the study.

Results

As can be seen in Figure 3, the results in the low price-efficacy salience conditions paralleled those of the previous experiments, where price discounts reduced the number of puzzles solved. Interestingly, the results in the high price-efficacy salience conditions suggest that drawing attention to the price-efficacy beliefs weakens these beliefs, thereby eliminating the placebo effect and providing further support that the effect of price discounts is non-conscious (see Strack *et al.* 1993). These results also discredit cognitive-dissonance as a possible account for the results.

Figure 3
Experiment 2



Why Did We Not Observe a Desirable Placebo Effect? One question that arises from experiments one and two is why there was no desirable placebo effect of the regularly- priced drink and instead we observed an undesirable placebo effect of discounted prices? Part of the answer to this question comes from examining participants' expectancies, prior to the puzzle-solving task, in the no-treatment control condition. Note that, unlike the treatment participants, the control participants were neither given SoBe® nor the accompanying instructions highlighting the price of the drink prior to the puzzle-solving task. Hence, beliefs relating to the price of SoBe® could not be activated in these participants. However, other beliefs (e.g., about their natural [unaided] ability in tasks such as solving word puzzles) may have been more salient to control participants. Among treatment participants, these self-efficacy beliefs may have been less salient due to the external cues that were presented (e.g., the drink's price having been presented more than once at the beginning of the experiment). In sum, a combination of two reasons may account for our results: (1) price related (self-efficacy) beliefs may have been the most salient to participants in the treatment (control) conditions due to the procedure we used and, therefore, (2) the resulting expectancies relating to self-efficacy beliefs in the control conditions may have been as high as those relating to price in the regular-price conditions. To test these accounts, we first examined a measure relating to self-efficacy beliefs that was collected at the end of the experiment—participants were asked to rate on a 1 (not at all good)/7 (very good) scale, how good they were, in general, at solving word puzzles. As we had surmised, the mean rating on this measure was higher in the control condition than in the regular-price and the discounted-price conditions, with the latter two being no different from each other.

To follow up on this finding, we conducted a separate study to assess expectancies prior to the puzzle-solving task (those expectancies were not administered in the control conditions of the main experiments). Sixty-one participants, drawn from the same population as that in the main studies, engaged in a task that was similar to those used in experiments one and two. Participants were randomly assigned to one of three conditions, two treatment conditions (regular-price and discounted-price), and one no-treatment control condition. After participants received the initial instructions and paid for their drinks (in the treatment conditions), they engaged in a filler task, and then rated their expected concentration and mental performance during the subsequent puzzle-solving task on two scales that were adapted from those administered in the high expectancy-strength conditions of experiment one. As we had surmised, the mean expectations were not different in the regular-price and control conditions, but were lower in the discounted-price condition. These findings suggest that a possible reason for not observing a desirable placebo effect of the drink in the regular-price conditions of experiments one and two was that the expectations prior to the puzzle-solving task were not different in these conditions compared to the no-treatment control.

Discussion

The results of experiment two provide further support for a placebo effect due to price discounts. We replicated the findings of experiment one in the low price-efficacy salience conditions of experiment two—the number of puzzles solved was lower when the product was purchased at a discounted price than when it was purchased at its regular price. Further, as in experiment one, we observed an undesirable placebo effect in the discounted-price condition, but not a desirable placebo effect in the regular-price condition compared to the no-treatment control. Experiment two shed additional light on the underlying process. Specifically, drawing attention to the price-efficacy beliefs prior to solving puzzles reduced the strength of response expectancies, eliminating the undesirable placebo effect we observed in

the discounted-price condition. Further, in line with prior work on non-conscious effects of biasing information, when participants' attention was drawn to the relationship between price and the product's efficacy, the placebo effect did not occur. This result supports the notion that the process giving rise to the placebo phenomenon we observed occurs non-consciously. Finally, that the basic effect was attenuated rather than enhanced reduces the viability of an alternative account related to cognitive-dissonance.

Experiment two also shed light on a potential reason for observing only an undesirable placebo effect in the first two experiments. First, self-efficacy ratings were higher in the control condition compared to the treatment conditions. We discuss this finding further in the General Discussion Section. Second, a separate study revealed that expectancies in the regular-price condition were no different than in the no-treatment control, which can account for the finding that the number of puzzles solved was no different across these conditions.

EXPERIMENT THREE

Experiment three had several goals. One was to seek further support for the role of response expectancies in the placebo effect of price discounts that we observed. Enhancing the antecedent intrinsic beliefs about the active substance or treatment via advertising claims, for example, should strengthen expectancies, and therefore, the subsequent placebo effect. Accordingly, we manipulated not only the price factor as in the previous two experiments, but also another marketing variable relating to intrinsic beliefs about the effectiveness of SoBe®. To this aim, we presented the following instructions on the cover page: "Drinks such as SoBe® have been shown to improve mental functioning, resulting in improved performance on tasks such as solving puzzles. In fact, the website of SoBe® includes references to over 50 scientific studies suggesting that consuming drinks like SoBe® can significantly improve mental functioning (in the high expectancy-strength conditions)/slightly improve mental functioning (in the low expectancy-strength conditions)." We expected that adding this second factor relating to expectancy-strength, would allow us to observe a desirable placebo effect (in the regular-price, high expectancy-strength condition), which we had not observed in the previous experiments.

Another goal of experiment three was to examine the role of other mediators of the observed effects. Note that in experiments one and two, response expectancies that were measured *prior* to the puzzle-solving task were found to mediate the observed effects. However, we did not examine how respondents felt *during* the puzzle-solving task. Specifically, did respondents in the regular-price conditions feel more motivated and alert during the task than respondents in the discounted-price conditions? To test for this possibility, we asked participants to rate how alert and how motivated they felt during the puzzle-solving task (7-point scale items, with the last item reverse-scaled). A third goal of experiment three was to rule out another alternative account, relating to mood states. It is possible that participants in the discounted-price conditions of experiments one and two were in a more positive mood state (since they had received the drink at a discount) than those in the regular-price conditions. Research on mood-state effects suggests that positive mood states can impair cognitive capacity and evoke less careful and substantive process styles compared to less positive mood states (see, Forgas 1995 for a review). This might account for why participants in the discounted-price conditions solved fewer puzzles. We tested the validity of this account by collecting measures of mood states (following Watson, Clark, and Tellegen 1988) before the puzzle-solving task.

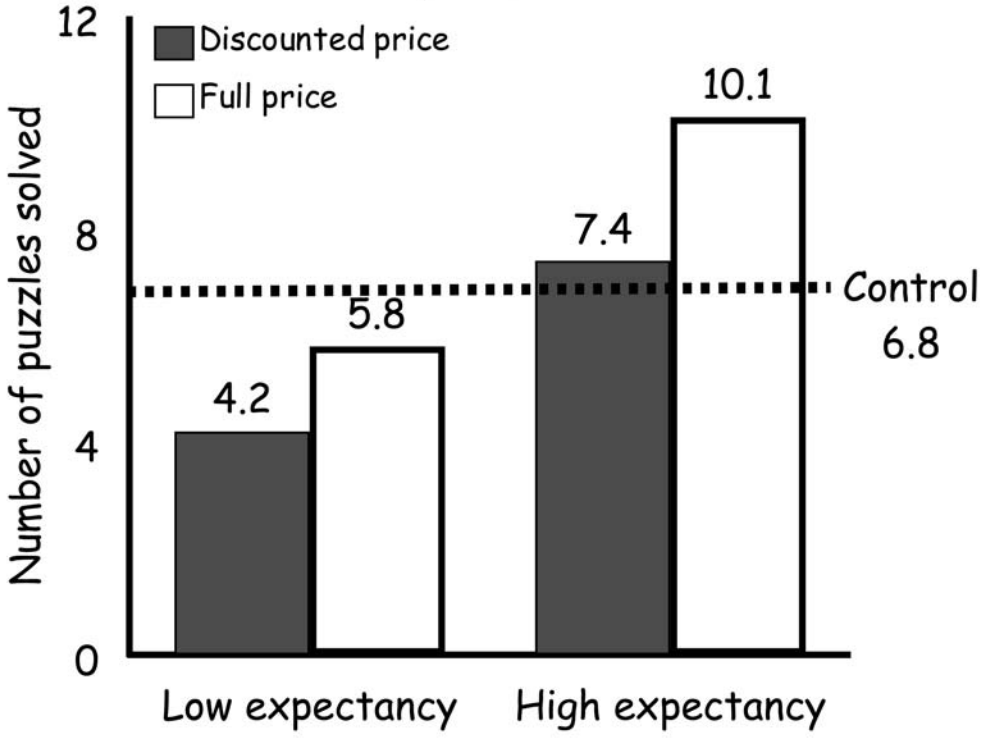
To summarize, experiment three used a 2 (price: regular versus discounted) by 2 (expectancy-strength: low versus high) between subjects design as well as a control condition. Apart from modifying the task to incorporate the expectancy-strength factor, including expectancy measures prior to the puzzle-solving task in all conditions as in the high expectancy-strength conditions of experiment one, and changing some of the puzzles for logistical reasons, the procedure paralleled those we used in experiments one and two. Our having changed some of the puzzles may account for some differences in the basic results across experiments one, two and three. Two hundred and four undergraduate students participated in the study.

Results

As can be seen in Figure 4, the number of puzzles solved was lower in the discounted-price conditions than in the regular-price conditions. The results in the high expectancy-strength conditions were also consistent with our conceptualization. Specifically, presenting strong claims about the efficacy of SoBe® to strengthen response expectancies increased the number of puzzles solved in those conditions compared to the low expectancy-strength conditions. Also, the number of puzzles solved in the regular-price, low expectancy-strength condition was lower than in the control condition, indicating that presenting weak claims about the efficacy of SoBe® resulted in an undesirable placebo effect even when the drink was sold at its regular price. Finally, the number of puzzles solved in the high expectancy-strength conditions (particularly in the high expectancy-strength and full price condition) was higher than the control condition—demonstrating a desirable placebo effect that we had not observed in our previous experiments.

We found further support for our conceptualization by examining the expectancy measures that we collected across all conditions prior to the puzzle-solving task. In line with

Figure 4
Experiment 3



our conceptualization, for both the low and high expectancy-strength, these ratings were lower in the discounted-price conditions than in the regular-price conditions.

Alertness and Motivation During the Task. Recall that following the puzzle-solving task, we asked participants how alert and motivated they felt during the task. Separate Sobel tests revealed that only the alertness measure mediated the effects of the independent variables on the number of puzzles solved. This finding is very reasonable given that a major claim of this drink is that it boosts alertness. The other measure (which, incidentally, the drink does not claim to influence) was not relevant as a mediator.

Did Mood Mediate the Observed Effects? An alternative account for our findings is that participants who bought the drink at a discount were in a more positive mood state than those who purchased it at its regular price. The difficulty of such mood explanation is that it predicts only a main effect of price and not an interaction with a second factor such as expectancy-strength that we find in all three experiments. To further reduce the viability of the mood account, we collected measure of mood states prior to the puzzle-solving task, and found no mood effects.

Discussion

Experiment three documented not only an undesirable placebo effect, as in our previous experiments, but also a desirable placebo effect. Specifically, participants who purchased the drink at its regular price and were presented with strong advertising claims about the drink solved more puzzles than those in the control condition. Results of this experiment also suggest that participants felt more alert in the regular-price than in the discounted-price conditions and that this mediated the placebo effect, consistent with a claimed effect of the drink—helping people feel more alert. Finally, experiment three reduces the viability of an alternative account related to mood states. First, as in the previous two experiments, it is difficult to account for the interactive pattern of results that was obtained in this experiment with the mood explanation. Further, the measures of mood states taken prior to the puzzle solving task revealed that participants' mood was not different across the various conditions.

This study highlights the possibility that placebo effects of marketing actions may bring up interesting ethical dilemmas. For instance, say that a marketer falsely claimed that a product offered a particular benefit (or, similarly, say that a marketer repackaged a product and significantly increased its price, suggesting [explicitly or implicitly] that the higher cost of the cosmetically different product is justified by its greater efficacy). Due to placebo effects of marketing actions, consumers' misplaced belief in such seemingly baseless claims may paradoxically make those claims come true, at least in part (in fact, given that, unlike false statements, puffery is often considered acceptable, even modest placebo effects may make false claims legitimate).

GENERAL DISCUSSION

Marketing actions can have powerful perceptual effects (e.g., Allison and Uhl 1964; McClure *et al.* 2004). For instance, cola can taste very differently when one knows it is 'the real thing' (a Coke) versus when the very same product is mislabeled as a generic brand. More generally, it is widely known that marketers can significantly influence variables such as (perceptions of) consumption experiences and purchase behavior. This paper extends the scope of effects that marketing actions are known to be capable of evoking, showing that they can also influence the actual efficacy of a marketed product. We found, for example, that participants who consumed an energy drink thought to improve mental acuity that they

purchased at a discounted price subsequently performed poorly on a puzzle-solving task compared to equivalent participants who purchased the same drink at its regular price.

We provide evidence that the effect of marketing actions that we document is mediated by expectations. In experiments one, two and three we show, for example, that the strength of expectancies affects the magnitude of the effect. Specifically, in experiment one we show that performance (after consumption of an energy drink that was purchased at a discount) was worse when the expectations related to the drink's efficacy were strengthened versus when they were not. In experiment two, drawing participants' attention to their beliefs about the price-efficacy link in experiment two weakened their beliefs (as respondents presumably realized that the beliefs may not be applicable to that situation) and, consequently, the magnitude of the effect. Experiment three revealed that strengthening response expectancies by presenting strong advertising claims enhanced the magnitude of the basic effect. Across the three experiments, we also rule out several alternative accounts, such as ones relating to cognitive-dissonance, distraction and mood states. Our findings also suggest that the process by which expectations give rise to the observed effects occurs non-consciously.

The effect we document is akin to placebo effects in medicine. We contribute to the placebo literature in that we extend the types of features known to invoke such effects from ones that are inherent to the placebo (*e.g.*, information about the placebo or the substance/treatment it replaces, or how a placebo is administered) to price, a feature that is not inherent to the product/treatment. Finding that the process by which expectations give rise to the placebo effects we document occurs non-consciously is also significant as it informs our understanding of placebo more generally.

Our findings also extend what is known about the association between price and quality in a significant way, showing that price affects not only perceived quality but also actual quality, that is, the actual efficacy of the product. In fact, the effect we found and its dependence on expectancies helps shed light on a puzzling disparity between two conclusions of the large body of research on the relationship between price and quality (cf. Gerstner 1985; Bettman, John, and Scott 1986; John, Scott, and Bettman 1986). On one hand there is vast empirical evidence that consumers often perceive lower-priced products and services to be of lower quality, especially if they have no simple alternative means of assessing quality (Rao and Monroe 1989). On the other hand, investigations of the relationship between price and objective indications of quality, such as *Consumer Reports* ratings, generally arrive at a different conclusion. For example, Riesz (1979) examined the correspondence between prices and indications of objective quality from *Consumer Reports* for 679 brands in 40 packaged food product classes over a 15-year period. He concluded that the correlation was near zero, and in instances such as frozen foods it was even negative. More generally, such investigations conclude that the empirical relationship between those two variables is generally weak at best (Gerstner 1985). Why would consumers perceive the relationship between price and quality to be significant when it is, in fact, generally not so? One possible explanation that is implied by our research for this discrepancy may be a self-fulfilling nature of consumer expectations. Such expectations may lead lower-priced products to perform worse regardless of whether their objective indications of quality (what research of the type that *Consumer Reports* examines) are actually worse. In other words, the well-known cliché that 'one gets what one pays for,' which opens our paper, may have more merit than has been believed. Exploring this is an interesting direction for future research.

A related direction for future research is to delve deeper into why we observed only undesirable placebo effects related to discounted prices in experiments one and two. Our findings in experiment two suggest that one reason that may account for our results is that

individuals normally focus on self-efficacy beliefs in tasks such as solving puzzles, but partly shift their focus away from their own abilities toward beliefs about external stimuli when presented with a performance-enhancer such as SoBe®. An interesting research question is—can being offered a performance enhancer lower expectations about or the salience of one's abilities, and thereby potentially lead to diminished performance (particularly if beliefs about the efficacy of the product are not as strong as the self-efficacy beliefs)?

We believe that showing other instances in which marketing actions can have placebo effects is a promising direction to extend this research. Replicating our results with price promotions on medical products, for example, is another interesting direction for future research, with considerable implications for the marketing of such products and for public policy. As a first step in this direction, we conducted a small preliminary study. Undergraduate marketing students were asked to maintain diaries of situations when they caught a cold over the course of a semester and had to use an over-the-counter (OTC) medication (i.e., a prescription was not needed) to treat the symptoms. At the end of the semester, 29 students who had fallen ill during the semester and who had bought national OTC brands were asked to indicate on a 1 (not at all) to 7 (very) scale how effective the medication they had bought was in treating their symptoms. In a separate question, they were then asked to indicate whether they had bought the medication at its regular price or a discounted price. Consistent with a placebo effect of price discounts, the 16 students who had bought their medication at a discounted price rated the effectiveness of the medication to be lower than the 13 students who had bought their medication at its regular price.

More generally, it seems reasonable to speculate that marketing decisions ranging from product features like color and texture to marketing mix decisions such as advertising messages and distribution-channels may influence the physical effectiveness of the products to which they are applied. If so, the implications could be immense. As an admittedly speculative possibility, if two consumers purchase the same car, but one does so at a substantial discount, the two consumers may drive differently. A possible result is that the one purchasing the car at a discount will be more accident-prone. Alternatively, if two consumers purchase the same car, but only one is exposed to advertising messages that stress the safety benefits of the car, the possible result could be that the one exposed to the advertising drives differently than the other consumer. Further research should carefully examine such possibilities.

Another interesting research direction is to identify additional moderators of the effect. Beyond the obvious theoretical importance, this would also be significant from a practical viewpoint, as it might help reduce or even eliminate undesirable placebo effects (as we did in experiment two), in such cases as selling subsidized medications to consumers. For example, will a delay between consumption of a health-related product and subsequent engagement in a task (cf. Nowlis, Mandel and McCabe 2004) diminish the magnitude of the placebo effect we document? Investigating such questions will help identify boundary conditions, shed more light on the underlying process, and explore the scope of placebo effects of marketing actions.

ENDNOTES

1 Though some researchers (e.g., Hahn 1997) have distinguished between placebo and nocebo effects, we use the term placebo for both, in line with the common view that the desirability of the effect should not influence its labeling (Stewart-Williams and Podd 2004).

2 This assumption was supported in a separate pre-test. Thirty-three participants, drawn from the same population as the main studies, engaged in a task similar to that used in experiment one. Participants were presented with the energy drink SoBe®, and informed that its regular price was $1.89, but that they would buy it from us at a discounted price of $.89. Following a filler task, participants rated the perceived efficacy of the drink (as in the high expectancy-strength conditions of experiment one). But for one group of participants the price-efficacy link was made salient before they rated the drink (they were told, "Given the price of SoBe®, please rate...") Consistent with our assumption, the mean ratings were lower when the price-efficacy link was made salient ($M = 3.8$) versus when it was not ($M = 4.9$; $F(1, 31) = 7.6$, $p < .01$).

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