TURN ON VERSUS TUNE OUT:

CONSUMER REACTION TO SUPPLEMENT VERSUS DRUG MARKETING

Lisa E. Bolton, Americus Reed, II, Kevin G. Volpp and Katrina Armstrong *

* Lisa Bolton and Americus Reed II, Marketing Department, The Wharton School, University of Pennsylvania; Kevin G. Volpp, Philadelphia Veterans Affairs Medical Center; University of Pennsylvania School of Medicine, Department of Health Care Systems, the Wharton School; Katrina Armstrong, Leonard Davis Institute and Abramson Cancer Center, University of Pennsylvania. We thank Professor Paul N. Bloom for his feedback on an earlier version of this manuscript and Jane Jaskowiak for her assistance with data collection for experiments 2 and 3. Partial support for this research comes from the Collaboration to Reduce Disparities in Hypertension (CHORD) project. Correspondence concerning this article should be addressed to Lisa E. Bolton, The Wharton School, University of Pennsylvania, 3730 Walnut Street, 700 Jon M. Huntsman Hall, Philadelphia, Pennsylvania 19104-6371. E-mail: boltonl@wharton.upenn.edu

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This research investigates consumer reactions to the marketing of drugs versus supplements. A series of experiments provides evidence for a mere labeling effect: remedies labeled as drugs (versus supplements) undermine risk perceptions and increase risky behavior intentions as problem status rises. Supplements "turn on" whereas drugs "tune out" complementary health-protective behaviors—because consumers perceive drugs as get-out-of-jail-free-cards that take the risk out of risky behavior.

The purpose of this research is to investigate the effects of drug and supplement remedy messages on risk perceptions and intentions to engage in risky health behavior. Although the *intended* objective of remedies is to reduce health risks, recent research suggests that remedy marketing may have *unintended* consequences that undermine risk-avoidance by consumers (Bolton, Cohen, and Bloom 2005). In the health domain, one important distinction between remedies is that of drugs versus supplements. Over-the-counter drugs are a common route for self-care by consumers (Wellner 1998), and consumers have also embraced the $13 billion supplement industry (Nutrition Business International 1998). Moreover, prescription drug advertising has grown rapidly from $40 million in 1989 to approximately $2.5 billion in 2002 (Main, Argo, and Huhmann 2004), and supplement advertising is also on the rise (Wilke 1997). Our research investigates consumer reactions to drug versus supplement marketing. To our knowledge, there has been no systematic effort in consumer behavior to investigate drugs and supplements as remedies with consequences for risk perceptions and, in turn, intentions to engage in risky behavior. Such research should be valuable to a number of parties including the public, regulatory agencies, the courts, Congress, the media, the business community, the medical and scientific communities as well as consumer advocacy and special interest groups (Kreth 2000).

REMEDY MESSAGES IN THE HEALTH DOMAIN

Research on persuasive messages to curb risky behavior has been premised on various theoretical frameworks, including protection motivation theory, the health belief model, and the theory of reasoned action. For example, recent meta-analyses of research on protection motivation theory found that increases in threat appraisal (probability and severity) and coping appraisal (response efficacy and self-efficacy) were associated with adaptive coping (i.e.,

stopping a risky behavior, or maintaining or starting a protective behavior) (Floyd, Prentice-Dunn and Rogers 2000; Milne, Sheeran and Orbell 2000). All of these models propose that health-protective behavior is a function of the probability and severity of health outcomes, the perceived effectiveness of the protective behavior, and the perceived costs and barriers to action (for a review, see Weinstein 1993). Thus, remedies should facilitate protective behaviors and, as a result, reduce consumer risk. For example, cholesterol remedies claim to promote low-cholesterol or reduce high-cholesterol and thereby improve cholesterol health and lower cardiac risk. Based on traditional models of health behavior, cholesterol remedy messages should increase perceived risk perceptions of cholesterol consumption and/or improve perceived efficacy of remedy products, thereby helping consumers achieve greater cholesterol health and reduced cardiac risk and, as a result, improving consumer welfare.

In contrast to traditional models, however, research on risk compensation suggests that remedies may have unintended outcomes that harm consumer welfare—akin to the moral hazard problem of health insurance (cf. Pauly 1968). According to risk compensation, a remedy reduces the costs or risks of a target behavior—and people may trade away some of this gain in safety and engage in riskier behavior. Aggregate evidence for risk compensation has been found in various domains, including drinking alcohol (Rogers and Greenfield 1999) and HIV/AIDS (Richens, Imrie, and Copas 2000). However, research in this tradition has been criticized for its use of aggregate methods (Dulisse 1997), lack of evidence for the role of subjective risk perceptions or other psychological processes, and mixed evidence of compensating behaviors (Stetzer and Hofmann 1996).

Recent research by Bolton et al. (2005) suggests that problem status (consumer's relationship to the problem domain, or its relative attractiveness) moderates the effects of remedy

messages. Specifically, remedy messages undermine risk avoidance and increase risky behavior, especially among those most at risk. For example, as smoking increased, risk perceptions declined and smoking intentions increased after exposure to a remedy message (for a nicotine replacement product). Similar results in other health and non-health domains were also found. The authors attribute their findings to motivated reasoning about the remedy—either as a signal of risk, or as a signal that the risk can be managed. Consumers outside the problem domain (i.e., relatively unattracted to the risky behavior) perceive the remedy as a signal of risk (else why would the remedy exist?) that reinforces risk-avoidance. Consumers within the problem domain (i.e., relatively attracted to the risky behavior) perceive the remedy as a "get out of jail free card" that takes the risk out of risky behavior, thereby encouraging it (i.e., a boomerang effect).

Within the health domain, there are many risky behaviors (e.g., high-fat eating, a sedentary lifestyle, smoking, excessive drinking) that are attractive to consumers and yet increase disease risk (e.g., heart disease, stroke, cancer, liver disease).[1] The present research investigates whether boomerang effects on risk perceptions and risky behavior extend to both drugs and supplements as remedies. On the surface, there may seem little reason to expect differences. For consumers within the problem domain, both drugs and supplements may be perceived as remedies that reduce risk and thereby undermine risk avoidance. In contrast, however, we investigate whether the "mere labeling" effect of a product as a drug versus a supplement will have differential effects on consumer reactions to such remedy marketing.

DRUGS VERSUS SUPPLEMENTS

Drugs and supplements are defined by federal regulation. The Federal Food, Drug, and Cosmetic Act defines a drug as "any article (excluding a device) intended for use in the

[1] Of course, individual behavior and lifestyle contribute far more to certain disease states than others. In the latter case (e.g., depression), remedies may undermine risk perceptions but not boomerang on risk-avoidance—since there may be no individual risky behaviors that contribute to the disease state and that some consumers find attractive.

diagnosis, cure, mitigation, treatment, or prevention of disease and articles (other than food) intended to affect the structure or function of the body". The Dietary Supplement and Health Education Act defines a dietary supplement as "any product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a vitamin, mineral, amino acid, herb or other botanical; or a dietary substance for use to supplement the diet by increasing the total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any ingredient described above; and intended for ingestion in the form of a capsule, powder, softgel, or gelcap, and not represented as a conventional food or as a sole item of a meal or the diet" (cf. Mason 1998; Mason and Scammon 2000).

These are the *regulatory definitions* of drugs and supplements. There are also differences in regulation for drugs and supplements. For example, drugs are subject to Food and Drug Administration (FDA) approval prior to going on the market whereas supplements are not. Both are subject to regulation once on the market by various agencies such as the FDA (e.g., safety) and the Federal Trade Commission (e.g., advertising). Whether or not more or less enforcement action is necessary, and what kinds of intervention are required, is a hotly contested debate (e.g., Galloway 2003; Vladeck 2000; Milner and Van Doren 2000).

Part of what underlies the debate over regulation is whether consumers fully understand the differences between drugs and supplements. Both drug and supplement marketing may rely on scientific jargon to persuade consumers (Haard, Slater and Long 2004) and may claim to promote health or prevent disease in ways that may confuse the consumer or lead the consumer to infer similar benefits (Vladeck 2000). For example, a supplement can claim to help maintain a healthy cholesterol level (i.e., via a structure-function claim) but cannot claim to prevent an unhealthy level by reducing it (i.e., a disease-prevention claim) (Mason 1998; Vladeck 2000)—a

fine distinction that consumers may not grasp. Compounding the problem, some products have "dual status"; that is, low doses may be treated as a supplement whereas high doses must be treated as a drug. Moreover, recent research suggests that consumers process dietary supplement claims through biased filters linked to prior attitudes, certainty of beliefs and even demographic factors (France and Bone 2005). Indeed, the call for empirical research on the effects of labeling and warning messages (Stewart and Martin 1994) strongly suggests the need to address how the labeling of a product as a drug versus a supplement alters consumer reactions to it (see Eggers and Fischoff 2004).

THE "MERE LABELING EFFECT" OF DRUG VERSUS SUPPLEMENT

Past research suggests that merely labeling a product (in this case, as a drug versus a supplement) may have powerful effects on consumer attitudes, intentions and behavior. First, such labels may serve to aid consumer categorization of the product and thereby bring to mind a schema that guides subsequent processing of product information and inference-making from product claims (Alba and Hutchinson 1987). Second, such labels may influence learning about the product by providing a consumption vocabulary that guides subsequent consideration of product features and claims (West, Brown and Hoch 1996). Third, such labels may lead to transfer of category affect (Boush and Loken, 1991; Broniarczyk and Alba 1994) about drugs and supplements that affects judgment even in the absence of deeper processing. Fourth, such labels may create a mental set that frames the health problem and restricts the solution space—for example, influencing expectations and preferences (Moreau, Markman, and Lehmann 2001) and even inhibiting learning about the remedy and alternatives or complementary behaviors (Wood and Lynch 2002). Together, these effects suggest that labeling a product as a drug versus

a supplement has the capacity to alter consumer attitudes, usage intentions and actual behaviors toward such remedies.

In the case of drug versus supplement labels, we have previously suggested that consumers likely do not understand the regulatory definitions or distinctions. Indeed, consumer mis-calibration is common in a variety of knowledge domains (cf. Alba and Hutchinson 2000). However, the mere label itself conveys meaning that may affect consumer response. First, the label "drug" may carry with it an association to poor health inasmuch as prescription and over-the-counter drugs are commonly used when consumers are sick or treating a disease. Indeed, the ordinary dictionary definition of a drug is that of "a substance intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease" (Merriam-Webster 2005), and we suggest that consumers will mostly share this common meaning. Second, the label "supplement" in itself suggests "something that completes or makes an addition" (Merriam-Webster 2005). If so, then supplements may be seen as part of a broader array of complementary behaviors that must be engaged in to protect one's health. Accordingly, we hypothesize that:

> **H1**: Compared to supplements, drugs will a) increase the salience of thoughts about poor health; b) reduce the salience and importance of thoughts about complementary health-protective behaviors.

As a result, we argue that supplement marketing may be *less* likely to lead to boomerang effects than marketing of a similar product labeled as a drug for two reasons. First, by increasing the salience of thoughts about poor health, a drug may lead consumers to classify their problem as one of poor health. This low self-image may reduce self-efficacy about enacting complementary health-protective behaviors (Bandura 1986) inasmuch as a sick person feels less empowered to take responsibility for their own health outcomes and instead may look to external aid and treatment. Second and more straightforwardly, drugs—by reducing the salience and

perceived importance of other complementary health-protective behaviors—may persuade consumers that drugs alone are sufficient to reduce risk. With supplements, additional protective behaviors will still be seen as important to protect one's health—indeed, the label itself serves as a reminder. Put simply, the drug itself takes the risk out of risky behavior (i.e., reducing risk perceptions)—a true "get out of jail free card"—whereas the supplement does so only in conjunction with additional health-protective actions. These differences in causal attribution (cf. Kelley 1967) have important consumer welfare implications. Consistent with Bolton et al. (2005), we expect boomerang effects to be driven by problem status, such that consumers within the problem domain will be particularly motivated to reason that the drug alone is sufficient to manage the risk. As other health-protective behaviors decline for drugs versus supplements, risky behavior increases. Accordingly, we hypothesize that:

> **H2**: Compared to supplement messages, drug messages undermine risk perceptions and increase intentions to engage in risky behavior as problem status rises.

If supported, this finding would be significant for four reasons: 1) our research proposes a boundary condition for the boomerang effects of remedies demonstrated in previous research, namely the type of health remedy (supplement versus drug); 2) "mere labeling" of remedies as supplements (or using related language) could serve as a corrective technique by reminding consumers that the remedy is supplemental to other protective behaviors; 3) from a consumer welfare perspective, the proliferation of supplement marketing may in fact be more beneficial at promoting health than similar drug marketing that undermines other health-protective behaviors; and 4) from a public policy perspective, the marketing activities of companies promoting drugs and supplements may merit attention to ensure that the supplement label is prominently displayed to reinforce other protective behaviors that also improve health.

Insert figure 1 about here

In the set of experiments that follow, we investigate consumer reactions to drug versus supplement messages. Figure 1 provides an organizing framework for the empirical research. In a pilot study, we first investigate the meanings and associations of these remedy labels for consumers (testing H1). In experiment 1, we examine the effects of drug versus supplement messages as a function of problem status on risk perceptions and risky behavioral intentions (testing H2). Experiment 2 replicates and extends experiment 1 by examining the role of remedy effectiveness in a field study of consumers with high problem status (testing a corollary to H2). And, finally, experiment 3 explores additional consequences (hypothesis H3 to be discussed later) of remedy labeling on consumer perceptions.

PILOT

The purpose of the initial experiment is to investigate consumer perceptions of drugs versus supplements, providing an empirical test of hypothesis H1. We investigate consumers' own understanding of the definition of a drug and a supplement and also examine the health associations, salience and importance of other complementary health-protective behaviors that accompany such remedies. If so, then the stage would be set for drug (versus supplement) messages to undermine consumer risk perceptions and risky behavior.

Method

Subjects and Design. The experiment was a 4-group between-subjects design. Participants were staff and students (recruited from two local universities and a hospital) who received financial payment for participating in the study. A total of 81 subjects participated.

Materials and Procedure. Participants completed the experiment in two phases. In the first phase, participants completed an open-ended question:

> "As you know, there are many different drugs and supplements sold over the counter in your local store. In your own words, explain what is meant by a drug versus a supplement. (What is a drug? What is a supplement? How are they similar and/or different?)"

The purpose of this question was to elicit a consumer definition of drug and supplement and to investigate the salience of poor health and other health-protective behaviors via open-ended cognitive responses.

In the second phase, participants responded to a short scenario describing a drug and a supplement for weight management. The purpose of the scenario was to assess health perceptions and importance ratings for complementary protective behaviors as a function of drug versus supplement labeling. For exploratory purposes, information about the relative effectiveness of the drug and supplement was manipulated as shown in square brackets:

> "Assume that there are 2 brands of weight management products in the marketplace. One is a drug available over-the-counter at your local drug store; one is a supplement available in the vitamin and supplement section of your local GNC (or similar) store. Both products are taken when eating to reduce fat absorption from foods. [In independent testing, both were equally safe, and the supplement was somewhat more effective. / In independent testing, both were equally safe, and the drug was somewhat more effective. / In independent testing, both were equally safe and effective. / omitted]"

Participants were then asked "With which product will it be more important that you also follow a low-fat eating plan?" and "With which product will it be more important that you also exercise regularly?" Responses were collected on two seven point scales, with endpoints "the drug" and "the supplement". The scenario then continued as follows:

> "Continue to assume that these two weight management products are available in the marketplace. Now imagine two men: each man is 40 years old and six feet tall and weighs 185 pounds (about ideal for a man of this age and height). To help manage his weight, Bob takes the drug and Bill takes the supplement."

Participants were then asked the following: “Overall, who is healthier?”, “Who follows a low-fat diet?”, and “Who exercises regularly?” Responses were collected on three seven point scales, with endpoints “Bob” and “Bill” and mid-point “No difference”.

Results

Open-ended responses to the definitional question were coded by two judges who were blind to experimental hypotheses. Inter-coder reliability was 89%; disagreements were resolved through discussion by the judges. The descriptive results are shown in Table 1.

Insert table 1 about here

These results provide qualitative support for our hypotheses. Consistent with H1a, 55.1% of respondents associated drugs with poor health, specifically treating illness or disease (compared to 1.3% for supplements). Consistent with H1b, 68.0% of respondents reported that supplements work with or enhance other body functions (vs. 9.0% for drugs). In contrast, drugs were perceived by 21.8% of respondents (vs. 5.1% for supplements) to exert their effects by altering body functions. Of course, the descriptive results also support the general notion that consumer understanding of drug and supplement differences is poor. Only 18.0% of participants noted regulatory differences (and some did so incorrectly, mistakenly believing that supplements also undergo FDA approval). Many respondents (35.9%) also associated supplements with “natural” substances like vitamins and nutrients (i.e., already found in the body or in foods) and drugs with non-natural chemicals (15.4%)—not only does this distinction lack validity, but it can also be interpreted as evidence consistent with H1a and H1b. That is, drugs are a chemical intervention to fix a health problem; supplements enhance what the body already does naturally. Finally, we also note that more respondents associated drugs than supplements with effectiveness (11.5% vs. 0%)—an issue that we address in the scenario-based results that follow.

Turning to the scenario-based responses, recall that participants rated the importance of complementary health-protective behaviors (low-fat eating and exercise) at two points in the scenario (initial direct importance ratings, and indirect ratings via the Bob/Bill items). An index reflecting health-protective behavior was created by averaging these four items (coefficient α = 0.73) and is reported in Table 2. ANOVA of this index reveals no difference among ratings when safety is equal and effectiveness is described as equal, less or more for the drug than the supplement ($F < 1$); importantly, ratings favor the supplement over the drug (all p's < .05). When no information is given about safety or effectiveness, the index favors supplements even more so ($F(1, 73) = 6.69$, $p < .05$). This evidence suggests that, independent of remedy effectiveness, consumers perceive other health-protective behaviors as more important for the supplement than the drug—thereby supporting H1b. In the absence of comparative information about safety and effectiveness, this difference is exacerbated.

Participants also provided health perceptions for a consumer taking the remedy (see Table 2). Health ratings did not differ as a function of effectiveness ($F < 1$) and, more importantly, favored the supplement over the drug (all p's < .05). When no information was given, health ratings favored the supplement even more so ($F(1, 74) = 4.65$, $p < .05$). This evidence suggests that, independent of remedy effectiveness, it is perceived healthier to take a supplement than a drug—thereby supporting H1a.

Insert table 2 about here

Overall, these results support hypothesis H1. Compared to supplements, drugs increased the salience of thoughts about poor health and reduced the salience and importance of thoughts about other health-protective behaviors. Although these results are encouraging and support the

rationale for the predictions to be tested in hypothesis H2, we note several limitations as follows. 1) The observed effects occurred when both drug and supplement category labels were salient. This design could (arguably) enhance perceived differences among drugs versus supplements. Our follow-up experiments utilize between-subjects designs and the findings are consistent. 2) The present study deliberately used an impoverished set of stimuli that provided only minimal information about the drug and supplement in order to examine consumers' spontaneous reactions, relatively uncontaminated by specific aspects of the stimuli. In subsequent experiments, we provide a specific instantiation for the drug versus supplement. Greater experimental control of other information about the remedy should provide a stronger test inasmuch as the "mere labeling effect" of supplement versus drug must be sufficiently powerful to overcome an equivalent but detailed product description. 3) We make no claims for representativeness to the general population in this pilot study. We utilized a convenience sample—one that is more educated and (arguably) knowledgeable about drugs and supplements than the average consumer (and it is an open question whether knowledge would exacerbate or minimize drug vs. supplement differences). Our follow-up experiments provide some variation in population sample and produce findings that are consistent with these preliminary results.

EXPERIMENT 1

The purpose of the present study is to investigate differences in consumer reaction to drug versus supplement messages, providing an empirical test of hypothesis H2. We examine a problem domain—high-fat eating—attractive to most Americans, for which food marketing has been implicated in epidemic rates of obesity (Seiders and Petty 2004). Meanwhile, various remedies (both fat-fighting drugs and supplements) continue to proliferate. Do they both do so at

the expense of risk-avoidance, that is, low-fat eating? Or are products labeled as supplements less susceptible to boomerang effects than products labeled as drugs?

Method

Subjects and Design. The experiment was a 2-group (Label: Drug, Supplement) between-subjects design. Participants were staff and students (recruited from two local universities and a hospital) who received financial payment for participating in the study. A total of 66 subjects participated.

Materials and Procedure. Participants completed the experiment in three phases. In the first phase, participants completed a "self-perception questionnaire". Embedded in this longer questionnaire was a 10-item six-point self-image scale (Cooper et al. 1986; Evans and Dolan 1993). This scale included items reflecting participants' self-perceptions about their body (e.g., "Have you avoided wearing clothes which make you particularly aware of the shape of your body?", "Have you felt that it is not fair that other people are thinner than you?") and was intended as a subjective measure of problem status related to the risky behavior (eating fatty foods). Participants also provided height and weight information.

In the second phase, participants completed a "consumer promotion study" and were exposed to one of two advertisements. Each message began by warning about the risks of high-fat eating and recommended that participants "Avoid fatty foods and follow a sensible eating plan. This is the only way to achieve an overall healthy lifestyle.". The message continued with the exclaimer "…Until Now! Introducing Chitosan RX Ultra" and then provided additional information about the remedy (a fat-fighting product that "When taken with fatty foods, [it] absorbs up to 60% of the fat in your food so that it doesn't end up in your digestive system or on your body"). In the drug label condition, the remedy was described as an FDA-approved drug

and a label on the bottle indicated FDA Drug. In the supplement label condition, the remedy was described as a natural herbal supplement and a label on the bottle indicated Supplement. After an open-ended thought-listing task, participants provided several ratings about the ad ("very unfavorable/very favorable", "bad/good", "really dislike/really like", "negative/positive") and rated the remedy's perceived performance on five-point scales ("low quality/high quality", "ineffective/effective", "harmful/harmless", "useless/useful", "a bad means of protection/a good means of protection", "risky/safe", "addictive/non-habit forming", and "unreliable/reliable"). As a manipulation check, participants also rated their perception of the remedy as a supplement or medicine on seven-point scales ("a medicine/a supplement", "a drug/a vitamin").

In the third booklet, participants completed a "restaurant dining study". In the cover story, participants were instructed to imagine themselves dining out with family and friends, looking forward to a meal since moderately hungry, and taking the remedy. Participants were then shown four menus, each with multiple items for 3 meals (lunch, dinner and dessert). The menu items within each meal varied in terms of fat content and always included at least one low-fat item. Participants then chose a menu item from each meal on each menu (i.e., 4 menus X 3 meals = 12 choices). Participants were also asked to provide behavioral intention ratings ("please indicate the likelihood that you would order each item on the menu") on 0-100% scales (with endpoints "definitely would not order" and "definitely would order") for a subset of each menu's items, some high-fat. Finally, subjects provided overall ratings of each menu on various dimensions as part of the cover story. As part of this task, participants were asked to rate their personal perceptions of the fat content ("how fatty do you personally find each menu item") on eleven-point scales (with end-points "low fat" and "high fat") for a subset of each menu's items, some high-fat.

Results

Manipulation Checks. Average perceptions (coefficient $\alpha = 0.77$) of the remedy as a supplement were marginally higher in the supplement versus drug conditions ($M_{supplement} = 4.62$ (1.88) vs. $M_{drug} = 3.58$ (1.98); $F(1, 62) = 3.72$, $p = .06$). This result suggests that we were successful in labeling the product as a drug versus supplement. In addition, average performance perceptions (coefficient alpha 0.87) did not differ for the medicine or supplement ($M_{drug} = 1.81$ (0.68) vs. $M_{supplement} = 2.04$ (0.67); $F(1, 62) = 1.37$, $p = .25$)—indicating that the labeling manipulation did not influence perceived performance (quality, safety, effectiveness, etc.). Note, however, that average attitude (coefficient $\alpha = 0.96$) was directionally higher for the drug than the supplement ($M_{drug} = 2.10$ (1.01) vs. $M_{supplement} = 1.74$ (0.82); $F(1, 62) = 2.00$, $p = .16$), possibly indicating that participants prefer a drug to a supplement of equivalent performance.

The body image scale (coefficient $\alpha = 0.91$) was averaged and then standardized ($M = 0$, s.d. = 1) for use as a covariate reflecting problem status in subsequent analyses. (Recall that hypothesis H2 predicts a boomerang effect for drugs versus supplements as problem status rises.) Note that body image correlated positively ($r = 0.27$, $p < .01$) with body mass index (calculated using height and weight information), indicating that self-image does reflect a more objective measure of problem status (i.e., bmi).

Risk Perceptions. An index reflecting average fattiness perceptions for high-fat menu items was calculated. ANOVA of this index indicates a significant effect of ad message ($F(1, 62) = 6.12$, $p = .02$), such that fattiness perceptions were lower in the drug condition than in the supplement condition. This result is suggestive of a boomerang effect, regardless of problem status, on risk perceptions for the drug versus the supplement. That is, the drug alone is sufficient

to neutralize the fat in food; the supplement is not (because other accompanying activities are needed to neutralize it in the consumer).

Behavioral Intentions. Two behavioral intention measures were constructed: 1) the number of high-fat items chosen across menus; and 2) average intention scores for high-fat menu items. As expected, MANOVA revealed a significant interaction of problem status and remedy label ($F(1, 62) = 4.88$, $p = .03$). As expected, choice of high-fat items increased with problem status in the drug versus supplement condition ($b_{drug} = 0.87$ (0.54) vs. $b_{supplement} = -0.36$ (0.44). Similarly, the intentions index increased with problem status in the drug versus supplement condition ($b_{drug} = 2.72$ (1.34) vs. $b_{supplement} = -2.24$ (1.09). This pattern of coefficients reflects a boomerang effect of the drug (versus supplement) on risky behavior intentions as problem status rises.

Taken together, these results support hypothesis H2. Risk perceptions declined for a drug versus supplement message, and risky behavioral intentions increased with problem status following a drug versus supplement message. We attribute this boomerang to the "mere labeling" effect of the remedy as a drug versus a supplement. A supplement, by its very label, reminds consumers that the remedy is to be used in conjunction with other complementary protective behaviors (such as low-fat eating). A drug, in contrast, acts as a get-out-jail-free card, taking the risk out of risky behavior and thereby encouraging it. The boomerang effect on behavioral intentions emerges as problem status rises due to motivated reasoning that the drug *alone*, in contrast to the supplement, is sufficient to take the risk out of risky behavior.

One alternative explanation for this study is that the supplement was perceived as less effective and therefore led to less of a boomerang effect than the drug. We refute this explanation by noting that the performance ratings of the drug and supplement did not differ (although

directionally greater liking for the drug could reflect greater confidence in its effectiveness that might lead to a boomerang). In addition, we note that effectiveness had no effect on importance ratings for other health-protective behaviors in the pilot study. Thus, we attribute the observed differences thus far to drug versus supplement labeling rather than perceived effectiveness. Of course, we acknowledge that effectiveness also has a role to play—inasmuch as remedies are unlikely to boomerang if perceived as ineffective. In the next experiment, we provide another (arguably) stronger manipulation of effectiveness to test its moderating role. We also use a different, albeit related, product category and remedy, and employ a field setting with a different sample population.

EXPERIMENT 2

The purpose of the present study is to investigate consumer reaction to drug versus supplement messages that vary in effectiveness. We examine a problem domain—high-cholesterol—that is increasingly common in America and an important risk factor for heart disease (American Heart Association 2005). Various drugs exist to treat high-cholesterol, and various supplements purport to promote good cholesterol levels; however, the FDA clearly recommends that: “Even with drug treatment, a cholesterol-lowering diet and exercise are still recommended” (FDA Consumer 2005).

In the present experiment, we investigate a sample of older men with multiple cardiac risk factors. These individuals are at substantially elevated risk for coronary heart disease, the primary adverse effect of high cholesterol levels. Therefore, they can be characterized as high problem status for messages about cholesterol remedies. As a result, this study provides a partial test of hypothesis H2—focusing on consumers within the problem domain who are most susceptible to boomerang effects. (As evidenced by experiment 1, a drug message undermines

health-protective behaviors as problem status rises—ironically, harming those most in need of help. With consumer welfare in mind, we choose to focus on these critical consumers.) In addition, we investigate effectiveness as a moderator of boomerang effects. We have previously argued that consumers within the problem domain engage in motivated reasoning that the remedy takes care of the risk. That is, the drug (versus supplement) signals that the risk can be managed with the remedy alone (versus in conjunction with other health-protective behaviors), thereby undermining risk-avoidance and increasing risky behavior. Obviously, such reasoning is less likely when a remedy is relatively ineffective. Accordingly, we hypothesize that:

> **H2** (corollary): As effectiveness increases, a drug (versus supplement) message will undermine risk perceptions and increase intentions to engage in risky behavior for consumers within the problem domain.

Method

Subjects and Design. The experiment was a 2 (Label: Drug vs. Supplement) x 2 (Effectiveness: Low vs. High) between-subjects design. The sample consisted of patients of a Veterans' Affairs Medical Center (screened for current treatment of high blood pressure for purposes of an unrelated study). Respondents were mailed surveys and received $5 as an incentive to participate. A total of 185 individuals provided usable responses to the survey (which had a response rate of 44.3%), with 41 to 50 respondents per cell.

Materials and Procedure. Participants were exposed to an advertisement for a remedy. The header read "Ask Your Doctor About PRADEL™ Today!". Beside a picture of a male, the introductory text read "Richard Johnson did. Now he takes his family history of high cholesterol a lot more seriously. Because even though he was doing everything right his cholesterol was still too high and he was at risk of a heart attack. So his doctor told him about PRADEL and now his cholesterol is right where it should be." The remedy was then labeled as either a drug or a

supplement as follows: "PRADEL™ is a [medicine/supplement] that along with diet and exercise can significantly lower cholesterol." The effectiveness of the remedy was then manipulated as follows [high/low]: "An independent study among people with high cholesterol found that one PRADEL is guaranteed to reduce cholesterol to normal in just 2 weeks. / An independent study among people with high cholesterol found that three PRADEL a day may slightly reduce cholesterol levels in 6 to 12 months."

Participants than rated the product's effectiveness on three five-point scales: "does not work / works very well", "a bad idea / a good idea", and "not very effective / very effective". Participants also rated the similarity of the product to an herb (reverse-coded), a vitamin (reverse-coded), a medication, and a drug, on five-point scales (with endpoints "not similar" and "very similar"). Participants also rated the ad on two five-point scales: "did not like / really liked" and "did not believe / did believe".

After a filler task, participants indicated their intentions toward various behaviors on 0-10 scales (with endpoints "Never" and "Often"), including the target behavior "I will eat low-cholesterol foods." Participants also rated their enjoyment of various activities on five-point scales (with endpoints "enjoy very little" and "enjoy very much"), including the target behavior "eating high-cholesterol foods". Participants also rated the extent to which various activities are "necessary to maintaining a normal, disease-free life" on five-point scales (with endpoints "not necessary" and "very necessary"), including the target behavior "eating low-cholesterol foods". Finally, participants answered various background questions, including cholesterol status and demographics.

Results

Manipulation Checks.[2] As intended, the average of the effectiveness scale (coefficient α = 0.93) was a significant function of the effectiveness manipulation (M_{high} = 3.75 (1.21) vs. M_{low} = 2.54 (1.30); F(1, 79) = 19.77, p < .01). Also as intended, the average of the similarity ratings (coefficient α = 0.70) was a significant function of the labeling manipulation (M_{drug} = 3.83 (0.92) vs. $M_{supplement}$ = 3.40 (1.08); F(1, 72) = 5.52, p = .02). Ad liking and ad believability did not differ (all n.s.), although participants directionally preferred the ads of higher effectiveness (M_{high} = 3.27 (1.44) vs. M_{low} = 2.80 (1.38); F(1, 90) = 2.53, p = .12). Thus, the manipulations appear to have succeeded as intended.

Risk Perceptions. A risk-benefit index was calculated by subtracting the enjoyment perception from the health risk perception for the target behavior, high-cholesterol foods. ANOVA of the risk-benefit index revealed a significant interaction of label and effectiveness (F(1, 177) = 4.88, p = .03). Follow-up simple effect tests indicate that higher effectiveness of the drug lowered risk-benefit perceptions (M_{low} = 2.42 (1.53) vs. M_{high} = 1.58 (2.10); F(1, 177) = 4.69, p = .03) whereas higher effectiveness of the supplement had no effect (M_{low} =2.02 (1.68) vs. M_{high} =2.35 (1.48); F < 1).

Behavioral Intentions. ANOVA of the intention measure (to eat low-cholesterol foods) revealed a significant interaction of label and effectiveness (F(1, 177) = 4.11, p = .04). Follow-up simple effect tests indicate that higher effectiveness of the drug decreased intentions (M_{low} = 7.64 (2.19) vs. M_{high} = 6.96 (2.21); F(1, 177) = 2.80, p < .10) whereas higher effectiveness of the supplement had no effect on intentions (M_{low} = 6.98 (2.22) vs. M_{high} = 7.48 (2.42); F(1, 177) = 1.45, p = .23).

[2] As intended, the majority of respondents were within the problem domain. Overall, 75.7% of respondents indicated either having high cholesterol (51%), following a low-cholesterol diet (53%), and/or taking cholesterol medication (47%). High-cholesterol status was used as a covariate in subsequent analyses but did not interact significantly with any of the factors of interest. Note also that, unless otherwise indicated, all variations in degrees of freedom are due to missing values.

Taken together, these results indicate that, for consumers within the problem domain, exposure to a remedy message for a more effective drug leads to a boomerang effect that decreases risk perceptions (of high-cholesterol eating) and increases intentions to engage in a risky behavior (by not eating low-cholesterol foods). In contrast, re-labeling the remedy as a supplement eliminated this boomerang effect.

EXPERIMENT 3

Thus far, the research has focused on the consequences of drug and supplement messages for risk perceptions and risky behavioral intentions. We find that perceptions of risk decline and risky behavioral intentions rise with problem status following a drug message (relative to a supplement message). We have also shown the moderating role of effectiveness, which enhances the get-out-of-jail-free nature of the drug. Our evidence suggests that labeling the remedy as a supplement helps ameliorate this boomerang effect. But an open question remains: what happens if consumers take the drug as a remedy and also engage in complementary health-protective behaviors? Is doing so sufficient to "undo" the harmful effects of drug messages, or are there other unintended downstream consequences (see Figure 1) of such remedies?

The purpose of the present study is to investigate reactions to consumption of a remedy with or without complementary health-protective behaviors. We focus on drugs rather than supplements—the former is the more critical case inasmuch as our evidence suggests that drug messages produce more harmful consequences for consumer welfare. Our investigation begins with the premise that a salient "health identity" is related to health-related self-attitudes and behavioral outcomes (cf. Reed 2004). For the purposes of our research, health identity is made up of a cognitive schema that is organized around a set of health-related trait associations (e.g., strong, independent, powerful) that are characteristics reflecting a higher order conception of the

self in terms of physical well-being. Health identity is likely to protect and enhance esteem by maintaining a positive view of the self and the world around it, a view that is possible because health identity facilitates avoidance of negative self-identities or "feared selves" (Markus and Nurius 1986) and maintains a positive view over the life-course. Hence, a stronger health identity should be associated with more positive perceptions of life quality because of the psychological need for internal consistency.

Put simply, a strong health identity drives inference making that people will have a better quality of life. The drug, by taking the risk out of risky behavior, facilitates the relationship between health identity and quality of life. In contrast, however, the need to engage in other health-protective behaviors in addition to consuming the drug is inconsistent with the drug label schema and thereby violates consumer expectations about the drug's risk-reducing role. In particular, engaging in complementary health-protective behaviors may be perceived as unnecessary or costly—especially when those additional behaviors contrast unfavorably with the drug as a remedy. Quality of life may be undermined if a consumer must rely on a difficult or disliked complementary health-protective behavior (such as consistent, daily exercise), especially when contrasted with an accompanying easier health-protective behavior (such as a popping a pill). If this is the case, then a stronger health identity may not necessarily lead to perceptions of life quality when a drug remedy is accompanied by other health-protective behaviors. In other words, when the get-out-of jail-free-card is no longer free, quality of life as a function of health identity is undermined. Accordingly, we hypothesize that:

> **H3**: In the presence of a drug remedy, complementary health-protective behaviors undermine the relationship between health identity and quality of life.

Method

Subjects and Design. The experiment was a 2-group (Complementary Health Protective Behaviors: present/absent) between-subjects design. The sample was drawn from the same pool as in experiment 3 (patients of a Veterans' Affairs Medical Center). A total of 32 individuals provided usable responses to the survey.

Materials and Procedure. Participants completed a short questionnaire entitled "The What Do You Think of This Person Survey". After some introductory instructions, participants were asked to read a scenario about an individual. All participants received a picture of an exemplar—a middle aged African-American male, along with the following information (the manipulation of complementary health-protective behaviors is shown in square brackets):

> "Joe Hanley is a 57-year-old retired schoolteacher. He was diagnosed with high blood pressure 34 years ago. His doctor started him on medication for his blood pressure over 25 years ago. Joe found it hard to take the hypertension pills. [It's been a bit of a rough road, so he started to watch his diet and exercise every day. But he found it was hard to keep up this new healthy lifestyle and he has gone back to his old habits. / It's been a bit of a rough road, so he started to watch his diet and exercise every day. In the past five years, he has lost thirty pounds and he still walks several miles at least three times a week.] Now he takes his pills every day. It's just part of his day. Just four years ago, Joe's daughter had her own little girl named Clare. She's named after her grandma. Every second with her is a joy. Joe wants to be around to watch little Clare grow up, too."

After an open-ended thought-listing task, participants then answered a series of questions about the exemplar (Joe), including health identity and quality of life. Health identity was measured using a trait-based approach (cf. Brewer and Gardner 1996) that relied upon an eight-item six-point trait scale (resourceful, strong, reliable, powerful, careful, sturdy, calm and confident, with endpoints "Really Doesn't Describe Joe" and "Really Describes Joe"). Various filler items were also embedded in the questionnaire. Participants also provided life quality perceptions on a four-item nine-point semantic differential scale (with endpoints "easy/difficult", "desirable/not desirable", "sensible/foolish", and "relaxed/stressful").

Results

Subsequent analyses used the average of the health identity scale (coefficient alpha = .92; standardized with M = 0 and s.d. = 1) and the average of the life quality scale (coefficient alpha = .71). Each was coded such that higher scores reflected a stronger health identity and quality of life. ANOVA of life quality revealed a main effect of health identity ($F(1, 27) = 4.47$, $p < .05$), qualified by an interaction with complementary health behavior ($F(1, 27) = 4.29$, $p < .05$). As expected, in the drug-only condition, the relationship between health identity and life quality was positive ($b_{drugonly} = 1.59$ (.52), $t = 3.08$, $p < .01$). When the drug was taken in conjunction with complementary health behavior (i.e., exercise), the relationship between health identity and quality of life was reduced ($b_{drug+exercise} = .15$ (.43), $t = .34$, n.s.).[3]

This pattern of results provides support for hypothesis H3. Specifically, complementary health-protective behaviors (in this case, exercise) undermined the relationship between health identity and quality of life when taking a drug. This finding suggests a "double boomerang" of a remedy when it is labeled as a drug. Not only do drugs undermine risk perceptions and increase risky behavior (by reducing complementary health-protective behaviors) for consumers within the problem domain, but even if consumers were to engage in complementary health-protective behaviors, their perceptions of life quality as a function of health identity are undermined. Both of these effects appear detrimental to consumer welfare.

GENERAL DISCUSSION

The present research investigated the effects of drug and supplement remedy messages on risk perceptions and intentions to engage in risky health behavior. In the Pilot, the salience of thoughts about poor health was higher and the salience and importance of thoughts about other health-protective behaviors were lower for drugs versus supplements. In Experiment 1, a drug

[3] Consistent with the rationale for H3, complementary health behavior (i.e., exercise) in the absence of a drug remedy did not undermine the relationship between health identity and quality of life. These control group results were omitted for brevity's sake.

(versus supplement) undermined risk perceptions and increased intentions to engage in risky behavior (i.e., high-fat eating) as problem status increased. In Experiment 2, consumers within the problem domain reported lower risk perceptions and lower intentions to engage in protective behavior (i.e., low-cholesterol eating) for a drug (versus supplement) as effectiveness increased. Taken together, these studies support a "mere labeling effect" for drugs versus supplements such that drug messages boomerang and undermine risk-avoidance by consumers in the problem domain. In addition, Experiment 3 provides evidence for a "double boomerang" inasmuch as engaging in complementary health-protective behaviors while consuming a drug remedy undermined the relationship between health identity and quality of life perceptions. These findings in support of hypotheses H1—H3 were obtained in laboratory and field experiments that provided some variation across risky behavioral domain, remedy, and sample populations.

Psychological Process. We have offered two potential explanations for the differential consumer reaction to drug and supplement messages. First, we argue that a supplement label by its very name suggests that the remedy works in conjunction with other health-protective behaviors. Second, we argue that a drug label prompts associations to poor health which lowers self-efficacy and leads consumers to look to external solutions for their health problems. We offer some preliminary evidence for these explanations in the Pilot, and the effects of drug and supplement messages in experiments 1 and 2 are consistent with these rationales. Bolton et al. (2005) propose that boomerang effects arise because problem status drives motivated reasoning about the remedy—either as a signal of risk or as a signal that the risk is manageable. Our research builds on this idea by suggesting that the remedy's label brings to mind a schema upon which motivated reasoning operates. (Indeed, the "mere labeling effect" seems particularly powerful because, we argue, it operates through the spontaneous product associations that come

to mind when consumers encounter the label. It does not require attention to and elaboration of a lengthy warning label or nutrition message, and the label appears powerful enough to overcome additional product information to exert its effects.) In the case of supplements, the schema suggests that the remedy alone is insufficient to take care of the risk unless accompanied by other health-protective behaviors. In the case of drugs, the schema suggests that poor health may preclude the consumer from taking other health-protective measures, but the remedy alone is sufficient to manage the risk so consumers can forego other health-protective behaviors. Thus, drugs (versus supplements) serve as get-out-of-jail-free cards that reduce risk perceptions and increase risky behavior among consumers as problem status rises.

Interestingly, experiment 3 suggests that when complementary health-protective behaviors accompany a drug, the get-out-of-jail-free-card no longer seems free. This violation of the drug schema appears to cost the consumer in terms of quality of life perceptions. The precise psychological mechanism for this boomerang merits further investigation. One possibility is that the drug schema leads consumers to differentially evaluate complementary health-protective behaviors. For example, consistent daily exercise may seem particularly arduous when contrasted against the ease of popping a pill (and thereby this direct contrast reduces quality of life perceptions). This mechanism suggests several avenues for future research, including the relative psychic cost (time, effort, difficulty, dislike) of the drug and its complementary behaviors. For example, a drug may be perceived as more costly when it requires a prescription (versus over-the-counter), includes a demanding treatment regime (painful daily injections vs. a simple pill or patch), or has prominent and undesired side effects (sexual dysfunction). Similarly, complementary health-protective behaviors may be perceived as more costly when they require complex lifestyle changes or impinge upon ingrained habits. The contrast between the remedy

and the complementary health-protective behaviors may alter perceptions of the drug as a get-out-of-jail-*free* card and thereby reduce or enhance boomerang effects on risky behavior. Of course, such an argument assumes that consumers can take such factors into account in an unbiased fashion when responding to remedy marketing (rather than reasoning in a motivated fashion driven by problem status). Moreover, puffery by marketers that makes a remedy seem relatively easy, effortless, or otherwise cost-free to use (relative to complementary health-protective behaviors) may likewise facilitate motivated reasoning that leads to boomerang effects.

Consumer Welfare. The present research adds to the extant literature on the effects of drug advertising and product labeling—topics of considerable interest to marketers, consumers and consumer welfare advocates, health care workers, and government regulatory agencies. For example, past research from a marketing perspective has examined the effectiveness of direct-to-consumer drug advertising (e.g., Narayan, Desiraju, and Chintagunta 2004). From a consumer perspective, research has investigated various types of advertising claims, including rational versus emotional appeals (Main et al. 2004), the use of scientific jargon (Haard et al. 2004), and nutrient claims in advertising (Andrews, Netemeyer, and Burton 1998). Consumer research has also focused on effectiveness of product warning messages (Stewart and Martin 1994; Argo and Main 2004) and specific kinds of labels—such as nutritional (Kozup, Creyer, and Burton 2003; Balasubramanian and Cole 2002), environmental (Kangun, Carlson, and Grove 1991), and even size (Krishna 2005). We add to these streams of research by demonstrating a "mere labeling effect"—controlling for the type of claim and presentational factors, consumer response to a remedy is driven by its label (drug versus supplement) and consumer problem status. In addition to accounting for mixed effects of drug versus supplement advertising (as a function of problem

status), our research also addresses an important problem in health care—how to encourage consumers to engage in health-protective behaviors and to comply with medication or treatment regimes (e.g., McDonald, Garg, and Haynes 2002; Bowman, Heilman, and Seetharaman 2004; Dellande, Gilly, and Graham 2004). We propose that drugs (versus supplements) reduce risk perceptions and undermine other health-protective behaviors—because the drug serves as a get-out-of-jail-free card for consumers within the problem domain. Such unintended effects may arise from actual consumption of the remedy (now that I'm taking this drug, I can do/eat whatever I want; experiment 1) or from simple exposure to direct-to-consumer advertising (why take other health-protective actions when a drug exists to take care of the problem; experiments 2 and 3). Of course, drugs do, in fact, lower specific health risks (e.g., hypercholesterolemia); but consumers appear willing to trade away some of this safety gain by engaging in riskier behavior (e.g., a sedentary lifestyle) that may also increase their exposure to other health risks not treated by the drug (e.g., osteoporosis). That is, by narrowing focus on the presumed benefit of the remedy, consumers may neglect other important benefits of risk-avoidance or a healthy lifestyle. As a result, our findings add to the growing debate over the regulation of drug and supplement markets and the role of direct-to-consumer advertising of drugs (Lexchin and Mintzes 2002; Calfee 2002) and are also relevant to de-marketing efforts to reduce risky consumption (e.g., Benthin et al. 1995). Specifically, our research suggests that drugs may boomerang on consumers attracted to the problem domain by promising to take the risk out of risky behavior; thus, consumers can "tune out" other health-protective behaviors. In contrast, supplement labels remind consumers to "turn on" complementary protective behaviors (as part of a healthy lifestyle package). Nonetheless, even supplement marketing should be treated with caution—lest such remedies also seduce consumers into treating them as get-out-of-jail-free cards.

TABLE 1: CONSUMER DEFINITION OF DRUG AND SUPPLEMENT (PILOT)

COGNITIVE RESPONSE	DRUG (%)	SUPPLEMENT (%)
Illness/disease	55.1	1.3
Work with/enhance other body function	9.0	68.0
Alter body function	21.8	5.1
FDA	18.0	2.6
Prescription	19.2	0
Natural substance	0	35.9
Non-natural chemical	15.4	0
Effective	11.5	0
Risky/Misuse/Side-effects	14.8	8.6

Note: Percent of subjects ascribing each cognitive response to the drug or supplement. Three subjects (out of 81) were omitted who did not answer the question.

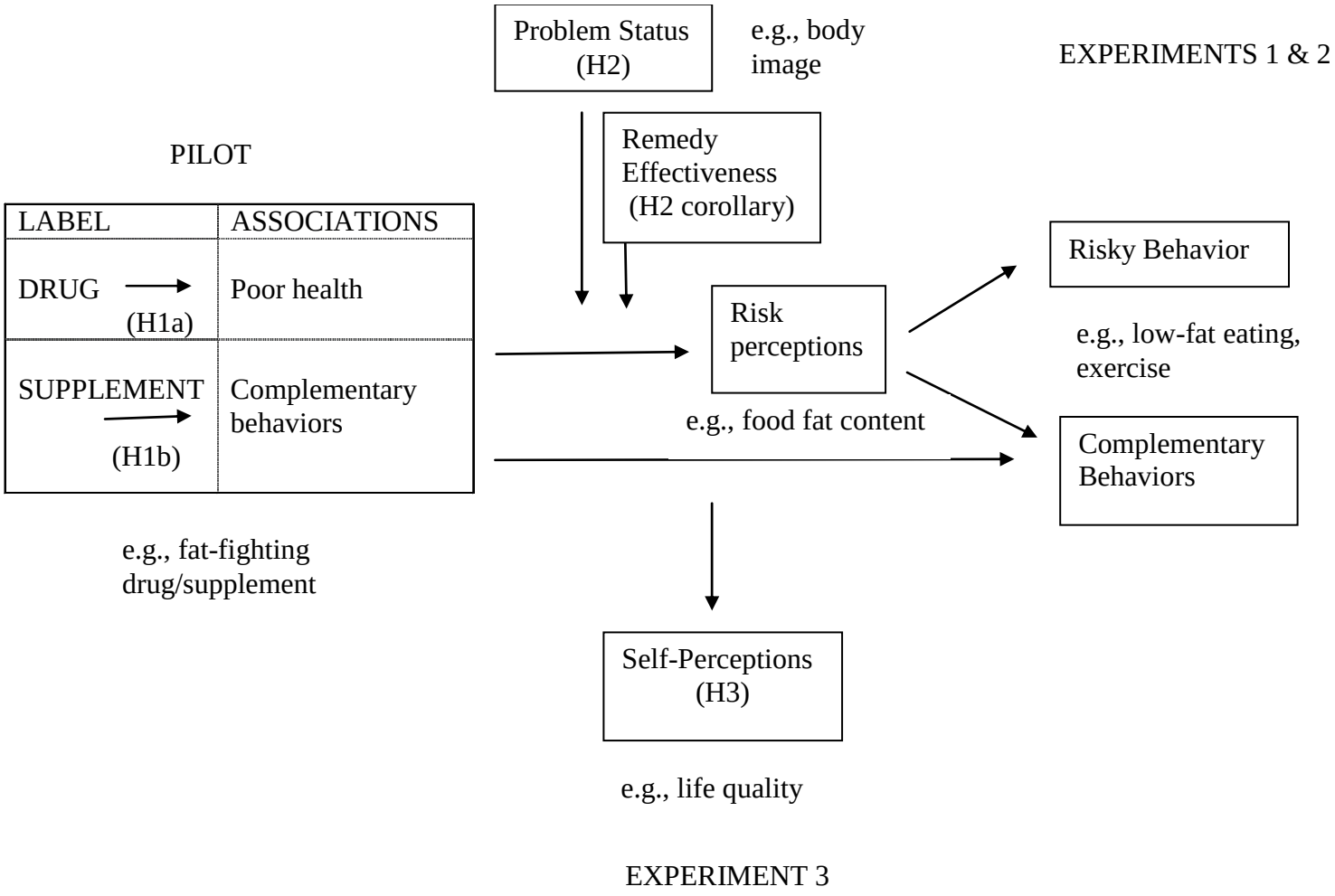
TABLE 2: SUPPLEMENT VERSUS DRUG SCENARIO RATINGS (PILOT)

EFFECTIVENESS	N	HEALTH-PROTECTION INDEX	HEALTH PERCEPTION
Equally effective	19	4.62 (0.90)	4.71 (1.42)
Drug more effective	20	4.58 (0.97)[a]	4.63 (1.04)
Supplement more effective	21	4.58 (0.76)	4.55 (1.11)
No Information	18	5.22 (0.98)	5.31 (1.09)

[a] 1 missing value

Note: All cell means are significantly different from neutral in t-tests ($p<.05$).

FIGURE 1: ORGANIZING FRAMEWORK



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