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The effect of a no-pain, no-gain lay theory on product efficacy perceptions

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Abstract We document the existence of an inference strategy based on a no-pain, no-gain lay theory, showing that consumers infer pharmaceutical products to be more efficacious when they are associated with a detrimental side effect or attribute. Study 1 finds that consumers high in need for cognition infer a bad-tasting cough syrup to be more effective than a good-tasting one. However, taste does not impact efficacy beliefs of consumers low in need for cognition. A second study conceptually replicates these results, showing that consumers who take allergy medications (i.e., those high in issue involvement) infer an allergy medication with common side effects to be more effective than one with rare side effects. Our final study builds on these findings by demonstrating that consumers high in need for cognition believe a pain killer with common side effects to be more effective than one with rare side effects. Demonstrating a boundary condition of this inference strategy, the effect is observed only when the pain killer has been on the market for a relatively long period of time.

Keywords Inferences · Lay theory · No-pain, no-gain · Medicinal efficacy

It tastes awful. And it works.
Advertising tagline for Buckley's cough syrup

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Two years ago, one of the authors of this paper received a phone call from his sister-in-law, who was very worried that her breast cancer treatment might not be working: after several rounds of chemotherapy, her hair had still not begun to fall out, which she inferred to be a sign of the drug's ineffectiveness to fight her cancer. Indeed, there is much support in the marketing literature for the important role played by consumer inferences (see Kardes et al. 2004b for a review). Consumers often seem to use observable product attributes to judge unobservable ones, believing, for example, that higher prices indicate higher product quality (e.g., Huber and McCann 1982) or that unhealthy crackers will taste better than healthy ones (Raghunathan et al. 2006). However, although research inquiries have shown that consumers rely on observable attributes (Chernev and Carpenter 2001; Dick et al. 1990) or the overall product evaluation (e.g., Broniarczyk and Alba 1994) to infer the values of unobservable or missing *attributes*, we currently know very little about the inference strategies used to infer a product's *efficacy*, that is, its capacity to deliver desired benefits.

Building on the burgeoning stream of research demonstrating that consumers often rely on lay theories (e.g., Labroo and Mukhopadhyay 2009; Mukhopadhyay and Yeung 2010), we propose the existence of a "no-pain, no-gain" lay theory, which is an inference strategy employed by consumers to judge the efficacy of products that possess unfavorable or detrimental attributes. No-pain, no-gain became a popular expression in the fitness domain after Jane Fonda started using it as an exercise slogan in 1982, suggesting that muscle pain or physical discomfort was necessary to achieve bodybuilding progress. However, the no-pain, no-gain motto has made its way into everyday parlance to describe that desirable results require undesirable associated by-products, such as in the finance sector (Pain 2009) and education (Rendón et al. 1998). Although this no-pain, no-gain lay theory may hold true across a wide range of product categories, with this paper, we focus exclusively on pharmaceuticals and OTC medicines to examine consumers' inference-making. Specifically, this no-pain, no-gain lay belief holds that products, like the cancer treatment medicine referred to above, are deemed more effective when accompanied by some detrimental or otherwise unpleasant side effect. In other words, this lay theory suggests that suffering from the pain of detrimental attributes, such as a medicine's bad taste, enhances the consumer's ability to achieve the desired gain, such as alleviating cold symptoms. Further, because we expect that consumers must be sufficiently motivated to apply inferences based on the no-pain, no-gain lay theory, these effects should be limited to those consumers likely to engage in effortful cognitive activities, such as those high in need for cognition or those with high issue involvement.

Results from our studies support these predictions. Specifically, the first study finds that consumers high in need for cognition infer a bad-tasting cough syrup to be more effective than a good-tasting one. However, the taste of the cough syrup does not impact efficacy beliefs of consumers low in need for cognition. We then conceptually replicate these results, showing that consumers who take allergy medications (i.e., those high in issue involvement) infer a fictitious allergy medication with common side effects to be more effective, compared to one with rare side effects. Our final study builds on these results and explores the length of time a medicine has been on the market as a moderator of the effect.

Findings of this research have important implications. Theoretically, we demonstrate the existence and boundary conditions of an inference strategy based on a no-pain, no-

gain lay theory used for efficacy judgments. Practically, our findings suggest that, counter to common intuition, there are particular situations in which marketers may benefit from publicizing detrimental or unfavorable attributes of their products.

1 Theory

1.1 No-pain, no-gain inference strategies and efficacy beliefs

The marketing literature is rich with examples of consumers' reliance on both external and internal cues to make inferences about products (e.g., Kardes et al. 2004a, b; Purohit and Srivastava 2001; Simmons and Lynch 1991). For instance, research has shown that consumers may assess the overall quality of a product based on its price (Tellis and Gaeth 1990) or warranty period (Srivastava and Mitra 1998), such that a higher price or a longer warranty period leads to higher inferred quality. More recently, Yorkston et al. (2010) showed that consumers evaluate brand extensions into new product categories more favorably when they infer the brand's personality traits to be malleable. Indeed, the more likely consumers are to make inferences about missing attributes, the more likely they are even to make a choice rather than to defer choice (Gunasti and Ross 2009).

Consumers may also rely on product cues or their overall evaluation of the option to infer the value of a specific unobservable attribute ("evaluative consistency" inferences; Broniarczyk and Alba 1994). For example, consumers infer that a camera with a higher overall evaluation also has relatively higher durability. Next, consumers may infer the value of an unobservable attribute based on its correlation with an observable, related attribute, termed "probabilistic" or "correlational" inferences (Dick et al. 1990; Pechmann 1992). For instance, when consumers have learned that higher shutter speed is positively correlated with camera durability, they may later use this information to make inferences for cameras with missing durability information. Additionally, correlational inferences can also be based on negative inter-attribute correlations (e.g., a healthful food item is inferred to be not tasty; Raghunathan et al. 2006). Finally, consumers may judge an unobservable attribute to be inferior because an observable, *unrelated* attribute is superior ("compensatory inferences"). For example, when two computer brands are equally priced, and the market is believed to be efficient, consumers infer that the brand that is superior on one attribute should be inferior on another, unrelated attribute (Chernev and Carpenter 2001).

However, despite these research inquiries, we still currently know very little about the inference strategies used to infer a product's efficacy. Such an investigation is important because a product's capacity to produce desired benefits is arguably the main driver for most, if not all, purchases, and especially so for products that promote or restore consumer health, which is the focus of our studies. Furthermore, while there has been extensive research on people's lay theories about personal risk in the health domain (e.g., Menon et al. 2002), the literature is largely silent about the factors that influence perceptions of medicinal efficacy. Finally, medicinal products tend to be high in credence qualities (e.g., Ostrom and Iacobucci 1995), that is, their efficacy often cannot be evaluated even during or after their consumption, so that research on strategies used to infer whether these products are successful is needed.

Limited work in the area supports our proposition concerning the role of inferences in efficacy judgments. Specifically, Posavac et al. (2010; study 1) find evidence that consumers infer relatively greater product efficacy when prescription drug manufacturers include profitability information in their advertisements, as compared to when this information is absent. Note that while the study of Posavac et al. (2010) focuses was on firm-specific aspects, we examine a product-specific factor, namely, associated side effects.

Prior research has also shown that consumers' efficacy beliefs may be inferred from the perceptual properties of either the packaging or the medicine itself. For example, products in dark packages (red, blue, or brown) are judged to act more rapidly, to be more expensive, and involve greater side effects than light-hued packages (yellow, green, orange, or gray). Further, brown and red packages corresponded to greater efficacy beliefs than green or yellow ones (Roullet and Droulers 2005). Finally, perceptions of product efficacy are also driven by the physical properties of the product, including its size, color, and form. For instance, capsules are perceived to be more efficacious than pills, and larger pills are perceived as more efficacious than smaller ones (Buckalew and Coffield 1982; Buckalew and Ross 1991).

However, there has been no research on efficacy inferences based on a product's associated detrimental attributes. We propose the existence of an inference strategy based on a no-pain, no-gain lay theory that suggests that effective products require detrimental attributes that in some way impact consumers negatively. For example, medicines that are associated with frequent side effects are likely to be perceived to be more effective than those with rare or no side effects, given consumers' beliefs that more powerful medicines bring on more frequent or severe side effects. Similarly, medicines that taste bad are likely inferred to be relatively more effective, whereas those without associated detriments, such as those that taste good, are likely to be perceived as weak, as implied by the phrase no-pain, no-gain.

Further, consumers may believe that medicines with stronger side effects would not succeed in the marketplace unless they also are highly effective. After all, consumers would not continue to repurchase products that make them suffer unless they also provided benefits commensurate with the side effect. Thus, products high in side effects and inferred efficacy will remain in the marketplace for a relatively long time, given that consumers are more willing to suffer associated detriments in exchange for attaining greater benefits. However, products low in side effects and inferred efficacy will remain in the market only for a relatively short time—until consumers become aware of their inefficacy. This reasoning is in line with consumers' beliefs about efficient markets (e.g., Chernev and Carpenter 2001), such that products with unfavorable attributes would not be on the market for a long time unless their unfavorable attributes (e.g., greater side effects) are compensated for by favorable ones (greater efficacy).

1.2 The moderating role of depth of processing

Although no pain, no gain is a common expression and thus familiar to most consumers, we suggest that not all of them are equally likely to apply inferences based on this lay theory when making judgments. Instead, efficacy inferences based on unfavorable product cues are likely only for consumers who are motivated to

process information relatively systematically. Greater processing motivation, in turn, can be a function of individual differences among consumers, such as their need for cognition (Cacioppo and Petty 1982), or of situational variables, such as their issue involvement (Petty et al. 1983). Our theorizing is based on research that suggests that inference-making strategies may comprise two stages (Chernev and Carpenter 2001), in which consumers first form an overall evaluation of the option based on the observable attributes and then use their intuitive beliefs about the relationship between attributes to update their evaluation. The two-stage nature of such inference strategies has been suggested to make them less likely to be observed when consumers are not motivated to engage in effortful cognitive activities or when consumers' cognitive capacity is curtailed (Chernev and Carpenter 2001).

Correspondingly, we predict that inferences based on the no-pain, no-gain lay theory will influence perceptions of medicinal efficacy only for those consumers who are motivated to exert sufficient cognitive effort to evaluate the medicine. One measure of this type of motivation is need for cognition (hereinafter: NFC), which is described as a stable individual difference in one's tendency to engage in and enjoy effortful cognitive activity (Cacioppo and Petty 1982). In particular, consumers high in NFC are intrinsically motivated to search for, gather, and analyze information to understand their world, and thus devote more cognitive resources to processing messages than consumers low in NFC. On the other hand, low NFC individuals tend to avoid effortful cognitive work, prefer tasks that require fewer cognitive resources, and are more likely to process information heuristically (Haugtvedt et al. 1992). As such, NFC has been shown to have a robust effect on consumer behavior (e.g., Kim and Kramer 2006; Petty et al. 1983; Zhang and Buda 1999). Therefore, we expect that need for cognition will moderate consumers' inference strategies, such that the higher the need for cognition, the greater the association between unfavorable attributes and inferred efficacy of a medicine. Further, given that consumers high in need for cognition are more likely to apply the no-pain, no-gain lay theory, they should also infer greater efficacy of medicines with unfavorable, as compared to favorable, attributes.

2 Study 1

Study 1 sought to investigate if higher levels of NFC lead to greater efficacy inferences in the presence of a negative attribute cue. Specifically, we tested if consumers with a higher (versus lower) NFC inferred that a bad-tasting cough syrup would be more effective in fighting colds. Additionally, we sought to test if consumers high in NFC infer greater efficacy of a bad-tasting, as compared to a good-tasting cough syrup.

2.1 Method

One hundred and fifty undergraduate students from a large East Coast university participated in a study on advertising in exchange for class credit and were randomly assigned to a manipulated valence condition (taste of the cough syrup: good versus bad) and a second factor that was measured (NFC; Cacioppo and Petty 1982).

Participants were presented with a mock advertisement for Buckley's cough syrup, asked to review it, and then asked to answer the questions that followed it. The headline of the good taste (bad taste) condition read, "Everything you want in a cough remedy. And everything (nothing) you want in taste." Next, the main part of the ad stated, "If you're suffering from a nasty cough, try Buckley's. It's an herbal based, sugar free cough remedy that'll get rid of the nastiest coughs due to colds in no time." This was followed by "It also happens to taste great" or "It just happens to taste awful" in the good versus bad taste condition, respectively, and a picture of a bottle of Buckley's cough syrup. Finally, the ad's tagline in the good taste versus bad taste condition was "Buckley's Mixture. It tastes great. And it works," versus "Buckley's Mixture. It tastes awful. And it works."

To assess how effective participants inferred Buckley's Mixture to be, they evaluated the cough syrup as not at all effective (1) versus effective (7); unsuccessful (1) versus successful (7); and not at all forceful (1) versus forceful (7); α=0.87. To measure their depth of processing, the participants completed the need for cognition scale (Cacioppo and Petty 1982), which includes items such as "I would prefer complex to simple problems," and "I don't like to do a lot of thinking" (reverse-scored); α=0.84. As a manipulation check, subjects then indicated on two items how they expected Buckley's to taste, where 1=very good and very pleasant and 7=very bad and very unpleasant; r=0.96, p<0.001.

3 Results and discussion

As a manipulation check, we conducted a multiple regression analysis, predicting the expected taste of the cough syrup from participants' experimental condition (good taste versus bad taste), the centered level of NFC, and the centered level of NFC by experimental condition interaction. Analysis showed that the participants in the good (versus bad) taste condition expected the cough syrup to taste significantly better (β=−2.012, t=−8.29, p<0.001). Greater NFC was also associated with expectations of better taste (β=−0.660, t=2.17, p<0.05). Importantly, the NFC by taste interaction was not significant (β=0.083, t=0.19).

Next, we regressed participants' inferred efficacy of the cough syrup on its taste, the mean-centered level of NFC, and the mean-centered level of NFC by taste interaction. Analysis showed that the taste of the cough syrup had a significant effect on its inferred efficacy (β=−0.901, t=−4.46, p<0.001), indicating that participants judged the bad-tasting cough syrup to be more effective in treating colds than the good-tasting one. Furthermore, greater levels of NFC were positively related to greater efficacy inferences (β=1.124, t=4.44, p<0.001). Finally, and as predicted, the NFC by taste interaction was significant; β=−1.393, t=−3.81, p<0.001. In particular, greater NFC resulted in greater efficacy inferences (β=1.125, t=4.77, p<0.001) for the bad-tasting cough syrup, but not for the good-tasting one (β=−0.269, t=−0.956).

Next, to further explore the nature of the interaction, we compared whether there were significant differences in inferred efficacy across the two taste conditions at both low and high levels of NFC. As NFC is a continuous measure, we followed the procedures recommended by Aiken and West (1991) and Fitzsimons (2008) and

performed a spotlight analysis at ±1 standard deviation from the mean of participants' NFC. The contrast for participants at high levels of NFC showed that inferred efficacy was greater when the cough syrup tasted bad compared to when it tasted good (β=−1.672, t=−6.02, p<0.001). On the other hand, there was no difference in efficacy inferences across the two taste conditions (β=−0.13, t=−0.44) for participants low in NFC.

The results of study 1 have thus supported our hypothesis that a greater need for cognition would result in greater efficacy inferences for a bad-tasting cough syrup, but have no effect on inferred efficacy of a good-tasting cough syrup. Importantly, we also found that participants high in need for cognition inferred that a bad-tasting, as compared to a good-tasting, cough syrup was more effective at fighting colds. To test the robustness of the effect, we next sought to conceptually replicate these results with a different operationalization of consumers' depth of processing (i.e., issue involvement) and a different detrimental cue, namely, frequency of side effects (Campbell and Stanley 1963).

4 Study 2

4.1 Method

One hundred and six undergraduate students from an East Coast university were presented with a mock advertisement for Allerstin, a fictitious brand of allergy medication with either common or rare side effects. To ascertain that common side effects were perceived as more unfavorable or detrimental than rare side effects, we first conducted a pretest with 39 subjects from the same subject pool used in the main study. Specifically, the subjects evaluated the presence of either common or rare side effects associated with medications, where 1=insignificant, not commonplace, and not at all dangerous and 7=significant, commonplace, and extremely dangerous; α= 0.75. Results showed that common side effects (M=4.65) were perceived significantly more unfavorably than rare side effects [M=3.77; F(1, 37)=5.12, p<0.05].

The text of the advertisement that was used in both the common and rare frequency of side effects conditions read, "Significantly reduce your allergy symptoms for up to 24 h. It has been shown that for people with multiple allergies, Allerstin can significantly reduce all allergy symptoms. Why wait any longer? Ask your doctor today how you might reduce your allergies." Next, the taglines of the ad differed between conditions as the manipulation of the frequency of side effects associated with Allerstin. In particular, in the rare (common) frequency condition, the tagline stated "Rare (common) side effects of Allerstin include vomiting and severe stomach cramps. See your doctor immediately if any of these occur." To assess the perceived efficacy of Allerstin in treating allergies, the participants evaluated the allergy medication on the same three 7-point scales as used in the previous study (α= 0.91). They then indicated whether they took allergy medications (31% did) to measure issue involvement (Block and Williams 2002). Finally, as a manipulation check, they marked the likelihood that they would suffer from Allerstin's side effects, where 1=not likely to all and 7=very likely [M=3.96 versus 3.31 in the common versus rare side effects condition; F(1, 102)=5.98, p<0.05].

4.2 Results and discussion

Analysis showed the predicted side effect frequency by issue involvement interaction [$F(1, 102)=3.20$, $p<0.08$]. Specifically, and conceptually replicating the results of the first study, higher issue involvement resulted in greater efficacy inferences for the allergy medication with common side effects [$M=5.23$ versus 4.25 for high versus low issue involvement, respectively; $F(1, 102)=5.18$, $p<0.05$], but not for the allergy medication with rare side effects ($M=4.39$ versus 4.47 for high versus low issue involvement, respectively; $F<1$). Further, the participants who took allergy medications (i.e., high issue involvement) expected Allerstin to be more effective in treating allergies when it had common as compared to rare side effects [$M=5.23$ versus 4.39, respectively; $F(1, 102)=5.88$, $p<0.05$]; however, the frequency of side effects did not impact the perceived effectiveness of Allerstin for participants who did not take allergy medications (i.e., low issue involvement); $M=4.47$ versus 4.25, respectively; $F< 1$.

Although the side effect by issue involvement interaction was only marginally significant, one might argue that this was because issue involvement (investigated in study 2) and NFC (investigated in study 1) are not completely interchangeable as operationalizations of processing depth. That is, participants who were high in NFC but low in issue involvement may still have relied on no-pain, no-gain inferences. Nonetheless, the results of our studies overall have been in line with our main hypothesis. That is, respondents high in NFC or with high issue involvement appear to rely on a medicinal product's detrimental attribute to infer its efficacy, believing that negative personal consequences are required for gaining health benefits. However, there are clear situations in which even consumers with high information processing motivation are unlikely to infer a product's efficacy based on an unfavorable attribute. One such moderator, which is under the control of marketers, is the degree to which the product's advertisement draws attention to the length of time it has been on the market.

Specifically, as we discussed, there are at least two reasons for the market presence of products with unfavorable (as opposed to favorable) attributes: either they are effective at treating the particular illness, so that consumers have been willing to purchase them and suffer the detriments, or the products are actually ineffective at treating the particular illness but consumers are still unaware of their lack of efficacy because they have only recently been introduced into the market. That is, unfavorable product attributes are informative cues for efficacy only for products that have been on the market for relatively long periods of time. In the next study, we seek to find a direct support for this claim. In particular, we manipulate the time since the medicine ostensibly was introduced to the market, such that half of the participants believes that the medicine was just introduced to the market in 2006, while the other half believes that the medicine has been on the market for a long period of time (since 1906). Our inference explanation for the effect would be strengthened if we found differences in efficacy based on the frequency of side effects for consumers high in NFC who evaluate the medication that has been on the market since 1906, but not for those who evaluate the medication that has been on the market since 2006.

5 Study 3

The objective of study 3 was to test if the length of time a medicine has been on the market moderates the interactive effect of participants' NFC and no-pain, no-gain inferences when they make efficacy judgments. Further, we generalize the effect found in the previous studies by using a different combination of detrimental attribute (frequency of side effect) and depth of processing (NFC).

5.1 Method

One hundred and ninety-nine undergraduate students from an East Coast university participated in a study on advertising in exchange for class credit and were randomly assigned to a manipulated frequency of side effect condition (rare versus common), time-on-market condition (since 1906 versus 2006), and a third factor that was measured (NFC; Cacioppo and Petty 1982). As in the previous studies, the participants were presented with a mock advertisement for Aspro Clear pain reliever, asked to review it, and then asked to answer the questions that followed it.

The time-on-market factor was manipulated by the headline of the ad, which stated either "Fast & Effective Pain Relief Since 1906" or "Fast & Effective Pain Relief Since 2006" in the long and short time-on-market conditions, respectively. This was followed in all conditions by a picture of Aspro Clear pain reliever and the text, "Aspro Clear is specially formulated to provide fast effective relief from headache, backache, and dental pain. Aspro Clear dissolves fast to form a totally clear solution and is absorbed into the bloodstream must faster than solid tablets for fast and effective pain relief." The bottom of the advertisement featured a health warning that constituted the unfavorable product attribute cue manipulation. Specifically, the warning in the rare (common) frequency of side effects condition read: "Rare (common) side effects include dry mouth and nausea. See your doctor if any of these occur." Next, we measured inferred efficacy of the pain reliever using the same three items as in the previous studies (α=0.84). As a manipulation check for the frequency of side effect manipulation, the participants indicated the likelihood that they would experience with Aspro Clear's side effects (1=not likely to all, 7=very likely), and as a manipulation check for the time-on-market manipulation, participants recalled how long Aspro Clear had been on the market (1906 versus 2006).

5.2 Results and discussion

As a manipulation check, we conducted a multiple regression analysis, predicting the expected likelihood of experiencing side effects from participants' experimental side effect frequency condition (common versus rare), time-on-market condition (1906 versus 2006), the centered level of NFC, and the three two-way and one three-way interactions. As expected, the analysis showed that participants in the common (versus rare) side effect frequency condition expected a greater likelihood of experiencing side effects (β=0.646, t=1.99, p<0.05). No other main or interaction effects were significant. Furthermore, 94% (187/199) correctly identified the year of Aspro Clear's market introduction.

Next, we regressed participants' inferred efficacy of the pain reliever on the frequency of associated side effects, time-on-market, the centered level of NFC,

and the three two-way and one three-way interactions. Analysis revealed a significant NFC by frequency of side effects interaction (β=1.141, t=2.57, p<0.05), as well as the expected three-way interaction between NFC, time-on-market, and frequency of side effects (β=−1.217, t=−2.03, p<0.05).

We then conducted separate analyses for the 1906 versus 2006 condition and regressed inferred efficacy on the mean-centered NFC, frequency of side effects, and their interaction. Analysis in the 1906 condition yielded only a significant NFC by the frequency of side effect interaction (β=1.141, t=2.55, p<0.05). Specifically, greater NFC resulted in greater efficacy inferences for the pain reliever with common side effects (β=0.785, t=2.31, p<0.05) but not for the pain reliever with rare side effects (β=−0.356, t=−1.23). To explore further the nature of the interaction, we performed a spotlight analysis. The contrast for participants at high levels of NFC showed that inferred efficacy was greater when the pain reliever had common, as compared to rare, side effects (β=0.769, t=2.30, p<0.05). On the other hand, there was no difference in efficacy inferences between the two side effect conditions for participants low in NFC (β=−0.508, t=−1.43). Conversely, neither frequency of side effects (β=−0.141, t=−0.606), NFC (β=0.301, t=1.12), nor their interaction (β=−0.076, t=−0.19) had significant effects on the inferred efficacy of the pain reliever in the 2006 condition.

In summary, the current study used frequency of associated side effects as an unfavorable product cue and replicated the effect found in the previous studies. However, we extended our previous results by identifying an important boundary condition. In particular, greater NFC was shown to result in greater inferred efficacy of a pain reliever with common side effects only when it had been on the market for a relatively long period of time. For a more recently introduced pain reliever, there was no relationship between the depth of processing and frequency of side effects on one hand and inferred efficacy. As we expand on in the general discussion, this finding is of particular relevance to marketing managers interested in communicating unfavorable product attribute cues in an effort to improve consumer responses. That is, such a strategy is likely to be effective only when consumers are not aware that the product was introduced into the market only recently.

6 General discussion

Successful marketing is often assumed to be the result of convincing consumers of the benefits of a product through the communication of favorable product cues. For example, taglines such as General Electric's "We bring good things to life" and Maxwell House coffee's "Good to the last drop" provide favorable cues about the product or company that are likely to contribute to favorable consumer responses, such as positive brand attitudes or increased purchase likelihood. So why does Buckley's cough syrup tout unfavorable, negatively valenced product cues, such as its bad taste, in the previously cited advertisement? Similarly, why did Listerine mouthwash want to attract customers with its slogan, "It's got the taste people hate, twice a day"? The current research sought to address these questions.

In particular, we have proposed the existence of an inference strategy, which, based on a no-pain, no-gain lay theory, suggests that consumers infer that effective

products will have to affect them negatively in some way to realize desired results. Given that the inference strategy proposed here is cognitive resource-intensive, we expected that its impact on efficacy beliefs should be limited to those consumers likely to engage in effortful cognitive activities. The results from our studies support these predictions. Specifically, study 1 found that consumers high in NFC inferred a bad-tasting cough syrup to be more effective than a good-tasting one. Furthermore, consumers who use allergy medications were shown to infer a fictitious allergy medication with common side effects to be more effective than one with rare side effects. Our final study built on these results and found that consumers high in NFC inferred a pain killer with common side effects to be more effective than the one with rare side effects, but only when it had been on the market for a relatively long period of time.

Theoretically, our results demonstrate the existence and boundary conditions of an inference strategy based on a no-pain, no-gain lay theory used to evaluate the efficacy of medicinal products. We thereby advance our understanding of inference-making by shedding light on the previously unexamined strategy employed by consumers for efficacy inferences. These findings extend those put forth by Posavac et al. (2010), which find evidence for efficacy inferences based on advertised firm profitability. Additionally, we provided the first empirical demonstration of a higher likelihood of inference-making for consumers who were more (rather than less) likely to engage in effortful cognitive activities. That is, although inferences have in the past often been assumed as cognitive shortcuts, such as consumer reliance on price to judge quality (e.g., Baumgartner 1995; Nowlis 1995; Rao and Monroe 1989), we demonstrate that inference strategies differ in the amount of cognitive resources required, resulting in an asymmetric impact of processing motivation on inferences. As such, our results are consistent with Chernev and Carpenter's (2001) suggestion that compensatory inferences are less likely to occur when consumers are distracted or under time pressure. Given that the impact of no-pain, no-gain inferences are limited to consumers who are likely to engage in effortful cognitive activities, marketers who want to use negative cues to enhance efficacy beliefs may first temporarily induce greater processing motivation by, for example, using novel or unexpected advertisements. Indeed, research has shown that novel stimuli increase the likelihood that consumers will engage in deeper, more elaborative processing (e.g., Aaker and Williams 1998).

Future research should determine if consumers also use no-pain, no-gain inference strategies in product categories other than the pharmaceutical one. For example, it is likely that brands that are positioned as powerful are expected to be associated with detrimental attributes, such that powerful detergents need to be harsh on the clothes being washed, good massages need to hurt, or low-calorie meal plans need to leave dieters hungry. Similarly, consumers may believe that in order to be powerful, products from industries as diverse as energy production (e.g., coal) or transportation (e.g., cars) also have to be bad for the environment. However, despite the success of Listerine's touting its harsh taste of mouthwash, this strategy actually hurt its planned extension to Cool Mint Listerine Toothpaste. Consumers theorized that if Listerine did not taste bad, it would not be effective, but toothpaste did not have to taste bad to be effective (Clancy et al. 2006).

Further, we operationalized depth of processing as NFC and as issue involvement, given that marketers can segment their markets based on these individual

characteristics. For example, experts tend to be higher in issue involvement, so a marketer may feature detrimental attributes in advertisements placed in magazines read by experts (e.g., a computer ad in PC Magazine), but not to one read by consumers overall lower in expertise (e.g., a computer ad in Newsweek). However, future research would also benefit from a manipulation of information processing depth, by, for example, manipulating participants' cognitive load.

Although we found the effect of no-pain, no-gain inferences on efficacy beliefs for motivated consumers to be robust across our studies, future research should investigate other types of unfavorable product cues. For example, Gaspari Nutrition's Mitotropin "30-day pre-contest physique repartitioning compound" (a sports supplement) informs consumers on the front of its label, "WARNING: Do not exceed recommended dosage under any circumstances." In this case, detrimental effects are communicated in a way to suggest that exceeding the recommended dosage would result in harm to the consumer, although the type of harm is left unspecified. Similarly, in other cases, the unfavorable attribute itself has to be inferred. For example, a cold medication may advise users not to drive or operate heavy machinery when first taking the medication, not to combine it with other medications, or to keep it out of reach of children. Consumers may infer from these warnings that there are side effects associated with the product, which in turn may determine efficacy beliefs (e.g., "if it can hurt children it must be strong medicine").

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