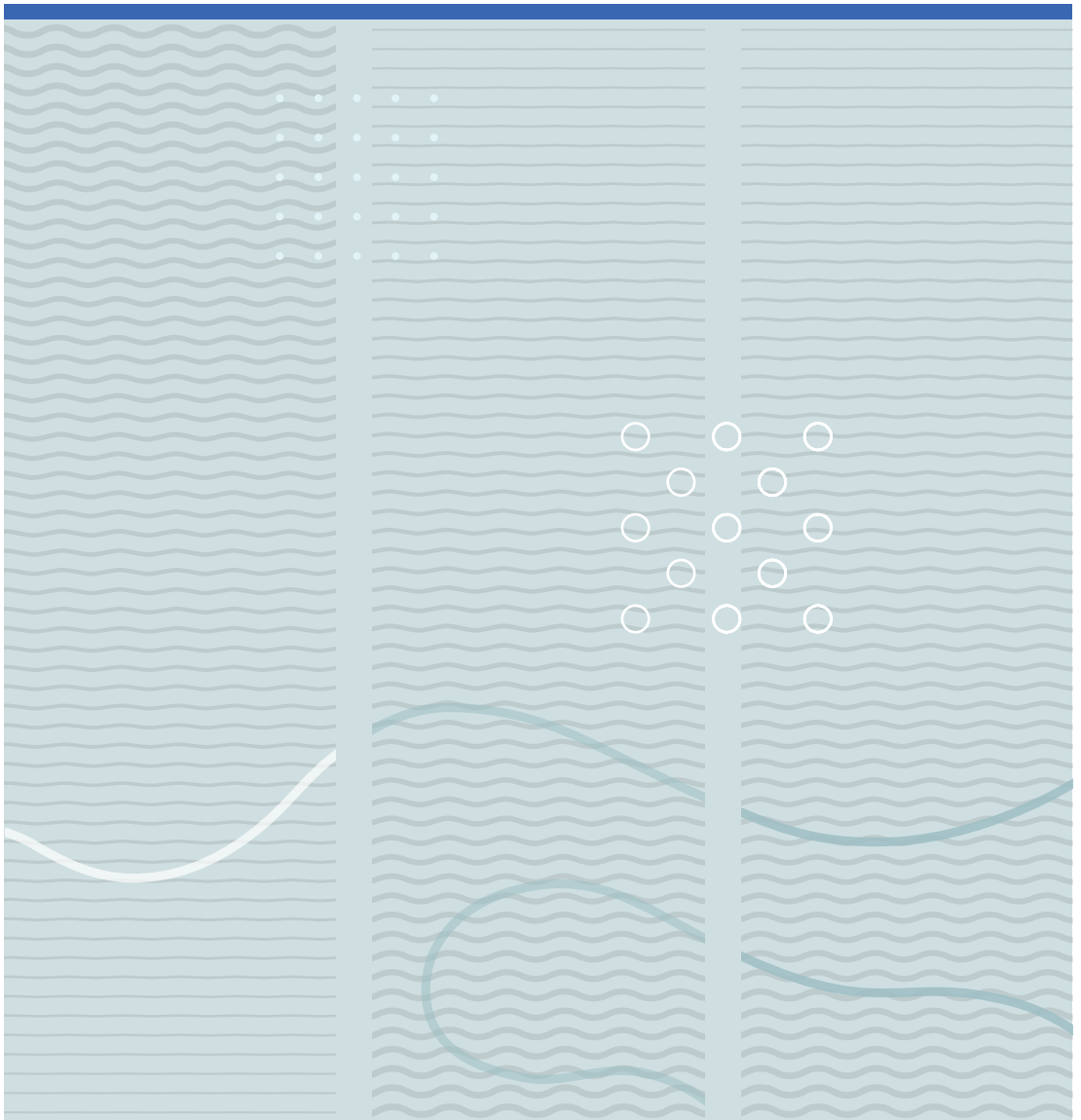Mesay Moges Menebo

Causal attribution and consumer perseverance on health remedies

USN

Mesay Moges Menebo

Causal attribution and consumer perseverance on health remedies

A PhD dissertation in
Marketing Management

Dedication

To Micky Mulugeta, Anteneh Moges, Memeheru Melkamu and Meaza Beyene

Acknowledgements

I would like to express my appreciation and gratitude to all the people who have contributed to my work on this dissertation and to my professional development in the years of my doctoral work.

I am very grateful to my supervisor, Professor Kåre Sandvik, for his constant encouragement. Thank you for making the methodological questions of my project easier to address. I am also thankful for his sincere and kind help in making my internship experience become a reality, for always being there to provide help regarding any topic, for his tremendous efforts to find solutions to the problems I brought to the table, and for making my stay at USN seamless. His feedback motivated me to aspire for higher-quality work. I am immensely grateful!

I would like to thank my co-supervisor, Professor Luk Warlop, for his tremendous mentorship and guidance since the first day of my thesis work. I am fortunate to have had a scholar like Luk, who is an expert in the field, is passionate about research, and is extremely caring, as my mentor. There were times of uphill struggles and times when thoughts of quitting overwhelmed me, but his encouragement and motivation made my road bearable. I will never forget "Tuesdays at BI" − where my career path was made. Luk was more than a supervisor. I cannot imagine having found a spot at Cornell and in Professor Gilovich's Lab had it not been for his effort. I am incredibly grateful!

I also extend my gratitude to Professor Thomas Gilovich for his tremendous mentorship, which positively impacted my research. My memorable stay at Ithaca, my encounters with him, our long walk-and-talks, and our thoughtful lab meetings not only forever benefited how I conduct research but also taught me how to be humble. Thomas and his wife Karen made my stay at Ithaca unique. They are both wonderful human beings. I am also grateful to everyone I met at the Cornell Psychology Lab: Fangming Cui, Sebastian Deri, Andres Montealegre, Bryan West, Stephanie Tepper, Mingui Ni, Tyler Wiesman, Randy Lee, and my favorite Jeremy Richardson.

I am very much grateful to The School of Business at the University of South-Eastern Norway and to the Psychology Department at Cornell University for giving me the opportunity to conduct my internship at Cornell University. It was one of the greatest experiences I have ever had. I especially

The Lord has been my fortification in times of trouble. I don't need a *p*-value to know how significant God is to me. "*How hast thou helped him that is without power? How savest thou the arm that hath no strength?*" said Job, and so do I. I revere and praise the Lord God. …. and to those who have loved me or hated me, I love you as well.

Abstract

Some alternative remedies have been proven to be pharmacologically ineffective and therefore unable to heal any illness and are a burden to publicly funded health insurance. Nevertheless, the market for such remedies is steadily growing and is predicted to reach a global market size of around USD 404 billion by 2028, posing a global health burden. A vast amount of literature has explored why people initiate use of alternative remedies. However, not so much on why maintain use. Counterintuitive to elementary knowledge about consumer behavior, case reports have indicated that some alternative remedy users persevere with a product even when the illness it is intended to treat is not overcome. This seemingly results from causal attribution bias, in which users attribute the cause of non-recovery more to themselves than to the product. In this dissertation, I documented evidence of this counterintuitive form of causal attribution as well as the propensity on the part of consumers to persevere with a failed remedy. Moreover, I explored the predictors of individuals' susceptibility to such behavior and investigated the consequences with respect to consumption variables relevant to marketing management.

The results from empirical investigation confirmed that the tendency for susceptibility to causal attribution bias differs depending on how much a remedy emphasizes mind–body integration and to what extent users of a remedy embrace this ideology. It was documented that alternative users tend to persevere for a longer (vs. a shorter) number of days with alternative (vs. conventional) remedies until they give up and conclude that it does not work even after knowing that the illness was not initially overcome. Moreover, it was shown that alternative remedies are in general less evaluable than conventional remedies. Such a feature of low evaluability caused less attribution of failure to the product and made participants persevere longer with an unsuccessful therapy but also resulted in significantly higher levels of WTP. Furthermore, this effect increased with an increase in an individual's BPI level, a dispositional belief trait held by every individual to a greater or lesser extent. The research's findings advance the literature on product loyalty and causal attribution. Managerial wise, the findings help health authorities in their campaign against the proliferation of ineffective health practices by identifying the attribute of the remedy that causes it and/or distinguishing personality of victims that are most susceptible.

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1. Context

One of the most fascinating phenomena in marketing is that consumers develop trust in the effectiveness of products that have "no inherent power to produce an effect that is sought or expected" (Stewart-Williams & Podd, 2004). "Placebo effects" have been observed for several types of products (Hróbjartsson & Gøtzsche, 2001) but most prominently in the domain of health and medicine. Medical researchers know that the mere expectation generated by a product or remedy may be responsible for part of the therapeutic outcome. This is why they routinely add placebo control conditions to the random controlled tests of new pharmaceuticals or other products so that the causal effect of the pharmaceutical can be separated from the effects of any expectations generated by knowledge of the product or the context of its administration (Kirsch, 1997).

Some types of medical treatment are believed to rely mostly or even exclusively on the generation of expectations and the occurrence of placebo effects. While both conventional and unconventional (alternative) medicine are subject to these factors, their implications are more adverse for some alternative therapies, namely those that are not scientifically proven to be effective and therefore carry the risk of significant consequential harm. The US National Institute of Health (NIH) has defined complementary and alternative medicine as "a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine."(Ventola, 2010a, p. 1). The full range of these therapies encompasses up to five subcategories. The first are those that emphasize mind–body intervention; for example, meditation, prayer, mental healing, art, music, and dance therapy. The second are biologically based therapies; for instance, herbs, foods, vitamins, and other dietary supplements. The third are manipulative and body-based methods, such as chiropractic and osteopathic manipulation and massage. The fourth are alternative whole medical systems, including homeopathic and naturopathic systems, and Chinese and Ayurveda medicine. The last category includes energy therapies, like *qi gong*, Reiki, therapeutic touch, and electromagnetic field exposure (Waldman & Terzic, 2009).

Practitioners of alternative medicine operate primarily outside of the classic medical system, often presenting themselves as antagonistic toward this system. Their remedies do not undergo the formal safety, efficacy, and other pre-clinical testing procedures followed by conventional medicine. It should therefore not be surprising that fatalities, organ injuries, and other health complications are frequently observed in alternative medicine (Ernst, 2011). For example, it was reported that the potential sensitizing capacity of numerous herbal remedies leads to allergic contact dermatitis (Niggemann & Grüber, 2003). Furthermore, acupuncture can lead to mechanical injuries, such as pneumothorax, cardiac tamponade, spinal injury, and infectious complications like hepatitis and bacterial endocarditis. Organ toxicity has also been associated with various herbal preparations involving the liver, kidneys, and the heart, with some herbs also having carcinogenic properties. As a consequence of what some authors have called a "cult diet" motivated by "parental food faddism," a belief held by some people who are critical of orthodox medicine, children have been subject to the negative repercussions of alternative remedies. In a case study explored by Roberts et al. (1979), infants and small children in the United States were fed strict vegetarian (vegan) diets or the even more extreme Zen macrobiotic diets, which largely consist of cereals. This resulted in severe nutritional deficiencies, like vitamin B-2 deficiencies, resembling "kwashiorkor."

On the other hand, some alternative health remedies are essentially harmless. For example, neither prayer nor homeopathy is likely to hurt anyone. Often, such remedies generate no harmful effects simply because they produce no effect at all (e.g., homeopathy); in this case, the worst consequence of such remedies is a waste of money. From a purely business perspective, it can be argued that people can spend money on whatever makes them happy, but this assertion cannot or should not apply when the costs for users are covered partially by publicly funded health insurance.

Several forms of alternative medicine—for example, homeopathy, therapeutic touch, imagery, and herbal medicine—are believed by scientists to not have any actual therapeutic effect (Angell & Kassirer, 1998). Despite this, many users of such inert substances develop strong loyalties to particular products, become regular users, and develop strong beliefs in their usefulness, and some become highly engaged in public advocacy for such treatments (Astin, 1998). Estimates show

that North Americans alone spend 30 billion dollars per year on alternative medicine (Fox, 2016), and the global market for alternative medicine is expected to reach USD 404 billion by 2028, according to a new report by Grand View Research (GVR, 2021). These reports testify to the large degree of credibility afforded to these remedies and therapies in global society.

2. Problem statement

It is important to understand how people can afford to become loyal users of remedies that are unproven, disproven, impossible to prove, or excessively harmful in relation to their effects. According to lay theories of medicine, people hold lay beliefs about illnesses and health remedies (Wang et al., 2010). For example, consumers attempt to identify the nature of an illness during diagnosis by relating their symptoms to the origins of the illness and by selecting the health remedy most appropriate to the illness identified during diagnosis. In addition, consumers rely on lay beliefs when assessing treatment effectiveness. For example, consumers perceive that fast-acting remedies, i.e., remedies whose effects quickly manifest upon administration, are more effective than slow-acting treatments. But in reality, some drugs are deliberately designed to be either slow acting or fast acting (e.g., slow-acting insulin versus long-acting insulin). Consumers also perceive that remedies that focus on treating an underlying illness are more effective than those that focus on alleviating symptoms. However, such a treatment focus does not technically demonstrate effectiveness so much as what the drug is designed to target. Such reliance on lay theories of medicine has the capacity to drive erroneous consumer decisions about health remedies, which, in turn, could have negative downstream consequences.

Another supposedly lay theory of medicine comes from patients' assessment of their treatment outcomes. In Simonton et al. (1992) report about cancer patients' dialogue with their practitioners and families, it was shown that patients spend much of their time assessing their treatment outcomes and assigning causes to their condition. In the event of their non-recovery from illness, some patients were found to attribute responsibility for the failure of the treatment to themselves rather than to the product or the practitioner. This trend is compelling because it contradicts theoretical perspectives on how consumers assign cause to events, namely that

consumers have a tendency to credit their disposition for treatment success and external situations for treatment failure (Folkes, 1984).

To solve the substantive problem of increasing consumer loyalty to ineffective products, it is first important to explore the psychological underpinnings behind this observation, which is contrary to existing theory. By doing so, this dissertation will contribute to both theory and practice.

3. Research objective

The present research proposes that lay theories of medicine influence health care decisions. There is precedent in the literature for adopting a lay theory approach to understanding health behavior by incorporating specific lay beliefs into explanatory models (Frosch et al., 2008). For example, people's lay belief about taking the disease label hypertension literally and consequently preferring relaxation instead of medication as the best treatment has been experimentally tested. In addition, lay beliefs about illness and its treatment have also been assessed by adopting a more systematic approach. For example, the dimensions of a scale intended to measure people's lay belief about generic medicines have been devised with factor analysis. The consequential implications for adherence and decision-making were tested with correlations (Figueiras et al., 2009).

My research built upon this past work by positing that consumer lay theories of medicine play a central role in health care decisions and behavior. I examined how users represent unconventional remedies. Specifically, I first found evidence for the tendency of self-attribution of blame for failure and longer perseverance using an unconventional remedy than a conventional remedy. Second, I explored personality and situational factors that lead to this phenomenon or that affect various other health behavior tendencies and belief systems—for example, the tendency to reject vaccines and the effect size of a placebo treatment. Third, I assessed the consequences of these factors with respect to marketing variables (i.e., willingness to pay).

4. Conceptual framework

4.1 Factors driving use initiation

According to previous studies, consumers resort to unconventional remedies out of desperation over the failures of conventional medicines (a push effect; (Barnes et al., 2004) or out of appreciation for intimate practitioner–patient interactions in the context of unconventional medicine (pull effect; (Furnham & Forey, 1994; Vapiwala et al., 2006). In addition, certain segments of the population have a higher propensity to entertain or engage in the use of such remedies. Descriptive studies have shown that people high in intuitive reasoning, paranormal beliefs, self-transcendence values, a holistic orientation to health, and contaminated mindware are more prone to use unconventional remedies (Lindeman, 2011; Saher & Lindeman, 2005; Siahpush, 1999). "Contaminated mindware" is a concept introduced by Stanovich (2016) to explain belief traits that inhibit reasoning processes and has been empirically shown to embody three dimensions (Rizeq et al., 2020): paranormal beliefs, conspiracy beliefs, and anti-science attitudes.

4.2 Factors leading to use maintenance

A person can recover from an illness in three ways. First, the majority of medical illnesses are self-limiting; therefore, the immune system rids the body of such illnesses within a given period of time without any medical intervention (Blanco & Matute, 2020). Second, recovery can occur when a medical intervention successfully delivers the pharmacologically or physiologically desired effect (Ripley & Saseen, 2014). A successful pharmacological effect implies that an active drug ingredient selectively attached to drug receptors in the body or other micro-organisms. For example, β2-blocking anti-hypertensive medications attach selectively to β2 receptors on heart cells to limit the heart muscles from pumping too much blood (E. Oliver et al., 2019). In another example, penicillin-group antibiotics specifically attach to and destroy the cell wall of the bacteria that causes the infection (Yocum et al., 1980). A successful physiological effect implies that a non-active drug ingredient, because of its viscosity or taste or even the thought of taking the substance, leads to changes in the body's physiological activity (Eccles, 2006). For example, a sugar solution used as a cough syrup smoothens the throat. The mere belief in the effectiveness of a substance or a placebo pill can trigger the production of endorphins and enkephalins that act as natural

analgesics and produce the desired state of wellness in some health conditions (Peciña & Zubieta, 2015).

Most unconventional treatments do not undergo clinically controlled random efficacy testing. Those that do are shown to contain no pharmacologically active ingredients. Accordingly, they are not approved as medicines but are sold informally (Ventola, 2010b). One category of unconventional medicine that requires scrutiny in this regard are plant-based treatments. Medicinal plants are mainly applied empirically without mechanistic knowledge of their pharmacological activities or active constituents (Sneader, 2005). But the establishment of rational clinical investigations of medical herbs in the eighteenth century changed that practice and even led to some of today's conventional drugs (Sneader, 2005). This is specifically the case for plant-based traditional Chinese medicine (TCM), Ayurveda, and Egyptian medicine. There are prominent examples of unconventional medicines that have been systematically investigated and shown to be pharmacologically active and therapeutically effective. For example, the contemporary antimalarial and potentially anticancer agent artemisinin was originally derived from the traditional Chinese herb Artemisia Annua and has been used for treating malaria-like symptoms (Klayman et al., 1984). Berberine was traditionally used for gastric ailments but is now clinically used for bacillary dysentery (Farnsworth et al., 1985). The clinically effective hemostatic agent Catheticin had a similar purpose as a traditional medicine (Farnsworth et al., 1985). Although there seems to be a close relationship between a traditional preparation and a drug obtained from the same plant, data supporting such claims are extremely weak. For example, from 114,000 extracts derived from 12,000 species that the US national cancer institute (NCI) investigated over decades, only two (Taxol and Camphotecin) are currently used as pharmacologically active drugs (Cragg et al., 1999). This implies a 0.016% chance of a plant-based unconventional remedy being pharmacologically active and therapeutically effective in relation to the indications for which the respective compounds are traditionally used. While this dissertation refers to unconventional remedies in general, I mainly refer to holistic remedies that emphasize the mental component of healing more than the physical substance administered.

In the eye of a scientific observer, the only explanation for a patient claiming recovery after using such inactive products would be either that the illness is self-limiting in the first place or that

the product has a physiological placebo effect that helps only in low-risk illnesses like depression, cough, and mild pain. Conversely, empirically speaking, the only explanation for a patient claiming to have not recovered after using such products is because the product is ineffective.

However, it is particularly fascinating that even the experience of failure (or lack of improvement) with unconventional remedies is often not enough to discourage their use (Simonton et al., 1992). It seems that consumers of holistic medicine are prone to considering themselves, and not the product, the cause of the failure or lack of improvement. This phenomenon is particularly interesting because it goes against one of the most elementary findings in consumer behavior: consumers' tendency to attribute product success to themselves and product failure exclusively to the product or service (Folkes, 1984). Nonetheless, little is known about why alternative medicine users are more prone to self-blaming and less prone to product blaming in the event of product failure nor about the downstream consequences (for example, maintenance of product use) in the event of non-recovery.

4.2.1. Attribution of blame

According to prior research on failure response, consumers can respond to failure in different ways: complaining, requesting a refund, switching to another product, negative word of mouth, apology expectation, desire to hurt a firm's business, or emotional responses (e.g., anger, frustration, shame, sadness; Day & Landon, 1977; Folkes, 1984; see Figure 1). Notably, researchers have shown that consumers' attributions of blame mediate the consequences of failure on response. Thus, understanding when and why consumers are more or less likely to attribute blame to the product is an important area of inquiry. Typically, when a product fails, consumers blame the company (Richins, 1983), the product (Valle & Shanker, 1979), the manufacturer, the retailer (Su & Tippins, 1998), and, only in very rare cases, themselves (Hocutt et al., 1997; Pacheco et al., 2017). The more blame is attributed to the product or the supplier, the more negative the consumer's response. Similarly, consumers' response to the failure of ineffective alternative health remedies can be understood within this framework. By examining how alternative remedy users attribute cause in the event of non-recovery and by exploring antecedent variables that can

possibly predict the cause assignment pattern, it is possible to understand the underpinnings of the perseverance tendency as well.

Figure 1. Failure response and upstream variables that predict the type of response.

Firm-and/or product-related variables	Attribution	Response
(Dawar, N,2004, Wanru, 1998, Dawar, 2012) • CSR • Brand visibility, • Product price, • Situational cues • Base-rate information • Ease/difficulty of evaluability (Credence vs Experience) **Consumer variables** (Monga and John ,2008, Puzakova et al.,2013, Whelan and Dawar , 2016) • General thinking style • Brand anthropomorphization • Attachment styles • Belief in Psycho-immunology	*(Richins, 1983, Krishnan & Valle, 1979, Su & Tippins, 1998 ,Valle & Wallendorf, 1977)* • The company • The product • The manufacturer, retailer • The self (e.g. my effort,..)	*(Day & Landon, 1977; Folkes, 1984)* • Complain, • Request refund, • Switch product, • Negative word of mouth, • Expect apology, • Emotional response (anger, frustration, shame, sadness) • Repurchase

4.2.2 Inferring the causes of behavior

It would be beneficial to learn how loyalty or reuse behavior is established for inactive substances or why people resume use or resist giving up on a product even after non-recovery. For instance, why do cancer patients who undergo an unsuccessful course of unconventional treatment choose to appreciate the practitioners and the practice even on their deathbeds (Simonton et al., 1992)? Why do homeopathy consumers maintain loyalty even when the end product that they use is often so diluted—by a factor of 10^{-12}, in some cases—that it is indistinguishable from the dilutant? Is it because they have a different way of understanding product effect mechanisms? Causal attribution, which is the construal process people use to explain their own and others' behavior, is crucial to answering questions like these (Kelley, 1973; Kelley & Michela, 1980). It offers a set of concepts to explain how people assign causes (the treatment, the illness, etc.) to the events (e.g., no recovery or recovery of an illness after product use) around them and to the effects of these kinds of causal assessments (e.g., the decision to continue taking the same treatment regardless of its effects). Understanding causal attributions is

crucial to understanding everyday social behavior because we all make causal attributions throughout the day. The attributions we make can greatly affect our thoughts, feelings, and future behavior.

4.2.3. The pervasiveness and importance of causal attribution

When students receive their exam grades, they are not simply delighted or dejected about the results. They make an attribution. If the grade is good, they might decide that this is another example of how smart and hardworking they are. When the grade is bad, they might decide that they are not so good at the subject or that the test was unfair. Similarly, when consumers/patients realize that they have or have not recovered from an illness after using a substance, they do not simply take it at face value. They make an attribution.

Attributing a bad grade on an exam to a lack of ability leads to unhappiness and withdrawal, whereas attributing it to a lack of effort often leads to more vigorous attempts to study harder and more efficiently in the future. Likewise, when patients conclude that they did not recover because they did not correctly follow the substance-use directions or did not have sufficient faith or make enough effort, an entirely different set of emotional reactions occur than if they had concluded that they did not recover because the product lacked efficacy. Indeed, systematic research on causal attribution has shown that people's explanations have tremendous consequences in a number of areas, including health decisions (Gollust & Lynch, 2011; Michaela & Wood, 1986). For example, in an experimental study, Gollust and Lynch (2011) showed that when people attribute illness to behavioral causes, they are more likely to believe that individuals, not the government, should be responsible for the costs of medical care.

4.2.4 The process of causal attribution

How we assess the causes of observed or reported behavior helps in understanding the past, illuminating the present, and predicting the future. Only by knowing the cause of a given event can the true meaning of the event be grasped and predictions about future events be made. When trying to determine the cause of something, a particularly important question to ask is

whether an outcome is the product of something within the person (that is, an internal, or dispositional, cause) or a reflection of something about the context or circumstance (an external, or situational, cause). Ever since Kurt Lewin (1931) pointed out that behavior is always a function of both the person and the situation, theories of attribution have focused on how people assess the relative contributions of these two types of causes (Hilton & Slugoski, 1986; Hilton et al., 1995; Jones & Davis, 1965).

To date, most research on consumers' attributions of blame has focused on situational firm- and/or product-related predictors, like corporate social responsibility (Siu et al., 2014), brand visibility, product price, situational cues (Su & Tippins, 1998), and base-rate information (Lei et al., 2012). Researchers have only recently begun to examine how dispositional factors influence attributions of blame. For example, Monga and John (2008) examined the effect of general thinking style (holistic vs. analytic) on attributions for product failure. Puzakova et al. (2013) discussed how brand anthropomorphization and consumer beliefs regarding the stability of personality traits interact to predict attributions of blame following product wrongdoings. Whelan and Dawar (2016) examined the effect of attachment styles (fearful vs. secure) on the amount of blame attributed to a brand. The factors identified in these recent studies might also contribute to self-attribution of failure in the context of holistic medicine.

In this dissertation, I add to the extant literature by exploring both situational and dispositional factors relevant in predicting attribution of blame and subsequent consumption behaviors in the context of unconventional medicine and beyond.

5. Organization of the dissertation

In the first section of the dissertation, I report empirical evidence documenting the two phenomena central to my inquiry. The first is causal attribution bias, the phenomenon of self-blaming or the reduced tendency to fault a failed product. The second is the phenomenon of persevering longer with an unconventional remedy than with a conventional one by alternative medicine users. Since accounts of these phenomena from previous literature comprise only individual-based case reports, I considered it important to obtain more systematic support from an experimentally controlled study.

In the second section, I explore variables that predict these phenomena. First, I investigate situational factors that are unique in the context or are generally unique to unconventional remedies. I document empirical evidence for how ads/claims of unconventional remedies are generally difficult to evaluate by an average consumer, which in turn leads to causal attribution bias and eventually favors perseverance. Second, I describe a specific type of prescientific belief often promoted by holistic healers. This belief, psycho-immunology (BPI), is the conviction that mere thoughts, emotional states, feelings, and products of the imagination can influence or promote one's state of health and mitigate the prevalence of disease. I both developed a dispositional belief scale for the construct and documented how it successfully predicts the phenomenon. Third, I report the interactive effect of situational and dispositional factors. In the last part of this section, I discuss the impact of both the situational and dispositional factors discussed above on relevant downstream variables in marketing, such as willingness to pay.

In the last section, I borrow from theory to assess how various variables, like religiosity, incremental mindset, socioeconomic status, and shared BPI worldview, predict causal attribution and/or product perseverance.

Figure 2. Structure of the dissertation.
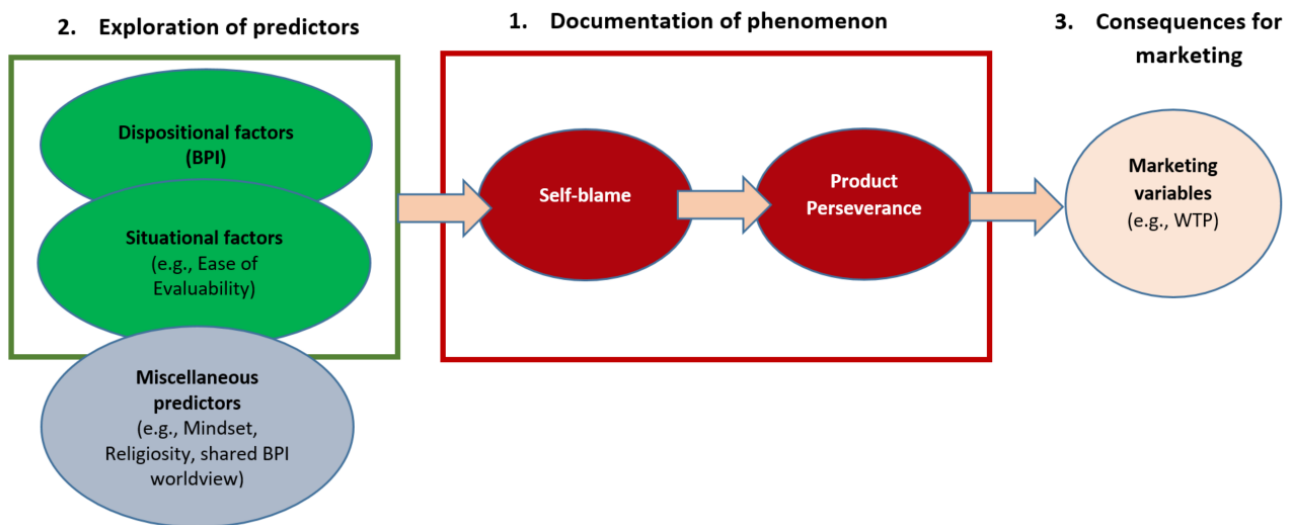
6. Documentation of the phenomenon

With its emphasis on mental control over physical states and on the importance of mind/body/spirit integration, the field of holistic health encourages the tendency to believe in biased explanations for failures. For example, since mental aspects are considered by the field to play an important role in the healing process, factors other than the product—for example, the patient's faith—are taken into the consideration of causal attribution for a treatment's deficiencies. This has particularly bolstered the defense of some products by their practitioners in the face of failure (Beyerstein, 2001; Lowenberg & Davis, 1994). A particularly convenient form of this defense is highly similar to how faith healers defend against setbacks by attributing them to the sufferer's lack of spiritual purity or the vagaries of God's will: "If I can't heal them, there's something wrong with their souls" (Nolen, 1975), or "I don't heal; the Holy Spirit heals through me" (Selberg, 1995). Such statements have equivalent popular credos in the holistic health movement: "It is much more important to know what sort of a patient has the disease than what sort of disease the patient has" (Ornstein & Sobel, 1999). Those whose physical symptoms do not abate are simply not the right "sort of patient." Perhaps they have not meditated sufficiently, have not achieved the proper integration of mind, body, and spirit, or have not abstracted the proper "meaning" from their illness. Failures are not the fault of the underlying theory but instead stem from the patient's inability to apply it effectively (Beyerstein, 2001; Ornstein & Sobel, 1999).

Patients often adopt this tendency to blame themselves for a treatment's deficiencies. Many conclude that it was their own fault—that they had not lived a sufficiently holy life. Others assume that getting well was just not a part of God's plan (Nolen, 1975). Likewise, many of those who do not benefit from various holistic health regimens engage in similar acts of self-blame to protect their belief in the treatment's general effectiveness (Gilovich, 2008). The same does not happen in conventional medicine, or does so to a much lesser extent, because of traditional medicine's reduced reliance on anecdotal evidence in favor of controlled experimentation. Many advocates of alternative health practices completely reject controlled experiments as a valid means for arriving at the truth. "Real life" experience is considered the only informative guide to whether a treatment is beneficial (Tabish, 2008). But since some illnesses are self-limiting and some

alternative practices offer physiological and placebo effects, this can sometimes make even ineffectual remedies seem effective. Conventional practitioners might initially defend their "bogus" treatments by explaining away their failures, but most at least acknowledge the supremacy of scientific investigation. Under such scrutiny, a treatment's weaknesses will eventually come to light, as has occurred with bloodletting and laetrile. Therefore, to find more concrete evidence for this tendency to self-blame and to persevere with unconventional, but not conventional, medicines, as already documented in case reports, I hypothesize:

Hypothesis 1: In the event of non-recovery, unconventional medicine users tend to assign more (vs. less) weight to the self (vs. the product) for the role it played in not getting better.

Hypothesis 2: Even with the experience of failure, holistic medicine users (vs. conventional medicine users) tend to persevere more (vs. less) with their remedy.

Study 1: Documenting causal attributions of unconventional medicine users

Procedure. I selectively recruited 222 survey respondents (51% women; M_{age} = 36) from the online participant recruitment platform Mechanical Turk in exchange for modest compensation ($7.25/hour)[1]. I limited access to the study to frequent or occasional alternative medicine users based on a filter question. I recruited respondents who replied "*I am an occasional user*" or "*I am a frequent user*" to the question "*Which one choice describes you the most concerning the use of a holistic or other unconventional treatment (for example, an herbal remedy not recognized by the American Medical Association, a homeopathic remedy, etc.)?*" I did not recruit respondents who answered *"I am not a user at all"* or "*I use some.*" Respondents who fulfilled the inclusion criteria were randomly assigned to one of the four experimental conditions— 2 (failure vs. success) x 2 (conventional vs. unconventional)—in a between-participants experiment.

In each condition, participants were asked to think about a time when they had a physical ailment or illness of some kind and sought treatment to get better. In the alternative condition, they were asked to recall a time when the sought-after treatment was a holistic or unconventional

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[1] Data cleaning techniques for all the studies are discussed in detail in Appendix A.

treatment, such as an herbal remedy not recognized by the American Medical Association or a homeopathic remedy. In the conventional condition, they were asked to recall a time when the sought-after treatment was a conventional treatment, such as an antibiotic or an accepted anti-inflammatory medication. In the failure condition (vs. the success condition), they were asked to think only about when the illness or ailment had not been overcome (vs. had been overcome). As a measure of attribution, participants were asked to rate four possible factors in terms of their importance for getting better in the success scenario or for not getting better in the failure scenario. The choices "*The treatment itself,*" "*My body's reparative systems,*" "*My belief that the treatment would work,*" and "*My ability to maintain a positive attitude and avoid stressful emotions*" appeared in a randomized order. The scale ranged from 0 to 100. In the success scenario (vs. failure scenario), 100 meant that the participant thought the choice selected was responsible for their improvement (vs. for the failure to see an improvement), whereas 0 meant that the participant thought the choice played no role in their improvement (vs. played no role in the failure to see an improvement). The four attributions did not add up to 100%; therefore, the attribution ratings referred to the independent importance of each choice rather than to the relative importance of the choices. To control for the type of illness and type of treatment, respondents were asked to write a brief description of the ailment or illness and the treatment they had used to deal with the problem. Participants were also asked how long they had continued to use the treatment as well as their inferences concerning why the ailment or illness had been or had not been overcome.[2]

Results. A composite score[3] for attribution to the self was calculated by taking the average score of the three choices: "*My body's reparative systems* (M = 61.0; SD = 25.5)," "*My belief that the treatment would work* (M = 56.4; SD = 29.8)," and "*My ability to maintain a positive attitude and avoid stressful emotions* (M = 58.9; SD = 30.1)." The composite self-score was named

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[2] Since participants were randomly assigned to each condition, it was assumed that the covariates would be the same across conditions unless differing by chance. I further checked to determine whether this was true. To do so, the texts were coded as described in the results section. For example, for the "illness type" covariate, all mentions of "headache" by the participants were given a similar numerical value, while the same processing for other illness texts. This way, I was able to convert all of the texts into a number format. Those covariates that differed across condition, by chance, were added in the ANCOVA.

[3] A discussion of whether composite items were treated as formative or reflexive can be found in Appendix B.

"attribution to the self" in contrast to "attribution to the treatment." I coded the textual responses to the covariate variables. Similar text codes were given a similar numerical value across conditions. For example, every mention of illness as "back pain" was given a numerical value of "1." I ran a two-way analysis of covariance with the attribution—to the self and the treatment—as dependent variables. The pattern emerged that respondents attributed failure less to the treatment and more to the self for unconventional treatments (M_{self} = 56; $M_{treatment}$ = 55) than conventional treatments (M_{self} = 53; $M_{treatment}$ = 57). Moreover, respondents attributed success more to the treatment and less to themselves for both unconventional (M_{self} = 64.8; $M_{treatment}$ = 69.6) and conventional remedies (M_{self} = 59.7; $M_{treatment}$ = 75.3). Despite this pattern, the two-way interaction effect, the differential attribution to the self and the product for failure and success, was not strong enough ($F(1,444)$ = 3.37, p = 0.067), nor was the three-way interaction effect ($F(1,444)$ = 3.70, p = 0.543; see Figure 3).

Figure 3. Study 1: Attribution of responsibility to self and treatment for conventional and alternative remedies.
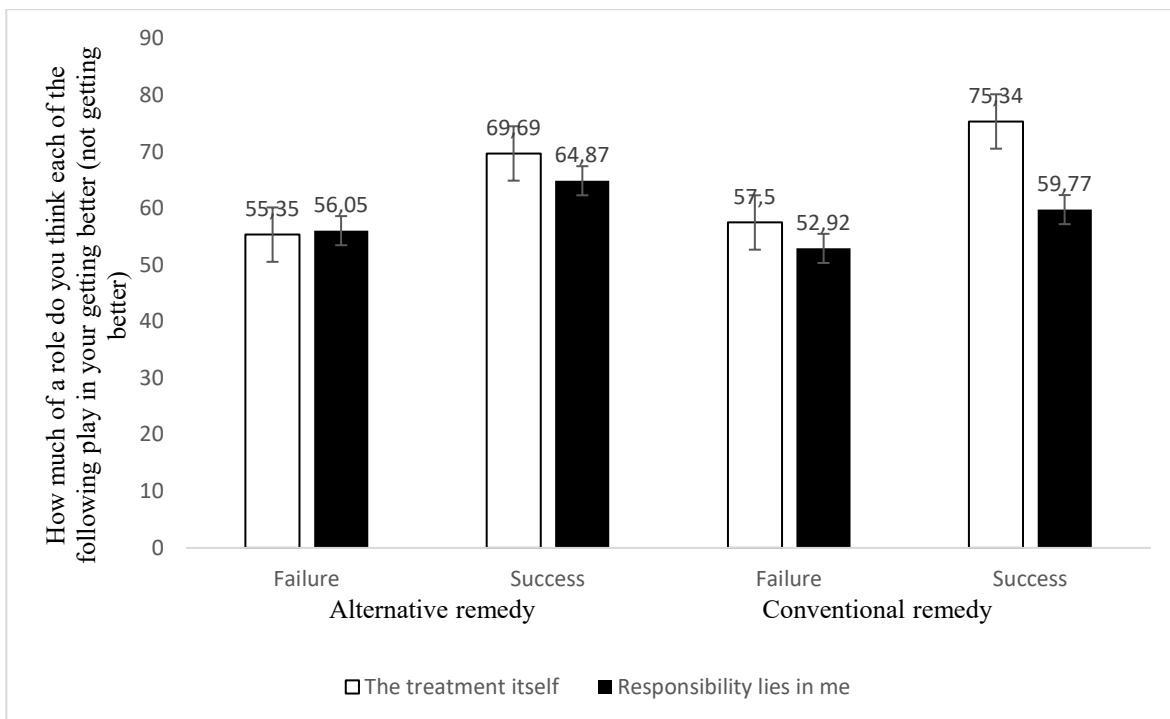
Note. Survey respondents tended to assign a greater (vs. lesser) role to the self (vs. the treatment) for the failure to see an improvement but a lesser (vs. greater) role to the self (vs. the treatment) for the improvement of an illness after use of an alternative remedy. In the case of a conventional remedy, this effect was partially reversed.

Discussion

One of the most important manifestations of holistic health is its emphasis on mental control over physical states and the importance of mind/body/spirit integration. Since there are different categories of holistic health practices, I anticipated that the degree of emphasis given to mental control over physical states would differ among categories. This is one reason why the pattern in Study 1 failed to reach conventional standards of statistical significance. I conducted a pretest study to rate 26 types of alternative remedies with regard to the importance of a person's attitude and belief in influencing the effectiveness of the remedy as a treatment for certain illnesses. Based on the findings of this study, I replicated Study 1. I selected one of the alternative remedies ranked at the top in pretest 1 and used it in the Study 2 manipulation.

Pretest 1: The extent of mind–body emphasis across unconventional remedies

Procedure. 57 survey respondents (40% women; M_{age}= 32) were recruited from the online participant recruitment platform Mechanical Turk for modest compensation ($7.25/hour). Participants rated 26 types of remedies, all of which are classified as unconventional medicine as per the Office of Alternative Medicines (OAM) classification at the US NIH (Gordon, 1996), on two scales. The list of remedies included prayer, acupuncture, Ayurveda, homeopathy, naturopathy, Chinese or Oriental medicine, chiropractic and osteopathic medicine, massage, body movement therapies, Tai chi, yoga, dietary supplements, herbal medicine, nutrition/diet, electromagnetic therapy, Reiki, Qigong, meditation, biofeedback, hypnosis, art, dance, music, visualization, and guided imagery.

The first scale measured the importance of a person's attitude and belief in influencing the effectiveness of each practice. Before the participants were asked to grade the list of medicines on the scale, they were given the following description about how they should proceed with the grading: "*Different medical interventions vary in terms of how important it is that the person maintains a positive attitude and is convinced that the intervention will work. For example, if a person has a fractured forearm and gets a plaster cast put on the arm, it is not that important that the person be optimistic that the treatment will work; casts have been shown to be effective even for people who have a negative attitude about the treatment and about their prognosis. On the*

other hand, it has been shown that psychotherapy is more effective in treating depression among people who believe psychotherapy is effective. It provides little or no benefit to those who are skeptical about psychotherapy in general. What about the therapeutic practices listed below? How important is a person's attitude and belief in influencing the effectiveness of the practice?" A seven-point Likert scale was used, where "1" referred to "*not important at all; like treating a broken arm with a plaster cast*" and "7" referred to "*extremely important; like treating depression with psychotherapy.*"

Participants also graded the list of unconventional medicines in terms of the extent to which they believed each practice was an effective treatment for certain illnesses. They rated each remedy on the scale "*to what extent do you believe each of the therapeutic practices listed below is an effective treatment for certain illnesses? (0% = to a very low extent; 100% = to a very high extent*)."

Result. Meditation (5.6), prayer (5.26), and visualization (5.26) were the most salient types of alternative remedies with regard to the importance of a person's attitude and belief in influencing the effectiveness of the practice (see Figure 4). At the same time, massage (4.02) and Qiqong (4.06) were ranked at the bottom. Meditation (52.7), prayer (40.36), and visualization (36.44) were also considered to be effective treatments for certain illnesses.

Figure 4. Pretest 1: Extent of emphasis on mind–body conviction across unconventional remedies.
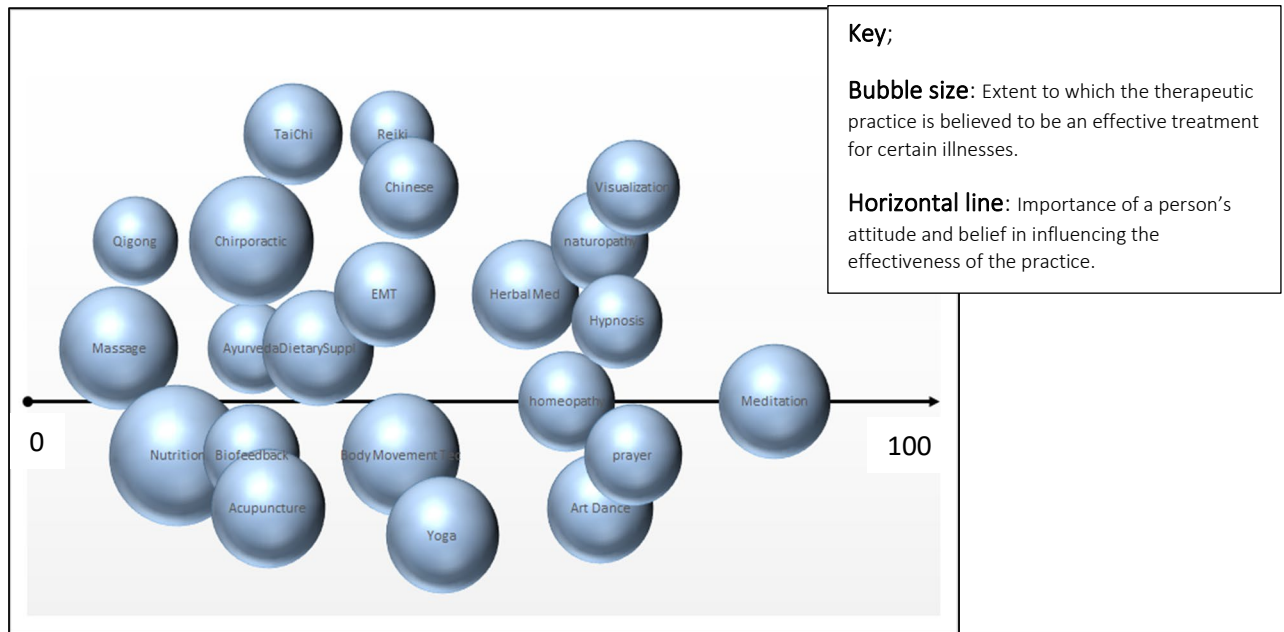
Note. Rating of 26 alternative remedies on the importance of a person's attitude and belief in influencing the effectiveness of the practice (horizontal line) and the extent to which the remedy is an effective treatment for certain illnesses (the size of the bubble). Meditation, prayer, and visualization emerged as the top types of unconventional medicine for which a person's attitude and belief were influential in the effectiveness of the practice and, at the same time, were considered as an effective treatment for certain illnesses.

Based on the pretest findings, I decided to run a conceptual replication of Study 1 using prayer as an alternative remedy of choice.

Study 2: Prayer and causal attribution

Procedure. I used a similar procedure and study design in Study 2 as in Study 1 except that I included respondents who had a strong faith in prayer as a remedy. A total of 100 survey respondents (43% women; M_{age} = 38) were recruited from the online participant recruitment platform Mechanical Turk after fulfilling the four inclusion criteria in exchange for modest compensation ($7.25/hour). Respondents who chose the religious affiliation "*Christianity (e.g., Baptist, Church of England, Roman Catholic, Methodist, Jehovah Witness)*" and the Christian denominations as "*Apostolic Pentecostal, Protestant, Baptist, Methodist, Lutheran, Anglican/Episcopalian, Calvinist/Reformed/Presbyterian*," and who scored 60 and above for the question "*How devoted a Christian are you? 100% means that you are devout Christian; 0% means*

that you are not devout at all," and who responded 3 or above on the seven-point Likert scale for "*How much do you believe in Prayer? 1 - Not at all; 7 - far too much*" were included in this study.

Respondents who fulfilled the inclusion criteria were randomly assigned to one of the two (failure vs. success) experimental conditions in a between-participants experiment. First, participants in all conditions were asked to imagine having a physical ailment or illness of some kind and, to get better, either having the minister at their church or someone else pray for them or praying for themselves. Participants in the failure condition were told to imagine that the illness or ailment did not get better or was not overcome. Participants in the success condition were told to imagine that the illness or ailment got better or was overcome. As a measure of attribution, participants were asked to rate four choices concerning how much of a role they thought each of four possible causes played in their getting better (for the success scenario) or not getting better (for the failure scenario). The choices "*Something about the prayer itself,*" "*My own faith in the power of the prayer,*" "*My belief that the prayer would work,*" and "*My own feelings about the prayer*" appeared in a randomized order. The scale ranged from 0 to 100. In the success scenario (vs. failure scenario), 100 meant that they thought the choice selected was responsible for their improvement (vs. for the failure to see an improvement), while 0 meant that the choice played no role in their improvement (vs. played no role in the failure to see an improvement). The four attributions did not add up to 100%; therefore, the attribution ratings referred to the independent importance of each choice rather than to the relative importance of the choices. To control for the type of illness, respondents were asked to write a brief description of the ailment or illness they imagined.

Result. Controlling for the type of illness respondents imagined, I performed a one-way analysis of covariance. Simple main effect analysis showed that respondents cited themselves (M_{faith} = 68.13, M_{belief} = 65.83, $M_{average}$ = 63.8,) more than prayer (M_{prayer} = 52.08) when it came to failure (p = 0.008; p = 0.023; p = 0.05) but not when it came to success (p = 0.32; p = 0.17; p = 0.42; see Figure 5). Moreover, respondents assigned more weight to prayer being more responsible for success *(M = 71.25, SD = 3.59)* than for failure *(M = 52.08, SD = 4.24; p = 0.001)*.

Figure 5. Study 2: Attribution of blame to the self versus prayer.
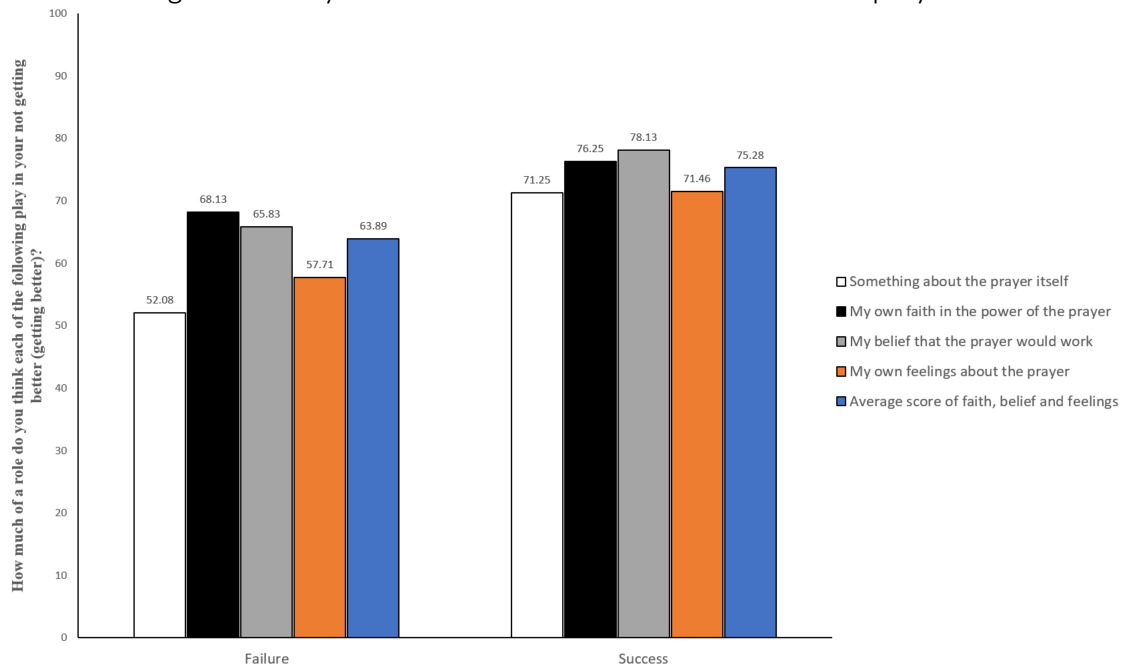
Note. Respondents attributed more responsibility to their own faith and feelings than to the prayer itself for the failure to see an improvement. However, both the self and the prayer were believed to be equally responsible for improvement.

Discussion

Prayer is considered to be an important medical therapy. According to a 2007 study that outlined patterns of complementary and alternative medicine (CAM) with data utilized from the 2002 National Health Interview Survey (NHIS), prayer was the most common CAM therapy, used by more than 60% of survey respondents (Brown et al., 2007). In that same survey, it was indicated that 45% of Americans incorporated prayer practices in addressing health concerns. As of 2016, 68% of Americans believed that a person could be physically healed by God and reported that they had prayed for someone else to be healed by God, a belief mainly held among Protestants and Catholics. From a sample of 31,000 people in the US, it was also shown that almost half of the respondents used prayer for their health (43%), some sought the prayer of others (24%), and a smaller number participated in prayer groups that focused specifically on personal health issues (10%) (Barnes et al., 2004).

In a widely cited article on unconventional therapies, Eisenberg and colleagues noted that 25% of all respondents reported using prayer as a medical therapy (Eisenberg et al., 1993). King

and Bushwick reported that 48% of hospital inpatients wanted their physicians to pray with them (King & Bushwick, 1994). Of 296 physicians surveyed during the October 1996 meeting of the American Academy of Family Physicians—which is the national association of family doctors in the US, with 133,500 members (AAFP, 2021)—99% were convinced that religious beliefs could heal, and 75% believed that the prayers of others could promote a patient's recovery (Sloan et al., 1999). Some scholars also want to advance the use of prayer, arguing for spiritual and religious interventions in medical practice and hoping that the "wall of separation" between medicine and religion will be torn down, with some asserting that "the medicine of the future is going to be prayer and Prozac"(Sloan et al., 2000, p. 1).

While prayer as a medical therapy is widely prevalent, it is also evident that the extent to which prayer is perceived as a serious medical therapy varies based on ones religiosity and the kind of illnesses for which it is used. For example, in one study, some individuals who reported greater religious activity perceived prayer to be more effective than conventional medicine (Ly et al., 2020). Participants were asked how effective they believed prayer to be in addressing 18 medical conditions that were categorized as acute, such as broken bones, fever, infection, the common cold, inflammation, and allergic reaction; and chronic, such as arthritis, diabetes, heart disease, high blood pressure, hepatitis, allergies, and nerve problems. The results showed that the participants were most certain about the efficacy of prayer for chronic conditions compared to acute conditions. However, it is reasonable to expect that many (even very devout) Christians who practice prayer as part of their religious commitment still do not expect prayer to work as a healing device.

It was under the framework of prayer as a medical therapy that Study 2 was conducted. That the pattern of self-attribution was more pronounced in Study 2 than in Study 1 has important implications. It suggests that self-attribution behavior is not equally strong in every type of unconventional remedy. More specifically, it indicates that the strength of self-attribution may vary depending on the degree to which each remedy emphasizes mind–body integration and the extent to which the users of each remedy embrace this ideology. One of the primary consequences of blaming oneself (instead of the treatment) is the tendency to persevere with the treatment (i.e., Hypothesis 2). Thus, in Study 3, I assessed the evidence for Hypothesis 2.

Study 3: Remedy failure and perseverance

Procedure. Two groups of survey respondents were recruited from the online participant recruitment platform Mechanical Turk in exchange for modest compensation ($7.25/hour). The first group of respondents included those who were occasional or frequent users of holistic or unconventional treatments. I recruited respondents who replied "*I am an occasional user*"' or "*I am a frequent user* " to the first question, "*Which one choice describes you the most concerning use of a holistic or other unconventional treatment (for example, an herbal remedy not recognized by the American Medical Association, a homeopathic remedy, etc.)?*" I excluded those who answered "*I am not a user at all*" or "*I use some*" from this group. Ultimately, 68 participants (29% women; M_{age} = 35) were recruited to this group. In the second group, 134 regular MTurkers (54% women; M_{age} = 38) were recruited without any inclusion criteria. This is because most were assumed to be conventional medicine users. Respondents in each group were randomly assigned to one of the two experimental conditions (alternative remedy vs. conventional remedy) in a between-participants experiment. In the alternative (vs. conventional) condition, respondents were asked to imagine that they had a problem with diabetes and that they had been told by someone they respected to try an alternative (vs. conventional) remedy. They were further told that the illness was not initially overcome. As a measure of perseverance, participants were asked an open question about how long they would stick with the treatment until they gave up and concluded that the treatment did not work.

Result. I coded the open replies to perseverance into a number of days. Then, I ran a one-way ANOVA. Alternative users tended to persevere for more (vs. less) days on alternative (vs. conventional) remedies until they gave up and concluded that it did not work even after knowing that the illness was not initially overcome: $F(1,67)$ = 5.18; p = 0.029. However, regular (supposedly conventional) users persevered for the same duration of time with the alternative and conventional remedies: $F(1,133)$ = 2.09; p = 0.15.

Figure 6. Study 3: The tendency to persevere with a conventional or unconventional remedy by alternative or regular users.
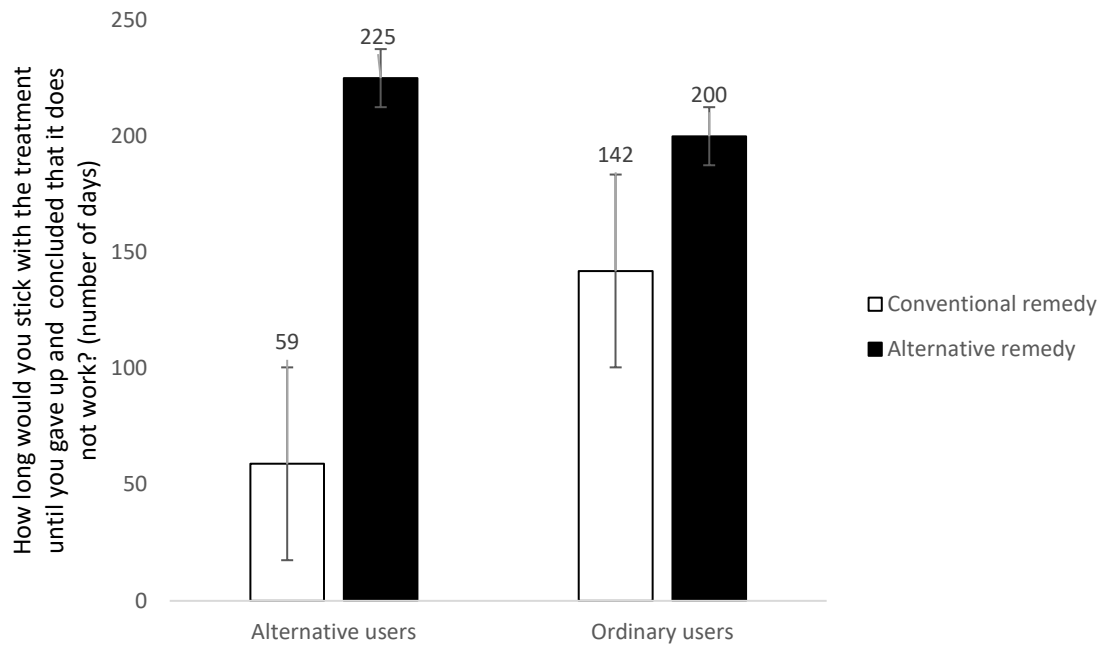
Note. Alternative users tended to persevere for a greater (vs. fewer) number of days on alternative (vs. conventional) remedies after learning about their failure, whereas regular users persevered equally long regardless of the type of the remedy.

7. Exploration of situational predictors

Contrary to elementary consumer behavior, I have shown that individuals tend to causally attribute blame more to themselves and less to the product or treatment after its failure. It was also indicated that this phenomenon occurred mainly for those health remedies for which mind–body integration was more salient. These findings shed more light on case reports that described events associated with self-blaming patients (Simonton et al., 1992). Based on the framework of causal attribution theory, which predicts that the causal assignment of factors to an event determines an individual's decision-making, I suspected that perseverance with an unsuccessful therapy was likely attributable to a differential manner of causal attribution. Although I tested the link between causal attribution and product perseverance, I have demonstrated, as discussed in the previous section, the tendency for alternative users to persist with alternative products for longer than conventional products, which is a pattern not reported for conventional users.

As behavior is always a function of both the situation and the person (Lewin, 1931), my main task, as conveyed in this and the next section, was to explore factors that predispose individuals to causal attribution bias or to identify situations that do the same and thus lead to product perseverance. Particularly in this section, three main objectives are discussed. First, with Study 4, I explored a situational factor that is salient in alternative medicine, namely the low evaluability of product claims. I hypothesized that the existence of such a situational factor or the formation of products as such creates causal attribution bias. Second, I tested the link between causal attribution and product perseverance. With Study 5, I explored whether situational factors like the low evaluability of product claims are generally more dominant in alternative remedies than in conventional remedies. This determination was used to enrich the discussion of why susceptibility to persistence with a failed product is more prevalent with alternative remedies than with conventional remedies.

Study 4: Difficulty of evaluability and perseverance

Credence (difficulty of evaluability). One feature of alternative or holistic remedies is that they have many attributes of credence products. Credence attributes are difficult for the average consumer to verify due to ambiguous and/or complex causal-effect mechanisms (Darby & Karni, 1973). The magnitude of a product's credence character is based on its claims. For example, products that make claims like "boosts *attention* and *focus*" are high in credence (Mitra et al., 1999). This means that measuring the extent of improvement in attention or focus is difficult during or after product use. Girard and Dion (2010) described herbal supplements and anti-wrinkle and hair-growth creams as examples of products with high credence attributes. In these cases, the consumer is unlikely to know with absolute certainty whether the product delivers what it is meant to and is unlikely to have the technical expertise to assess its efficacy. Such a verification gap makes product evaluations ambiguous among users, and it becomes challenging to identify product success or failure or the reason for a lack of improvement.

In the literature, evaluability has been defined as the degree of difficulty associated with evaluating a product based solely on the level of the attribute alone, independent of any contextual information (Yeung & Soman, 2005). I adopted the exact definition of evaluability of product claims

concerning the attribute on which the evaluation is solely based. The nature of credence products and their claims makes product evaluability difficult (Gottschalk, 2018). And this difficulty of evaluability would seem to play a significant role in sustaining motivated cognition. It is easy for people to think they are above average drivers because being a "good driver" can mean many things—being careful, having a good feel for handling the car, having quick reflexes, etc. But it is not so easy for people to think that they are above average when it comes to being "punctual" because that term means only one thing: showing up on time. So, the less clear-cut "improvement" is, or the more ways one might consider oneself "improved," the easier it will be for people to continue to believe in a failed remedy.

Hypothesis 3: *There is a higher (vs. lower) tendency to persevere with a low-evaluability (vs. high-evaluability) product after failure to see an improvement from an illness.*

Contingencies of attribution. What typically distinguishes credence products is that product evaluations are ambiguous, as the verification of product qualities or claims is challenging (Srinivasan & Till, 2002). Therefore, the consumer will not be confident enough to determine product failures. For example, it is essentially difficult for a consumer to ever determine whether an anti-wrinkle cream has succeeded or failed (Girard & Dion, 2010). In contrast, search and experience products *do* afford at least some knowledge from information and experience. A product that claims to heal a headache or relieve a fever can easily be evaluated since the claims are more easily experienced or verified. The experience of headache or fever relief is more diagnostic such that assessing whether the product has actually relieved symptoms is easy to determine (Hocutt et al., 1997; Su & Tippins, 1998). However, in a product that claims to boost immunity, determining whether the product has actually delivered on its claims is ambiguous. Even when lack of progress (failure of the medical case) is recognized, the nature of the product as credence limits further evaluations, therefore making attribution of blame ambivalent.

Hypothesis 4: *There is a lesser (vs. higher) tendency of attributing blame to a low-evaluability (vs. high-evaluability) product after failure to see an improvement from an illness.*

According to the failure response literature, attribution assignment has consequences for future decision-making (Folkes, 1984). This literature dictates that attributions influence how consumers respond to product failure. A sequence is implied in which consumers first ask "Why did the product go wrong?" and, from the answer to this question, consider "What should be done about it?" The particular value of this attributional approach is that a scientifically determined structure is imposed on the myriad types of causes for product failure—a structure that then permits predictions concerning specific consumer reactions. For example, consumers tend not to complain about a product ordered online but arriving late if they attribute the failure to factors other than the retailer (Hocutt et al., 1997). Such attributions are also less likely to dissuade future purchase intentions by a particular user regarding a particular retailer. Similarly, when consumers' causal assignment concerning failure is biased because the determination of improvement is less clear-cut and less blame is placed on the product, there is a higher tendency for perseverance.

Hypothesis 5: *There is a tendency to persevere more (vs. less) with a low-evaluability (vs. high-evaluability) product after failure to see an improvement from an illness. This is because of users' higher (vs. lesser) tendency of assigning blame to the product in the low-evaluability (vs. high-evaluability) condition.*

Procedure. In this study, instead of asking people to imagine an event in which they receive treatment for an illness, they were asked to recall their personal treatment use experience and how they previously responded to low-evaluability or high-evaluability products. This is because the judgment of claim evaluability comes after product use. Therefore, I designed a study with a memory paradigm. I came up with a list of high-evaluability/low-evaluability pairs of claims, all with an eye toward whether they would work in a recall study. For example, from categories of common cold-treating products, claims like "treats a headache" and "boosts the immune system" were paired as a high-evaluability and low-evaluability claim. From the list, I picked one pair to incorporate in the study. A total of 126 survey respondents (41% women; M_{age} = 34) were recruited from the online participant recruitment platform Mechanical Turk in exchange for modest compensation ($6/hour). Participants were randomly assigned to one of the two experimental conditions (low evaluability vs. high evaluability) in a between-participants experiment. In the high-evaluability condition, participants were

asked to think about a time when they did something to treat a headache or case of heartburn (for example, a supplement, a home-made remedy, a dietary change, or a conventional or unconventional treatment). In the low-evaluability condition, participants were asked to think about a time when they did something to boost their immune system and/or their vitamin-D levels (for example, a supplement, a homemade remedy, a dietary change, or a conventional or unconventional treatment). As a manipulation check, participants in the high-evaluability condition were asked how easy it was to evaluate whether or not their headache/heartburn was alleviated after taking the treatment. Participants In the low-evaluability condition were asked how easy it was for them to evaluate whether or not their immune system/vitamin-D levels were boosted after taking the treatment. The participants replied on seven-point Likert scale, where 1 referred to "extremely easy" and 7 referred to "extremely difficult."

As a measure of product perseverance, participants were asked "*If you thought that your vitamin-D level/immune system was not boosted (vs. headache/heartburn was not treated), how long did you stick with the treatment until you gave up and concluded that it did not work? (1 = immediately; 7 = very long)[4].*" Then, I measured attribution by asking the participants how much of a role they thought each of the four choices played for their failure to see an improvement. The choices were '"The treatment itself," "My body's reparative systems," "My belief that the treatment would work," "My ability to maintain a positive attitude and avoid stressful emotions," or "Other factors." They rated the scores from 0 to 100%, with 100% meaning that they thought the choice was responsible for the failure to see an improvement and 0% meaning that they thought the choice played no role in the failure to see an improvement. The attribution questionnaire required the participants to rate the relative importance of the five attributions by allocating percentage values to each of them such that they totaled 100% (Crombie, 1983). I also controlled for the type of treatment the participants recalled, the duration for which they stayed on the treatment, and how they knew whether or not their headache/heartburn was healed/alleviated by asking open questions and coding their replies for later analysis.

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[4] 1= I **immediately** gave up and concluded that the treatment did not work, 7 = I stuck **very long** with the treatment until I gave up and concluded that it did not work

Results. The covariate open-ended replies were coded and integrated into the analysis of covariance. Survey respondents found it more difficult to evaluate whether their immune system/vitamin-D levels were boosted in the low-evaluability condition than whether their headache/heartburn was alleviated in the high-evaluability condition ($F(1,125) = 22.05$; $p < 0.001$), giving validation to the manipulation ($M_{low-evaluability} = 3.28$; $M_{high-evaluability} = 2$). When respondents thought that their illness was not improved, they persevered more with the high-evaluability product than they did with the high-evaluability product ($M_{non-evaluable} = 5.06$; $M_{evaluable} = 4.12$) before they concluded that the product did not work ($F(1,125) = 11.70$; $p = 0.001$), giving support to Hypothesis 3. With regard to attribution, survey respondents in the low-evaluability condition considered the treatment to have played a higher role in the failure to see an improvement ($M_{non-evaluable} = 23.2$; $M_{evaluable} = 32.49$) than those in the high-evaluability condition ($F(1,125) = 3.66$; $p = 0.05$. Thus, Hypothesis 4 was supported. To test Hypothesis 5, the effect of evaluability (0 = high evaluability, 1 = low evaluability) on causal attribution of blame to the product and, consequently, on product perseverance, I used the PROCESS macro model 4 ((Hayes, 2017); 95% confidence level; 5,000 bootstrap samples). The results confirmed the significant effect of evaluability on the attribution of blame to the product ($b = -0.33$, $p = 0.05$) but not on the attribution of blame to the product concerning product perseverance ($p = 0.77$). The direct effect of evaluability on product perseverance was significant ($b = 0.58$, $p < 0.01$), as was the total effect ($p < 0.01$). However, the indirect effect of evaluability on product perseverance was not significant concerning causal attribution of blame ($b = 0.01$, 95% CI: -0.10, 0.15).

I suspected that perseverance with an unsuccessful therapy might also require users, besides attributing less blame to the product, to be financially fit. And since this study was a recall study in which participants were asked to recall their particular experiences, their income levels might have also affected their tendency toward product repurchases in addition to causal attribution. Therefore, I tested a moderated mediation effect with an income variable moderating the relationship between causal attribution of blame to the product and product perseverance. I used an income variable participants responded as part of demographic measures. The income variable was rated from 1 to 4, where 1 referred to participants earning 10,000USD/year or less, while 4 referred to participants earning 50,000USD/

year or more. To test the indirect effect based

on individuals' income difference, I used Hayes' model 14 (Hayes, 2017) with evaluability as a factor, treatment blame attribution as a mediator, product perseverance as a dependent variable, and income as a moderator of the path between treatment blame attribution and product perseverance. The PROCESS macro provided an estimate of the mediation effect at Johnson-Neyman (P. O. Johnson & Neyman, 1936) low and high significance regions of the moderator[5]. The findings showed that the magnitude of the mediation effect of evaluability on product perseverance through treatment blame attribution differed based on respondents' income levels (90% CI: 0.00, 0.21). The results illustrated that the conditional indirect effect for evaluability via treatment blame attribution on product perseverance was not significant (90% CI:-0.05, 0.13) when participants' income level was low (income levels of 2.85 and below) but significant (90% CI; 0.002, 0.32) when participants' income level was high (income levels of 3.9 and above).

Figure 7. Study 4: Relative indirect effect of low evaluability (vs. high evaluability) on product perseverance through treatment blame attribution.
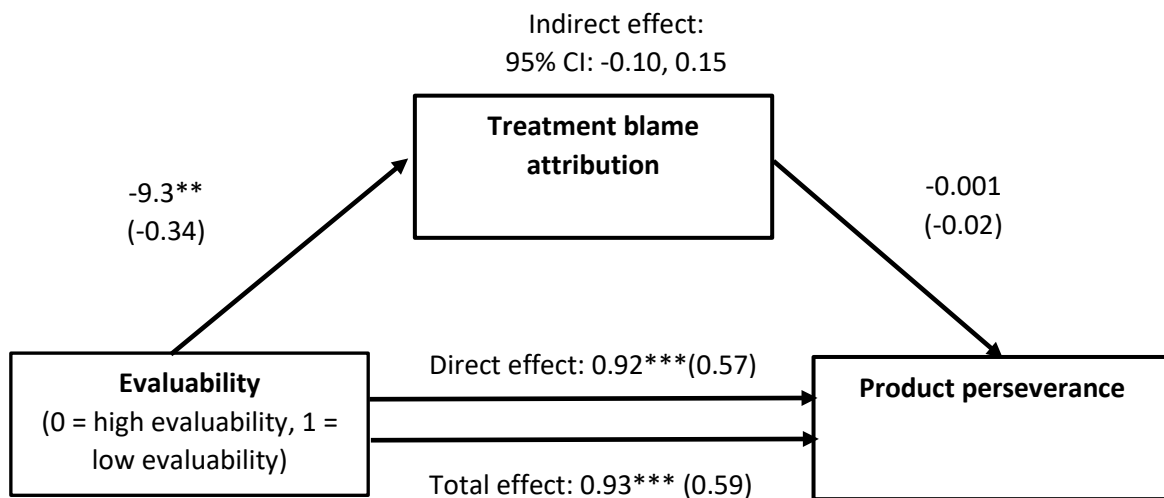
Note. Standardized estimates are in parentheses. *$p < 0.10$; **$p < 0.05$;***$p < 0.01$. **Condition** (0 = *high* evaluability, 1 = low evaluability). Treatment blame attribution *(100 = the treatment itself was fully responsible for the failure to see an improvement, 0 = the treatment itself played no role in the failure to see an improvement).*

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[5] Johnson–Neyman technique in Process Macro identifies regions in the range of a moderator variable in which the effect of an independent variable on a dependent variable is low (or not significant) and is high (or significant)(Hayes & Matthes, 2009; P. O. Johnson & Neyman, 1936).

Product perseverance *(1 = I immediately gave up and concluded that the treatment did not work, 7 = I stuck very long with the treatment until I gave up and concluded that it did not work).*

Discussion

Study 4 provides initial evidence that low evaluability leads to greater product perseverance after unsuccessful treatment. Moreover, low evaluability also caused causal attribution bias, making product blame assignment minimal. Thus, H3 and H4 were supported. This finding is consistent with previous research on causal attribution theory that emphasized that when consumers engage in an attributional search, it may be biased toward certain categories of causes (Folkes, 1984).

Moreover, the initial prediction of the mediation effect was not supported because it is not often true that individuals persevere with a product only because they blame the product less for failure but also when individuals can afford several repurchases. As previously researched, the predictive power of causal assignment on consumption consequences might depend on moderating factors (Nikbin et al., 2016). In Study 4, I showed that an individual's income level moderates the link between causal attribution and consumption decisions, thus describing conditions supporting H4. Study 5 explored whether alternative remedies, in general, have low-evaluability properties.

Study 5: General claim evaluability across unconventional (vs. conventional) remedies

In Study 3, it was shown that alternative remedy users persevere for longer than conventional remedy users after unsuccessful treatment. In Study 4, it was documented that low evaluability of products leads to product perseverance. Accordingly, can it be concluded that alternative remedy users persevere for longer with alternative remedies than do conventional remedy users because of the low- (vs. high-) evaluability feature? Making such a conclusion would be premature since the evaluability manipulation in Study 4 was based on a single pair of low-evaluability/high-evaluability claims. Study 5 served as a bridge between Studies 3 and 4, as it explored whether alternative remedies in general are less evaluable than their conventional counterparts. Accounts indicate that holistic medicine practitioners want the claims about their remedies to be more general so that there are several ways to justify treatment failure (Gilovich,

2008). However, these accounts comprise simple observations and as such require systematic study.

Hypothesis 6: *The claims of alternative (vs. conventional) remedies are generally less (vs. more) evaluable.*

Procedure. I used stratified random sampling to select 100 claims each from conventional and alternative products. Five up to 10 ads/claims were randomly picked from 10 up to 20 commonly used physiological strata. These strata refer to the physiological groups to which the drugs are pharmacologically assigned. Examples of such strata are anticancer, antibacterial, antiviral, antidiabetic, and antihypertensive. Amazon Marketplace was used as a data source for alternative remedies since it is considered a hub for most types of complementary and alternative remedies. As the online pharmacy shop list netmeds.com makes more than 25,000 prescription and non-prescription medication ads/claims visible to the public, it was used as a data source for the conventional remedies. In total, 200 product claims were collected from both categories.

A total of 21 respondents (62% women; M_{age} = 40) were recruited as judges from the online participant recruitment platform MTurk in exchange for a "master MTurker" compensation of $2 per task. The judges rated the claims made about how easy it would be to tell whether the remedy was effective if they suffered from each condition in question and they took the remedy. The 200 claims were presented in random order for each judge, and one judge was randomly assigned to rate 50 claims that were randomly picked from the total mixed claims. Before presenting the 50 random ads/claims to the judges, I gave them a description of how to proceed with the scoring: "You will *see 50 ads for medical remedies. Please read each one carefully. For each one, we'd like you to rate how easy it would be to evaluate whether or not the remedy was effective if you suffered from the condition in question and you took the remedy. For example, the claim 'boosts immune function' is difficult to evaluate because it is hard to know whether one's immune system is functioning well at any one moment—a person can't 'look inside' and see or feel it working well or poorly. Alternatively, the claim 'treats heartburn' is easy to evaluate because one can tell if one is still experiencing heartburn or not*." After the description, the judges were asked to rate the ads/claims: *"Please rate how easy it would be to tell whether the remedy was effective on the scale*

below: 1 = very difficult to tell, like 'boosts immune function' … 7 = very easy to tell, like 'treats heartburn'."

Table 1. Study 5: A short list of 200 ads/claims rated by judges (see extended list in Appendix C).

R.No	Conventional remedy ads/claims		Alternative remedy ads/claims	
1	Atrest 12.5 mg	Used in the treatment of the involuntary movements of (chorea) Huntington's disease	Turmeric curcumin 1500	Supports anti-inflammation and detoxification
2	Camyda 300 mg	Used in the treatment of severe bacterial infections	Gaia herbs prostate health	Maintains prostate function
3	Tretinoin 0.05% cream	Used to reduce fine wrinkles	AZO	Safely helps reduce occasional urgency, promotes healthy metabolism to improve weight management, supports a good night's sleep, supports bladder strength and helps reduce the urge to go, day and night; supports serotonin balance and helps promote metabolic health to support healthy weight management
4	Clindamycin phosphate	Used to treat mild to moderate acne (spots)	Prostate support	Helps support urinary health, boosts testosterone
5	Adapalene and Clindamycin	Used to treat blackheads, white	Magnesium caps	Supports energy production, critical for enzyme function

heads, and pimples
(acne vulgaris)

Results. Each ad/claim received a total of six ratings from six judges. I calculated an average score for each ad/claim. Judged evaluability was higher for the 100 conventional remedy ads/claims ($M_{conventional\_claims} = 4.47$; $M_{alternative\_claims} = 3.62$) than for the 100 alternative remedy ads/claims ($F(1,199) = 45.89$, $p < 0.001$).

Figure 8. Study 5: A rating of 200 unconventional and conventional remedy claims on evaluability.
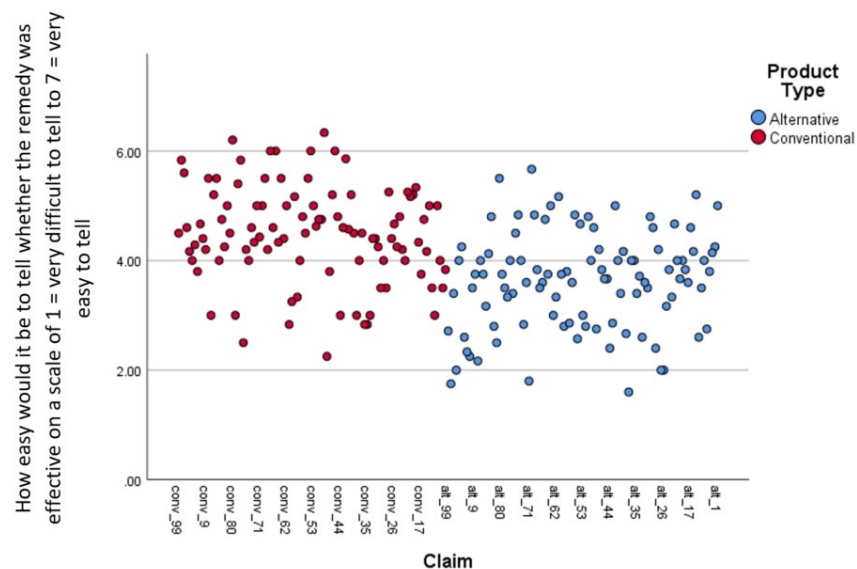
Note. Each claim on the x-axis has a respective average score on evaluability on the y-axis. The 21 judges who were randomly given a mix of conventional and alternative claims to rate on the evaluability index found it easier to evaluate the 100 conventional remedy claims than the 100 alternative remedy claims.

Discussion

Two Implications can be derived from Study 5. First, Study 5 sought to bridge Study 3 and Study 4: the explanation for why alternative users persevere more with alternative remedies than conventional ones (Study 3) is that alternative remedies, in general, have low evaluability (Study 5), a feature that drives both causal attribution bias and product perseverance (Study 4).

Study 5 also supported claims made about holistic medicine practitioners: Holistic medicine practitioners want the claims about their remedies to be more general in order to find easy ways to justify treatment failure (Gilovich, 2008). This is in line with the conceptual link between low evaluability and ambiguity. In the next section, dispositional predictors are explored.

8. Exploration of dispositional predictors

Some types of medical treatments are believed to rely mostly or even exclusively on the generation of expectations and the occurrence of placebo effects. Several forms of alternative medicine (e.g., homeopathy, therapeutic touch, imagery, and herbal medicine) are believed by scientists not to have any actual therapeutic effect (Angell & Kassirer, 1998). Naïve theories of health, like the control of the mind over the body, are suggested to drive the creation and maintenance of such strong beliefs about inert substances (Gilovich, 2008). One of these is the belief in psycho-immunology.

Psycho-immunology, also called psychoneuroimmunology, is a legitimate field in biochemistry (Wieselmann, 2012). Findings in the field have documented pathways connecting the brain and the immune system (Maier et al., 1994; Nabi et al., 2016). They have also indicated how psychological events influence some indices of the immune system and, ultimately, health. There is, however, a prescientific form of psycho-immunology, which is named as belief in psycho-immunology. This prescientific context is more dramatic than the actual science. In its prescientific context, the concept of psycho-immunology is understood as a belief trait held by every individual to a greater or lesser extent. "Belief in psycho-immunology (BPI)" was first elaborated by Gilovich (2008) as the conviction that mere thoughts, emotional states, feelings, and the products of our imaginations can influence or promote our state of health and mitigate the prevalence of disease. This places a larger part of the responsibility on the patient, or at least convinces the patient that he or she is responsible. Such beliefs are powerful because they are rooted in the fundamental prescientific notion of the close relationship between body and mind, and they are more common in Asian and African philosophies than in the Western, Cartesian view of body–mind distinction (Mick, 2017).

Holistic[6] health practitioners are the primary advocates of the BPI as they benefit substantially from its implications. Suppose that appropriate thoughts and feelings *do* promote health. In that case, holistic health practitioners can easily promote the implication that a failure to adopt the right attitude is a plausible cause for both illness and non-recovery from illness. Faith healers employ an exceptionally convenient form of this defense by attributing any setback (e.g., failure of their healing efforts) to the sufferer's lack of spiritual purity or the vagaries of God's will: *"their not getting well was just not having the right faith in the first place, not the legitimacy of the healing" (Macdougall, 1983)*. Practitioners and users of various holistic health regimens also engage in similar defense mechanisms to protect their belief in the treatment's general effectiveness. For example, some alternative medicine practitioners advocate self-faith as an essential part of the healing: "*If you don't believe it, it won't help you*" (Shahid et al., 2010). At the same time, users make their lack of belief responsible in cases of no recovery from illness. It is not uncommon to see quotes like what one cancer patient, who failed to recover after use of an alternative treatment, forwarded to his practitioner on his death bed: "*tell the practitioner that the method still works, it was my disbelief that was the fault*" '(Simonton et al., 1992).

One of the holistic health movement's most popular credos is "It is much more important to know what sort of patient has the disease than what sort of disease the patient has" (Ornstein & Sobel, 1999). Those who do not have the right psychological characteristics are considered simply as not the right "sort of patient" (Gilovich, 2008). This implies that the right sort of patients are those who believe in psycho-immunology: the conviction that mere thoughts, emotional states, feelings, and the products of the imagination can influence or promote the state of health and mitigate the prevalence of disease. This belief trait could be measurable as an inter-individual difference. Therefore, characterizing the right or wrong sort of patients and ultimately predicting the tendency of an individual's perseverance with inert substances is possible. Accordingly, it can be hypothesized that the score of individual BPI can predict self-blaming for product failure and perseverance with inert substances.

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[6] Holistic medicine is one branch of alternative medicine that takes a whole-body approach to health care and emphasizes the mental component of healing more than the physical substance administered.

Hypothesis 7: People who score high (vs. low) on belief in psycho-immunology have a higher (vs. lower) tendency to attribute blame to the self and consequently to persevere more (vs. less) with a product in the event of non-recovery.

No prior research has developed a measure to capture inter-individual differences in BPI. One construct that bears some resemblance to BPI is "locus of control" (Craig et al., 1984; Martin et al., 2007), which taps into a belief about who or what (ourselves, luck, potential others) controls the things (e.g., illness) that happen to us. However, this construct does not consider the role of emotional and psychological states, only a general personal will (e.g., "I am directly responsible for my health"). Personal will and mental states are two different aspects, at least in terms of controllability (Kenny, 2003).

In an initial pretest, I surveyed whether people's scores on locus of control, as a proxy of BPI, correlated with how people differentially attributed weight to the self during product failure assessment. A total of 109 participants (40% women; M_{age}= 34) were recruited from the online participant recruitment platform MTurk in exchange for modest compensation. Participants were asked to imagine that they had been taking an alternative treatment for an illness for more than a week but felt that they did not get better. Then, the participants were asked to rate seven possible causes (the doctor, the product, the hospital, mental disbelief, thoughts and imagination, emotions, the illness) in terms of how big a role each played in not making progress. The scale ranged from 0 to 100, with 0 as extremely unlikely and 100 as highly likely. Finally, I used the 19-item multidimensional health locus of control (MDLC) scale (Wallston et al., 1978) to assess participants' locus of control. This scale measures the belief that the source of reinforcements for health-related behaviors is primarily internal, referring to the internal dimension of the scale or a matter of chance or the control of powerful others referring to the external dimension. Individuals scoring higher on the internal dimension of locus of control tended to blame themselves[7] for the lack of progress ($r(109) = 0.43$, $p < 0.01$).

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[7] Self-blame = An average score on "my mental disbelief," "my thoughts and imagination," and "my emotion." More clarification can be found in Appendix B.

Encouraged by these results, I decided to develop a measure to assess individual differences in BPI more specifically. With this measure, I would be able to further examine whether people's scores on the BPI correlated with how they attributed weight to the self versus treatment during product failure assessment and the extent of treatment persistence. I first report the development and validation of the BPI scale. The choice to investigate a more specific and elaborated psycho-immunology construct was made after observing how effective the marketing strategies of holistic therapy can be at manipulating users and finding medical consumers highly responsive to the conviction that the body's immune system is maximally reactive to one's mental and emotional life (Gilovich, 2008, pp. 140-145).

8.1 Belief in psycho-immunology

Psycho-immunology, sometimes called psychoneuroimmunology, is a medical discipline concerned with the study of interactions between the central nervous system (mainly the brain) and immunity (Maier et al., 1994). Immunity refers to the body's defense against invading pathogenic microorganisms and tumors and is an essential component of tissue repair processes after injury. The discipline studies biochemical pathways connecting the brain and the immune system, and thus how psychological events might influence indices of the immune system and ultimately health (Maier et al., 1994; Solomon, 1987; Wieselmann, 2012).

There is some evidence that acute stressors (e.g., social defeat, sleep deprivation, maternal separation, taking an examination), chronic stressors (e.g., crowding, divorce, bereavement, need to exercise power), mood and emotional states (e.g., depression, anger, and anxiety) and conditioned stimuli (e.g., water placebo as chemotherapy) trigger the release of neurotransmitters (e.g., catecholamines) or hormones (e.g., glucocorticoid) into general blood circulation. These released neurotransmitters and hormones have been shown to result in a minimal effect on some immune parameters (Nabi et al., 2016; Pérez-Aranda et al., 2019). However, there is no evidence for mere psychological events suppressing/enhancing immune function and ultimately influencing or promoting the state of health and mitigating the prevalence of disease.

Parallel to the scientific discipline of psycho-immunology, beliefs about how the mind influences the body have always been important in naive theories of health (Burgmer & Forstmann, 2018). As first elaborated by Gilovich (2008), the mental contents in BPI constitute four aspects: mere thoughts, emotional states, feelings, and the products of the imagination. The "thought" and "imagination" components are represented particularly concerning how thinking about experiences of disease spark negative or positive emotions or feelings. Consequently, the thoughts and imaginings that trigger emotions and feelings make individuals more prone to believing they are vulnerable to acquiring the particular disease imagined or believing they have a poor ability for disease recovery.

From the cognition-emotion perspective, cognition precedes emotion or they are highly interdependent, and emotion is a comprehensive construct (Storbeck & Clore, 2007). Therefore, emotions can be seen as the end product of a complex interaction between cognitions (Posner et al., 2005). In that regard, I constituted emotion and feeling aspects into the BPI scale but still made an effort to choose a comprehensive model of emotion that embodied various aspects and illuminated the interdependence between cognition and emotion.

One notable theory of emotion that reflects the relations between cognition and emotion in the design of emotion items is Plutchik's theory of emotion (Plutchik, 1982), in which the notion of interdependence between cognition and emotion is expressed in the following postulation: "*the existence of any emotion presupposes the prior occurrence of cognition or evaluation. However, although all emotions presuppose evaluations, not all evaluations produce emotions.*" I relied on Plutchik's model of emotion to select items for the development of a scale. In Plutchik's theory of emotion, 24 emotions are postulated, which vary in their degree of similarity to one another, demonstrate polarities, and vary in their degree of intensity or level of arousal (Plutchik, 1982). First, eight primary emotions—anger, fear, joy, sadness, acceptance, disgust, surprise, anticipation—are conceptualized in terms of pairs of polar opposites. For example, anger and fear are opposites in the sense that one implies attack and the other flight. Joy and sadness are opposites because one implies possession or gain while the other implies loss. Acceptance and disgust are opposites because one implies accommodation, and the other implies rejection. Surprise and anticipation are opposites because one implies the unpredictable and the other

implies the predictable. In addition to the polarities inherent in the structure of emotion, there is another implicit dimension: the relative similarity of the emotions. Thus, anger and disgust are more similar than are anger and surprise. Second, Plutchik's theory of emotion also postulates that each primary state of emotion can exist in varying degrees of intensity or levels of arousal. This dimension was added to highlight different aspects of the eight primary emotions, grading them from less salient to most urgent: interest – anticipation – vigilance, distraction – surprise – amazement, serenity – joy – ecstasy, pensiveness – sadness – grief, acceptance – trust – admiration, boredom – disgust – loathing, annoyance – anger – rage, apprehension – fear – terror, respectively.

For two main reasons, I based scale development items on Plutchik's model of emotion. First, important aspects of emotion, like *disgust, interest, fear, trust, anticipation*, or *acceptance,* that are relevant experiences to the topic of BPI are constituted in Plutchik's model. For example, some practical examples of BPI build on individuals' inference of their *acceptance* of the healing or *trustfulness* of the practitioner's role or *anticipation* of fast recovery as key role players in the healing process. Moreover, BPI also promotes the intuition that the *disgust* from learning about a new disease and the *imagination* of it play a negative role in one's immunity (Gilovich, 2008). This broad elaboration of aspects in Plutchik's model allows the incorporation of items representing the mental contents of cognitive feelings, which are one branch of the BPI structure. This would make the item construction and BPI dimension representation complete. Second, the structure of the valence dimension as bipolar in Plutchik's model closely corresponds with how mental events are described in the BPI conceptual construct as negative or positive. For example, there is a general inclination in BPI that bad mental states are not good for health, while good mental states promote health.

8.2 Methodology: Overview

The scale development procedure followed the general guidelines suggested by Churchill Jr (1979), Bollen (1989) and Rossiter (2002). The details of the procedure are presented in Table 1. First, a review of the existing literature was conducted. The review led to the understanding of the possible dimensions of BPI and the construction of an exhaustive list of 45 items from

Plutchik's model of emotion. I found this model to be more relevant to the topic of the BPI concept and corresponded very well with how mental events are described in the conceptual construct of BPI as negative and positive. In study 6, a content validity assessment was conducted. It was a process of assessing whether the elements of the BPI construct are relevant and representative. The elements of the BPI construct that were subject to this process included individual items, response formats, and instructions. Assessment of relevance included checking the appropriateness of the elements for the targeted construct. Representative assessment scrutinized the degree to which the elements were proportional to the facets of the targeted construct. This process led to 24 items for pilot testing.

In Study 7, the structure of the generated items was refined with exploratory factor analysis ($N = 480$), revealing a three-dimensional BPI construct. I named the three factors positive emotion-immunity (PEIM), negative emotion-immunity (NEIM), and cognitive feelings-immunity (CFIM). In Study 8A, the three-factored BPI measurement model was specified on AMOS 26.0, and confirmatory factor analysis was conducted ($N = 422$). In Study 8B, I replicated Study 8A on a large sample ($N = 700$) to check the robustness of the confirmatory loadings and the fit of the measurement model. The confirmatory factor analysis resulted in a final list of 20 items with acceptable model fit indices and model specifications. In Study 9, construct validity was assessed by analyzing the extent to which the 20-item BPI scale adequately assessed the construct it purported to assess. The two subtypes of construct validity, convergent and divergent, were determined. For convergent validity ($N = 209$), whether the scores on the BPI scale converged with other theoretically similar constructs—for example, locus of control, superstitious beliefs, religiosity, and conservatism—was determined. For divergent validity ($N = 486$), whether the scores on the BPI scale diverged from other theoretically different constructs—for example, need for cognition and impulsivity—was assessed. In Study 10A to 10C ($N = 425$), I conducted a concurrent validity test, which is one type of criterion validity assessment that in this study reflected the extent to which the BPI scale was related to the behavioral outcome it should theoretically predict—for example, the use of complementary and alternative remedies, the vaccine acceptance rate, and placebo response.

Table 2. Detailed procedures of item generation for BPI scale development.

R.No	Procedures	Findings
1	Theoretical elaboration of BPI	・ Thomas Gilovich's theoretical explanation of psycho-immunology in the context of consumer behavior
		・ Dimensions of BPI specified
2	Item generation	・ The mental contents subject to BPI are summarized with Plutchik's framework of emotions
		・ 45 items generated
3	Content validity	・ Faculty members commented on the appropriateness of the scale, MTurk series of studies used to refine structure and wording of scale
		・ 24 items selected as appropriate and representative of the BPI construct for pilot study
4	Exploratory factor analysis ($N = 480$)	・ Structure of 24-item scale refined with explanatory factor analysis
		・ 23 items valid on 3 factors
		・ One item cross-loaded significantly on two factors, removed
5	Latent variable naming	・ Bearing with theory, three factors were accepted
		・ Latent factors named as "*positive emotion immunity, negative emotion immunity, cognitive feelings immunity*"
6	Confirmatory factor analysis 1 ($N = 422$)	・ Measurement model (12 items on F1, 8 items on F2, 3 items on F3) specified on AMOS 26.0
		・ Model specified again to improve poor fit (removed 3 poorly loading items)
		・ 20 items specified with acceptable model fit indices

7	Confirmatory factor analysis 2 (*N* = 700)	‣	Confirmatory test conducted on a large sample to check robustness of the measurement model fit and confirmatory loadings
8	Convergent validity pre-test (*N* = 209)	‣	Convergent validity of BPI with locus of control, superstitious beliefs, religiosity, and conservative political orientation
9	Divergent validity (*N* = 486)	‣	Discriminant validity of BPI with need for cognition and impulsivity
		‣	
10	Criterion validity (*N* = 288)	‣	Predictive validity of BPI on complementary and alternative medicine (CAM) use controlling for CAM familiarity
11	Criterion validity 2 (*N* = 111)	‣	Predictive validity of BPI on vaccine acceptance rate, placebo effect of BPI
14	Criterion validity 4 (*N* = 21)	‣	Predictive validity of BPI on the type of consolation advice people offer
12	Criterion validity 3 (*N* = 82)	‣	Predictive validity of BPI on product perseverance

The theoretical definition of prescientific psycho-immunological beliefs, as put forward by Gilovich (2008), considers important aspects of belief conviction (i.e., emotional states, thoughts and feelings, products of imagination) as affecting the state of health (promoting or harming). Plutchik's (1982) classical typology of emotions was used to summarize the mental experiences under the prescientific definition of psycho-immunology. The total BPI scale measures to what extent respondents believe in the positive or negative effect of specific emotional experiences on their immunity, as reflected in the susceptibility to and the course of illness. All items were measured on a bipolar, seven-point Likert scale. Each item asked participants to indicate whether being in a particular emotional state either "boosted their immunity, leading to faster recovery" or "weakened their immunity, leading to slower recovery." Answer categories ranged from -3 to

3: (-3 = "*I will recover* **extremely slower** *from an illness*," -2 = "*I will recover* **considerably slower** *from an illness*," -1 = "*I will recover* **somewhat slower** *from an illness*," 0 = "*I will* **neither be slower nor faster** *to recover from an illness*," 1 = "*I will recover* **somewhat faster** *from an illness*," 2 = "*I will recover* **considerably faster** *from an illness*," 3 = "*I will recover* **extremely faster** *from an illness*").

Table 3. Belief in psycho-immunology measure scale items (full list in Appendix D).

To what extent do you agree with the following statements?

	I will recover **extremely slower** from an illness (-3)	I will recover **considerably slower** from an illness (-2)	I will recover **somewhat slower** from an illness (-1)	I will **neither be slower nor faster** to recover from an illness (0)	I will recover **somewhat faster** from an illness (1)	I will recover **considerably faster** from an illness (2)	I will recover **extremely faster** from an illness (3)
When I feel afraid	○	○	○	○	○	○	○
When I am worried that something bad or unpleasant might happen	○	○	○	○	○	○	○
When I am emotionally terrified or scared	○	○	○	○	○	○	○
When I feel angry	○	○	○	○	○	○	○
When I become annoyed or displeased	○	○	○	○	○	○	○

Study 6: Content validity

For content validity, I assessed the degree to which individual items are proportional to the facets of the targeted construct. Next, I evaluated the degree to which individual items, response formats, and instructions of the assessment instrument are appropriate for the targeted construct and function of assessment (Haynes et al., 1995).

I involved faculty members at two business schools in discussing the 45 items, followed by a pilot study on MTurk. I asked faculty members to provide their opinion on two aspects. First, for each item, I asked them to what extent it represented each of the dimensions of BPI. Of the 45 items, 24 were classified as representative or highly representative and were retained (Haynes et al., 1995). In a second round of content assessment, the instrument was judged by three faculty members on applicable dimensions, such as item relevance, representativeness, clarity,

and technical quality, using a seven-point evaluation scale. All three judges rated the scale as "extremely good" with a 100% agreement level in terms of clarity and technical quality. In terms of appropriateness and representativeness, two of the judges rated the scale as "moderately good," while the third judge rated the scale as "extremely good."

Study 7: Exploratory factor analysis test—item refinement

Procedure. The scale items were language-edited once more before being submitted to an exploratory factor analysis test. In this test, I distributed a survey to 480 MTurk participants. Since random reply is an issue in online surveys, I included attention check questions. A higher capture rate of inattentive respondents occurs when using more than one attention check and even more so when using multiple types of attention checks (e.g., directed queries, logical statements, and manipulation checks) (Abbey & Meloy, 2017). Hence, I used two instructed response items and two directed query-type attention checks (Abbey & Meloy, 2017; Kung et al., 2018). In the directed query type, two questions appeared two times in the survey. This helped to screen for inattentive respondents who wished to rapidly complete surveys. The first question was "*What is the third word in this question: How many stars are in the American Flag*?," with the correct response being "*stars.*" The second question was "*Please select the option ''lavender note,'*" with the correct response, *"lavender note,"* included in the response options with *"sports car,"* *"cosmetic box," and "sofa.*" In the instructed response item type, two questions were inserted as an item into the 24 BPI scale on the 7th and 22nd positions. The former was framed as "*This item is testing how attentive you are. Click on 'I will recover considerably slower from an illness,'''* while the latter was framed as "*For this item, do not give an opinion but click on 'I will recover somewhat slower from an illness'.''* Prior research on MTurk responses suggested that the presence of an item asking respondents to affirm that they were attentive and honest was associated with more reliable responses (Rouse, 2015). Therefore, at the end of the survey, respondents were also asked to indicate whether they could confirm the reliability of their replies, with a "yes" or "no" question.

With the attention check questions, I filtered out 127 (26%) participants. For MTurk experiments, it is common that removal rates can vary from 2% to 52% depending on the number

and difficulty of items used for exclusion (Thomas & Clifford, 2017). In addition, I removed the replies of two participants that had a missing value on more than 10 of the items. I evaluated and identified outlier participants based on how far the mean vector data was from the mean distribution using a Mahalanobis distance measure (Mitchell & Krzanowski, 1985). Accordingly, 48 outlier observations were cleared.[8] I retained 303 observations, which is considered sufficient to proceed with factor analysis according to standard criteria (MacCallum et al., 1999).

I conducted two further tests to assess the suitability of the respondent data for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure assesses the proportion of variance among variables that might be common variance. According to KMO, sample items have the desired correlation that qualifies them for a factor analysis if the KMO threshold is above 0.6 (Kaiser, 1974). With a KMO of 0.934, the dataset fulfilled the pre-factor correlation requirement and was adequate for further analysis. Bartlett's test of sphericity checks whether there is redundancy between variables that can be summarized with some factors (Tobias & Carlson, 1969). The test indicated that correlations between items were sufficiently large for exploratory factor analysis (χ^2 = 4656.95, df =253, p = 0.000). The individual correlations within the group ranged as high as 0.77.

Factor analysis. To investigate the underlying structure of the 24-item questionnaire, data collected from 303 participants (57% women; M_{age} = 31) were subjected to principal axis factor analysis with oblimin rotation and a cut-off point of 0.32. Using an alpha level of 0.01 (two-tailed), a rotated factor loading for a sample size of at least 300 would need to be at least 0.32 to be considered statistically meaningful. This is because a factor loading of 0.32 implies approximately 10% of the overlapping variance[9] (B. G. Tabachnick et al., 2007).

I followed standard exploratory factor analysis procedures to choose factor extraction and rotation methods (Yong & Pearce, 2013). The decision of how many components to retain was based on two criteria. First, a scree test was considered. According to the scree test, the elbow of the graph where the eigenvalues seem to level off was found, and factors to the left of this point

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[8] Keeping or excluding the 48 outlier observations would not have affected the results. But to abide by the formal procedures of factor analysis, I proceeded by excluding the outlier observations.
[9] A factor loading of 0.32 equals 10% variance explained of the item (by the latent factor).

were retained as significant. Second, factors with eigenvalues greater than 1 were retained (Velicer & Jackson, 1990). One item, thoughtfulness, cross-loaded significantly on two of the factors at the same time. As per the recommendation of Gaskin (2012), an item that loads on two or more components with less than 0.20 loading difference is unacceptable since it does not provide unique information about one dimension and is thus redundant. Therefore, "thoughtfulness" was deleted and extraction was performed again, ultimately leading to the identification of three factors with eigenvalues exceeding 1 underlying the 23 questionnaire items (see Table 4). In total, these factors accounted for around 68.8% of the variance in the questionnaire data: 12 items under factor 1, eight items under factor 2, and three items under factor 3 loaded with loading coefficients ranging from 0.5 and above (Floyd & Widaman, 1995).

Table 4. Final sets of BPI (belief in psycho-immunology) items after the exploratory factor analysis.

Items	Factor			Dimension
	1	2	3	
When I become annoyed or displeased	.817	-.090	.055	
When I am disgusted with something	.815	-.153	.108	
When I am worried that something bad or unpleasant might happen	.809	-.108	-.115	
When I feel hate for somebody	.798	-.057	.021	
When I feel angry	.789	.021	-.032	Factor 1
When I am emotionally terrified or scared	.783	.044	-.157	(Cronbach's alpha
When I feel furious	.765	.032	-.028	= 0.938)
When I feel afraid	.724	-.033	-.004	AVE = 0.54
When I feel sad	.665	.185	-.283	CR = 0.93
When I am bored	.601	.093	.135	
When I get emotionally distracted	.588	.134	.026	
When I feel grief	.586	.243	-.321	
When I feel interested in something	-.069	.793	.067	

When I feel admiration for somebody	.039	**.770**	-.075	
When I trust somebody	-.107	**.759**	.007	Factor 2
When I pay careful attention to something	.015	**.672**	.045	(Cronbach's alpha
When I am amazed	.144	**.665**	.138	= 0.891)
When I hope for something	-.131	**.649**	.091	AVE = 0.48
When I am surprised	.313	**.618**	.121	CR = 0.88
When I accept the situation as it is	.041	**.573**	.030	
When I am joyful	.033	.080	**.852**	Factor 3
When I am in delight	-.022	.125	**.739**	(Cronbach's alpha
When I feel peace of mind	-.080	.208	**.667**	= 0.871)
				AVE = 0.57
				CR = 0.80

Naming. There are general and less complex categorizations of emotions in the emotion literature. The most general is the positive–negative polarity dimension. This categorization includes positive, negative, and cognitive feeling categories. This valence categorization better explains the three factor components retained from the data analysis. Therefore, the 12 items (afraid, terrified, worried, angry, annoyed, furious, sad, grieving, disgusted, bored, hateful, distracted) under factor 1 were named negative emotions, the eight items under factor 2 (trustful, hopeful, interested, admirable, acceptive, attentive, amazed, surprised) were named cognitive feelings, and the three items under factor 3 (joyful, delightful, peaceful) were named positive emotions.

Study 8A: Confirmatory factor analysis test

Model specification. Based on theory and on the explanatory factor analysis, a three-factor model was specified in which annoyed (N5), angry (N4), afraid (N1), terrified (N3), furious (N6), sad (N7), grieving (N8), worried (N2), disgusted (N13), bored (N14), and distracted (N24) loaded onto the latent variable "negative emotions on immunity" (NEIM). Interested (P20), hopeful (P19), amazed (P22), trustful (P16), admirable (P17), surprised (P9), acceptive (P18), and

attentive (P21) loaded onto the latent variable "cognitive feelings on immunity" (CFIM). Joyful (P10), delightful (P11), and peaceful (P12) loaded onto the latent variable "positive emotions on immunity" (PEIM). The indicators are subscales of BPI and have a range of scores from -3 to 3. Lower scores reflect higher levels of belief in extremely slower recovery from an illness with the stated emotion. Higher scores reflect higher levels of belief in extremely faster recovery from an illness with the stated emotion. A score of zero is neutral or no belief.

Procedure. A survey was created and administered using the Qualtrics system, and the survey link was distributed to 422 participants on MTurk to test the hypothesized measurement model. All 422 cases had complete data. However, attention check questions similar to those in the previous study filtered out 115 participants who were not attentive and likely had been filling the survey randomly. Prior to the confirmatory factor analysis, I evaluated for univariate and multivariate outliers as in Study 7 by examining Mahalanobis's distance (Mitchell & Krzanowski, 1985) for each participant, with 57 outliers detected and removed. I conducted the confirmatory test with AMOS 26.0, with a maximum likelihood minimization function. Goodness-of-fit was evaluated by using the standardized root mean square residual (SRMR) and root mean square error of approximation (RMSEA), with its 90% confidence interval (90% CI), comparative fit index (CFI), and Tucker-Lewis index (TLI). Guided by suggestions provided in Hu and Bentler (1999), acceptable model fit was defined by the following criteria: RMSEA (<= 0.06, 90% CI <= 0.06), SRMR (<= 0.08), CFI (>= 0.95), and TLI (>= 0.95). Multiple indices were used because they provided different information about model fit (i.e., absolute fit, fit adjusting for model parsimony, fit relative to a null model); used together, these indices provided a more conservative and reliable evaluation of the solution.

Result. The overall goodness-of-fit indices indicated a poor fit (SRMR = 0.0713, RMSEA = 0.064 (90% CI = 0.056–0.073), TLI = 0.93, CFI = 0.94) for the first specified model, leading to the specification of the hypothesized model. The indicators "bored," "distracted," and "acceptive" loaded poorly on their respective unobserved variables. They were removed to improve the model fit. Each of the overall goodness-of-fit indices of the newly specified model suggested that the three-factor model fit the data well: SRMR = 0.0634, RMSEA = 0.052 (90% CI = 0.041–0.062), TLI = 0.964, CFI = 0.964. Inspection of standardized residuals and modification indices indicated

no localized points of ill fit in the solution (e.g., largest modification index = 19.63, largest standardized residual = 3.4). Completely standardized parameter estimates from this solution are presented in Figure 9. All freely estimated unstandardized parameters were statistically significant ($p < 0.001$). Factor loading estimates revealed that the indicators were strongly related to their purported factors (range of $R^2 = 0.59$–0.87).

Figure 9. Study 8A: Completely standardized parameter estimates from the three-factor confirmatory factor analysis model of belief in psycho-immunology (BPI).
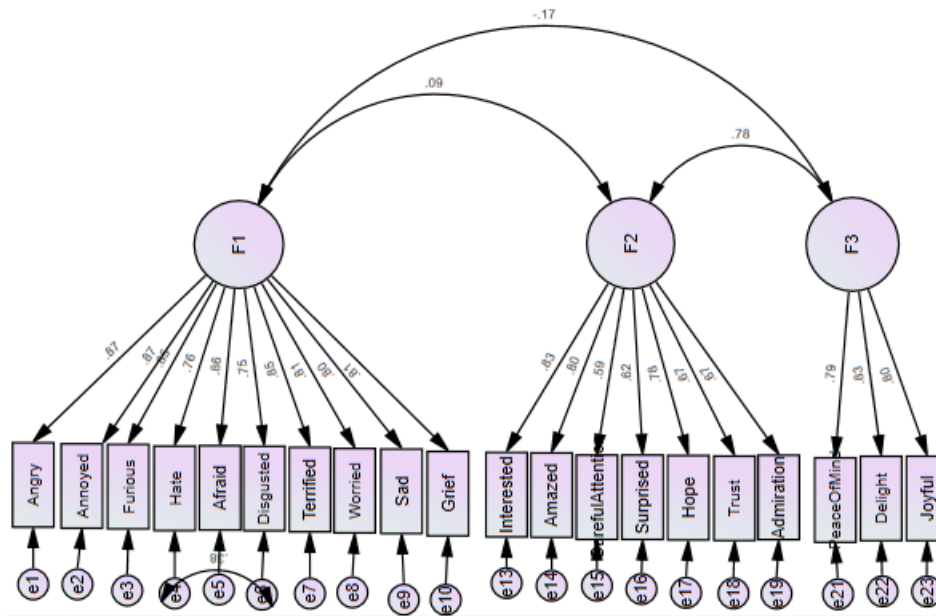
Note. The figure depicts the complete and final specification of the three-factor model. One part of model identification is determining how the latent variables should be addressed, and one way to do this is by determining an indicator that will act as the marker indicator for each factor. A factor's marker is constrained to load on that factor at a specific value (usually 1.0, indicating perfect loading). The marker also provides information about the scaling for the latent factor. This is because latent factors have no inherent scale and will therefore be defined with the same scale as the marker variable. Annoyed, interested, and joyful were used as marker indicators for factor 1, factor 2, and factor 3, respectively, as their EFA loading was higher than the rest of the items in their category. The measurement model contained no double-loading indicators, and two measurement errors were presumed to be correlated. Each latent variable was permitted to be correlated based on the prior correlation finding in factor analysis with an estimate of the correlation between the constructs being different from 0 at a p value of 0.05. Accordingly, the model was over-identified with 187 df. An under-identified model is one in which the number of unknowns (i.e., the number of parameters that are allowed to be freely estimated) is larger than the number of knowns (i.e., known input information like the variances and covariances of the indicator variables). Over-identified models, on the other hand, are models in which there are more knowns than unknowns. It is possible to find the best-fitting solutions for over-identified models. All freely estimated parameter estimates were statistically significant ($p < 0.001$).

Study 8B: Confirmatory factor analysis test- replication with a larger sample size

Model specification. A second confirmatory test was conducted with a larger sample to test the robustness of the measurement model. Based on the previous confirmatory test, a three-factor model was specified excluding Bored (N14), Distracted (N24), and Acceptive (P18) which were poorly loaded in study 8A.

Procedure. A survey was created and administered using the Qualtrics system, and the survey link was distributed to 700 participants (64% women; Mage=35) on MTurk. With similar automatic attention check questions used in the previous studies, 112 participants were filtered out which were not attentive and probably had been filling out the survey randomly. I evaluated for univariate and multivariate outliers prior to the confirmatory factor analysis by examining Mahalanobis's distance for each participant. 90 univariate and multivariate outliers were detected and removed which had a p-value of less than 0.001 for the distance score. I conducted the confirmatory test with AMOS 26.0, with a maximum likelihood minimization function. Evaluation of Goodness-of-fit and model fit is guided by similar procedures as in study 8A.

Result. The overall goodness-of-fit indices indicated that the three-factor model fit the data well: SRMR = 0.0573, RMSEA = 0.066 (90% CI = 0.60–0.073, CFit = 0.95), TLI = 0.952, CFI = 0.959. The inspection of standardized residuals and modification indices indicated no localized points of ill fit in the solution (e.g., largest modification index = 38.63, largest standardized residual = 2.11). All freely estimated unstandardized parameters were statistically significant ($p < 0.001$). Factor loading estimates revealed that the indicators were strongly related to their purported factors (range of R^2 = 0.68–0.94).

Composite score estimation. In addition to considering BPI as a second-order construct,[10] a composite score estimation was also performed to obtain one linear form of the scale.

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[10] When BPI is represented in structural equation modeling as a second-order construct, it is made to contain two layer structures of constructs; the three factors and the 20 items.

Table 5. Possible list of relevant indices the BPI scale can offer.

		Immunity	
		Slow recovery from illness	Fast recovery from illness
3 dimensions of BPI	Negative emotions	Negative emotion weakens immunity	
	Positive emotions		Positive emotion boosts immunity
	Cognitive feelings		Cognitive feelings boost immunity
	Average of indices	Emotion affects immunity	

The common school of thought in holistic remedy promotes detrimental consequences of negative psychological events and beneficial effects of positive mental events on illness recovery (Benson, 2019). Messages that reinforce users' hope about a treatment are also promoted in holistic remedies (Hay, 1995). For example, users are motivated to be trustful and hopeful about a treatment so that the treatment outcome will be positive. This implies how the contents of cognitive feelings are considered beneficial as well.

However, it is rare, in addition to being counterintuitive, to see the promotion of beneficial effects of negative psychological events and detrimental consequences of positive mental states on illness recovery. Therefore, I only considered estimating composite scores for indices pertaining to the former case: "negative emotion weakens immunity" and "positive emotion/cognitive feelings boosts immunity." The BPI scale with its three dimensions, constituting negative emotion, positive emotion, and cognitive feelings, and its bipolar content of elements (fast and slow recovery from illness) delivered distinct indices (e.g., indices 1, 2, and 3) in addition to the general composite score (Index 4) that can uniquely reflect the belief system promoted in holistic remedies (See Table 5). I argue that BPI will predict the use of alternative remedies because the promotion of these psychological events and their respective consequences on immunity are already employed as one tool of diagnosis in alternative medicine practice. This makes an individual with

an already established BPI trait more susceptible to initiate or loyally engage in the use of an alternative remedy.

I calculated an average score for the items under each of the three dimensions (See Table 6). A score was estimated for each dimension by taking the mean of indicators under the relevant dimension. For example, the "negative emotion weakens immunity" index was calculated by taking the mean of the 10 indicators under the negative emotion dimension. The total composite score was estimated by taking the mean of the three index scores.

Table 6. BPI scale composite score estimation techniques for four indices.

Score name	Stands for belief trait in	Score estimation
PEBI	Positive emotion boosts immunity (Index 1)	= MEAN (of replies on the 3 PE dimension)
NEWI	Negative emotion weakens immunity (Index 2)	= MEAN (of replies on the 10 NE dimension)
CFBI	Cognitive feelings boost immunity (Index 3)	= MEAN (of replies on the 7 CF dimension)
TEIM	Total emotion immunity (Index 4)	= MEAN (|PEBI|,|CFBI|,|NEWI|)

Note. The BPI multi-scale also allows different indices of the belief trait to be estimated for an individual. These are specific but complementary aspects of the general BPI. Referring to Table 6, NEWI, for example, estimates segments of the belief trait within BPI concerning whether an individual believes that "negative" emotion specifically has a role in "weakening" immunity. NEWI is the mean of replies on the 10 indicators of the negative dimension, PEBI is the mean of the three indicators of the positive dimension, and CFBI is the mean of replies on the seven indicators of the cognitive dimension. The TEIM is a general score calculated by taking the average absolute values of the indices. Absolute values were taken because the NEWI score lies in the negative part of the scale and values range from -3 to 0.

Study 9A/9B: Construct validity

Construct validity is the overarching principle of validity, referring to the extent to which a psychological measure actually measures the concept it purports to measure (Bagozzi et al., 1991). It is assessed by testing convergent validity, which is the degree to which two measures of constructs that theoretically should be related are, in fact, related, and by testing divergent validity, which is whether concepts or measurements that are not supposed to be related are actually unrelated (Bagozzi et al., 1991). Before conducting tests of convergent and divergent validity, the

measurement model was subjected to common method bias—which is the spurious variance that is attributable to the measurement method rather than to the constructs the measures are assumed to represent (MacKenzie & Podsakoff, 2012; Podsakoff et al., 2003). I employed Harman's single-factor test, and the total variance explained by the one general factor was 44.8%, which is less than 50% of the variance. If a single factor emerges or one general factor will account for the majority of the covariance among the measures, then it is concluded that a substantial amount of common method variance is present. Since the total variance for a single factor was less than the recommended threshold of 50%, this suggests that common method bias did not affect my data, hence the results (Podsakoff et al., 2003).

In addition, I conducted a common latent-factor test, as per the suggestion of Podsakoff et al. (2003). First, I designated a common latent factor for all the measurement indicators. Then, the measurement model was run with and without the common latent factor to observe the change in variation and to determine how much of the variation was due to method bias. The percentage of common method bias was 46% (0.68^2), and four paths seemed to be highly affected (with greater than 0.2 difference) by the method bias (See Appendix E). To control for this problem, I retained the common latent factor (CLF) in the measurement model for any structural equation models I applied using BPI as a second-order variable (See Figure 10).

Figure 10. BPI as a second-order variable ranging from -3 to 3, and BPI as a composite variable ranging from 0 to 3.

Convergent validity
- Locus of control
- Superstitious beliefs
- Religiosity
- Political orientation

Divergent validity
- Impulsivity
- Need for cognition

Concurrent validity
- CAM use
- Vaccine acceptance rate
- Placebo effect
- Product perseverance

(a) BPI as a second-order variable

(b) BPI as a composite variable

(c) Variables used in predictive, convergent, divergent validity tests

Study 9A: Convergent validity

Assessing convergent validity involves measuring the extent to which the indicators belonging to one latent variable actually measure the same construct (Gregory, 2004). It states that measures of similar constructs should be highly correlated. I argue that the BPI construct correlates with locus of control, superstitious beliefs, religiosity, and social conservatism.

BPI and health locus of control. Health locus of control taps beliefs that the source of reinforcements for health-related behaviors is primarily internal, a matter of chance, or under the control of powerful others (Wallston et al., 1978). Both general and health locus of control measure the degree to which people believe internal and external factors have control over events affecting their lives. Unlike the general locus of control, where events are general, the events of focus in health locus of control are specific health-related behaviors. Health internals score higher on the internality factor of the scale, as people believe one becomes healthy or sick as a result of one's own behavior. Health externals score higher on the fate externality factor and powerful others externality factor of the scale, as people believe that health is determined by factors over which one has little control: luck, fate, chance, or powerful others.

Thoits (1990) claimed that, most often, experiences or displays of emotion differ in quality or degree from what is expected in given situations because individuals have little control over emotion, which he referred to as emotional deviance. This implies the deviance of one's emotion and cognitive feeling from that which is expected, conventional, or obligatory to feel and display. For example, people may believe it is important to "not feel sad" to recover from an illness, but it is difficult to intentionally switch off one's own feelings of sadness. I hypothesized that this creates a sense of externality about one's own emotions or cognitive feelings, but without correcting one's belief that emotions or cognitive feelings can affect illness recovery. This is because BPI is a prescientific belief. And in a prescientific ideology, aspects such as luck, fate, or other external factors are considered responsible for behavior despite these factors being perceived as uncontrollable (Dag, 1999; Darke & Freedman, 1997). Hence, I expected a positive correlation between BPI and locus of control where people who score high on BPI have a higher tendency to score high on external dimensions and low on internal dimensions of locus of control. I used

Wallston et al. (1978) 18 items of multidimensional health locus of control, which has internal and external dimensions: luck and powerful others. For example, items in the internal dimension include "*If I get sick, it is my own behavior that determines how soon I get well again.*" The external dimension constitutes six items of the luck dimension and six items of the powerful others dimension. For example, "*most things that affect my health happen to me by accident*" belongs to the luck dimension, whereas "*health professionals control my health*" or "*my family has a lot to do with my becoming sick or staying healthy*" belongs to the powerful others dimension.

BPI and superstitious beliefs. We already know from previous studies that superstitious belief, which is the belief that particular events happen in a way that cannot be explained by reason or science, correlates with an external locus of control (Dag, 1999; Tobacyk et al., 1988) and predicts the initiation and maintenance of maladaptive beliefs and behavior (Vyse, 2013). BPI as a prescientific belief also connects psychological events and the progress of illness in a way that cannot be explained by reason or science. In addition, negative superstition occurs when a certain behavior or omen is magically associated with unlucky and potentially harmful consequences. For example, people may relate "seeing a black cat" or "breaking a mirror" to potentially harmful consequences. This is similar to the negative emotion dimension of BPI, which captures the belief that negative emotions inhibit recovery from illness. Positive superstition is the desire to bring about beneficial consequences by actively courting good luck. For example, people may believe that good luck can be brought about by "carrying a charm," "touching wood," and "crossing fingers."

Similarly, in the positive emotion dimension of BPI, illness recovery can be boosted by having good and right emotions (e.g., being joyful and delightful). Given that this is the case, I predicted that scores on both the negative and positive dimensions of superstitious beliefs would positively correlate with BPI. I used a six-item superstitious belief scale on which participants endorsed three negative and three positive superstitious beliefs using five response options (Dagnall et al., 2009).

BPI and religiosity. Religiosity concerns feelings, thoughts, experiences, and behaviors that arise from searching for the sacred (Hill et al., 1998). A religious person evaluates the world through religious schemas and will thus integrate his or her religion into much of his or her life. Such feelings and thoughts of a religious individual are easily integrated into health considerations. This is why substantial research supports the generally positive, yet sometimes negative, impact of religion on both mental and physical health. There is evidence that religious considerations are important in psychotherapeutic interventions (Thoresen, 1999; Worthington & Sandage, 2002).

In addition, a person with religious commitment adheres to his or her religious values, beliefs, and practices in daily life. One example of this is individuals' engagement in prayer for healing. The belief behind prayer is the conviction that an external supernatural force is in control of one's health (Spilka & Ladd, 2012). It is believing that an external force is able to bring about healing if one can effectively communicate the request by faith. It is also the practice and belief that an external force can be reached through meditation. Hence, a religious individual who relies on prayer to solve health issues comprehends the importance of external supernatural factors on health. Second, it is a religious individual's conviction that healing is only possible when prayer is practiced with great faith, implying the role of psychological aspects on health. Therefore, it is highly likely that a religious individual with a conviction that some external factors and psychological aspects can affect health also has an inclination to believe emotions and cognitive feelings can affect health. Accordingly, I expected religiosity to correlate positively with BPI. I used the 10-item measure of religiosity developed by Worthington Jr et al. (2003).

BPI and political orientation. Research suggests that there are consistent differences in the way liberals and conservatives think and perceive the world, and that these differences motivate different behaviors. For example, dogmatism, closure, and religiosity are common for conservatives, while higher tolerance of ambiguity and complexity are part of liberals' cognitive makeup (Jost et al., 2003; Thórisdóttir & Jost, 2011). Concurrent dimensions of political orientation are social and economic dimensions. The social dimension concerns attitudes about religion and moral values, whereas the economic dimension concerns the involvement of the government and the regulation of private enterprises. Primarily, I built on the prior hypothesis that religiosity positively correlates with BPI. Within that framework, since people high in social conservatism tend

to be religious (Malka et al., 2011), they are more inclined than liberals to have high BPI scores. Second, political ideology is a central predictor of one's attitudes toward science (Gauchat, 2012). Particularly, conservatives have been shown to have more of a tendency to approve of prescientific beliefs (Pennycook et al., 2020) and disapprove of scientific attitudes (Kempthorne & Terrizzi Jr, 2021). As BPI is rooted in the fundamental prescientific notion of a close relationship between body and mind, it seems to be accepted more by conservatives than liberals. I used a 14-item conservatism scale (SECS) for which participants were given a list of 14 words or phrases representing issues important to conservatism and were asked to rate them on a commonly used "feeling thermometer" (Azevedo et al., 2019).

Procedure. In Study 9A, I designed a survey with scales of BPI, health locus of control (Wallston et al., 1978), superstitious beliefs (Dagnall et al., 2009), political orientation (Everett, 2013), and religiosity (Worthington Jr et al., 2003) and recruited 486 participants (50% women; M_{age} = 37) on MTurk. I followed similar data preparation techniques as in the previous studies, and I filtered out 56 responses that failed to fulfill attention check questions. To test convergent validity, I correlated BPI scores with locus of control, superstitious beliefs, religiosity, and political orientation. Significant correlations at 95% and 99% confidence intervals were obtained, demonstrating evidence of convergent validity (Gregory, 2007). In addition, the average variance extracted (AVE) values for the BPI measurement scale were greater than or equal to 0.5, which thus established additional support for the convergent validity of the BPI scale (Hair Jr et al., 2017; Odou & Schill, 2020).

Table 7. Study 9A: Inter-construct correlations and reliability information.

	AVE	BPI				LOC	SB			PO			REL
		TEIM	CFBI	NEWI	PEBI		SB	SB-neg	SB-pos	PO	PO-soc	PO-eco	
TEIM		-	0.53	0.04	0.74	0.19	0.10	0.06	0.10	0.00	0.00	0.00	0.05
CFBI	0.62	.73**	0.92	0.05	0.31	0.18	0.11	0.06	0.12	0.02	0.01	0.03	0.07
NEWI	0.57	.19**	.22**	0.92	0.03	0.01	0.06	0.06	0.05	0.04	0.02	0.07	0.04
PEBI	0.50	.86**	.56**	.18**	0.73	0.09	0.04	0.03	0.05	0.00	0.00	0.00	0.03
LOC	0.51	.44**	.43**	$.09^{ns}$	.30**	0.86	0.07	0.05	0.06	0.01	0.00	0.01	0.06
SB		.32**	.33**	.24**	.21**	.26**	-	0.79	0.81	0.00	0.00	0.00	0.02
SB-neg	0.52	.25**	.25**	.24**	.17**	.23**	.89**	0.65	0.38	0.00	0.00	0.00	0.02
SB-pos	0.38	.32**	.35**	.23**	.22**	.24**	.90**	.62**	0.54	0.00	0.01	0.00	0.01
PO		$.03^{ns}$	.15*	.21**	$.03^{ns}$	$.08^{ns}$	$-.0^{ns}$	$.01^{ns}$	$-.02^{ns}$	-	0.83	0.55	0.23
PO-soc	0.53	$.01^{ns}$	$.09^{ns}$	.13*	$.03^{ns}$	$.05^{ns}$	$-.0^{ns}$	$-.01^{ns}$	$-.08^{ns}$	.91**	0.87	0.16	0.28
PO-eco	0.53	$.04^{ns}$	.18**	.26**	$.02^{ns}$	$.10^{ns}$	$.07^{ns}$	$.05^{ns}$	$.06^{ns}$	.74**	.40**	0.53	0.04
REL	0.75	.22**	.27**	.21**	.18**	.25**	.14*	.14*	.12*	.48**	.53**	.21**	0.96

Note: **LOC =** locus of control, **SB** = superstitious beliefs, **SB-neg** = superstitious belief negative dimension, **SB-pos** = superstitious belief positive dimension, **PO =** political orientation, **PO-soc** = social conservatism, **PO-eco** = economic conservatism, **REL** = religiosity. The diagonal elements (bolded) are the composite reliability. Upper off-diagonal elements are squared correlations. Lower off-diagonal elements are the correlations among constructs. (**) significant at 0.1 level. (*) significant at 0.5 level.

I found that BPI scores positively correlated with both negative and positive dimensions of superstitious beliefs, religiosity, and with the external dimension of locus of control. In addition, BPI scores also correlated negatively with the internal dimension of locus of control. In the case of social conservatism, I found a significant positive correlation only with the "negative emotion weakens immunity" dimension of BPI. It is evident from the findings that the measures of similar constructs were highly correlated. Therefore, convergent validity was confirmed, and it can be concluded that the indicators belonging to BPI measure the BPI construct.

Moreover, the relationship between BPI and the external dimension of locus of control shed more light on BPI as a form of prescientific belief. One aspect of this interpretation is the tendency for externalizing psychological aspects in high BPI people. This makes intentional switching between psychological aspects as nearly difficult, as one cannot change one's own luck

or fate. The interesting question this raises is why, then, do high BPI people continue to believe in the psychological aspect of being responsible for their health and still make an effort to self-alter their emotions or feelings. In superstitious and religious beliefs, it is a quite common tendency to believe in the importance of external factors as determinants of one's destiny but still exert a personal effort to alter destiny in favor of oneself. Hence, it would not be surprising if participants who scored high on BPI scored high on superstition, believing that fate and luck were crucial. Neither would it be surprising if such participants also scored high on religiosity because the more one is religious the more one believes on external factors like the creation (i.e., powerful others) to guide all aspects of life, including health.

Study 9B: Divergent validity

Divergent or discriminant validity entails that two latent variables meant to represent two different theoretical concepts are statistically different. I tested the discriminant validity of BPI with the need for cognition and impulsivity.

Impulsivity, need for cognition, and BPI. Impulsivity is a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions for the impulsive individuals or for others (Moeller et al., 2001). It constitutes cognitive (making quick decisions), motor (acting without thinking), and non-planning sub-traits (a lack of forethought). Need for cognition is the tendency to engage in and enjoy effortful cognitive endeavors concerning how people deal with tasks and social information (Cacioppo et al., 1984).

Some people might think that high BPI people might be more impulsive or use less elaborate cognition because they embrace nonscientific beliefs. However, I did not expect BPI to correlate with impulsivity or need for cognition. I inferred that when people have high BPI and discern, for example, that "when I feel sad I heal slower" it is out of belief but not out of simple randomness in their thinking, lack of effortful analytical processing, or exclusive reliance on role emotions. Hence, I predicted that BPI would not correlate with either impulsivity or need for cognition. I used the 30-item Barratt scale (Patton et al., 1995) to measure impulsivity and an 18-item standard scale to measure need for cognition (Cacioppo et al., 1984).

Procedure. In Study 9B, I designed a survey with scales of BPI, need for cognition (Cacioppo et al., 1984), and impulsivity (Patton et al., 1995) and recruited 486 participants (50% women; M_{age} = 31) on MTurk. I followed similar data preparation techniques as in the previous studies. To obtain empirical evidence for discriminant validity, I considered the heterotrait-monotrait ratio of correlations (Henseler et al., 2015). As Hensler et al. recommended, the HTMT ratio should be lower than 0.85 (more strict threshold) or 0.90 (more lenient threshold). In my study, the HTMT ratio of BPI to impulsivity was 0.20, while that of BPI and need for cognition was 0.14 (See Table 8) and thus below the recommended thresholds of 0.85 or 0.90. In addition, I applied the criterion developed by Fornell and Larcker (1981). This criterion compares the square root of the AVE with the correlation of latent constructs. The results revealed that the square root of the AVE was greater than the correlation between latent constructs (See Table 9), thereby supporting discriminant validity (Afthanorhan, 2013; Hair Jr et al., 2017; Ho & Chung, 2020).

Table 8. Study 9B: Discriminant validity – Heterotrait-Monotrait (HTMT) ratio for Study 9B

	BPI	IMP	NFC
BPI	-	-	-
IMP	0.04	-	-
NFC	0.04	-0.11	-

Note: BPI = belief in psycho-immunology, IMP = impulsivity, NFC = need for cognition. Values in the box are the average correlation of indicators between two constructs used to calculate the HTMT score. The second-order BPI construct is used here.

Table 9. Study 9B: Discriminant validity – Fornell and Larcker Criterion for Study 9B

	Square root of AVE	BPI	IMP	NFC
BPI	0.78	0.94	0.02	0.04
IMP	0.71	0.14	0.91	0.26
NFC	0.71	-0.2	-0.51	0.87

Note: BPI = belief in psycho-immunology, IMP = impulsivity, NFC = need for cognition. The diagonal elements (bolded) are the composite reliability. Upper off-diagonal elements are squared correlations. Lower off-diagonal elements are the correlations among constructs.

Study 10A: Criterion validity – BPI and complementary and alternative medicine (CAM) use

Criterion or concrete validity is the extent to which a measure is related to an outcome (Taherdoost, 2016). Based on the timing of measurement for the predictor and the outcome, criterion validity could be concurrent, comparing between the measure in question and an outcome assessed at the same time, or predictive, comparing the measure in question with an outcome assessed at a later time (Cronbach & Meehl, 1955). To demonstrate criterion validity of BPI, I predicted that people with high BPI scores would be more prone to using complementary and alternative medical treatments (CAM), after controlling for other variables that might affect CAM use (e.g., CAM familiarity), and would be less approving or accepting of vaccination programs.

BPI and complementary and alternative medicine (CAM) use. CAM are practices, products, knowledge, and skills promoted or used in the attempt to achieve the healing effects of conventional medicine that are unproven, disproven, or difficult to prove (Tabish, 2008). CAM ranges from homeopathy to acupuncture to herbal medicine to prayer (Eisenberg et al., 1993). The fundamental ideology behind CAM is based upon a holistic approach to health in which health is considered as the total balance between mind, body, and soul (McKee, 1988). Therefore, I predicted that people with an intuition of health as mind–body regulation are inclined to engage in the use of holistic medical treatments. Moreover, as discussed earlier, the common school of thought in holistic remedy predicts detrimental consequences of negative psychological events and beneficial effects of positive mental events on illness recovery (Benson, 2019), while the promotion of beneficial effects of negative psychological events and detrimental consequences of positive mental states on illness recovery is rare. Therefore, I specifically hypothesized that the "negative emotion weakens immunity" and the "positive emotion/cognitive feelings boost immunity" dimensions of BPI, in addition to the composite score, would predict CAM use.

Procedure. I designed Study 10A as a survey with scales of BPI, CAM use, and CAM familiarity. CAM use was measured by asking "*How often do you use alternative and/or complementary medical treatment options (e.g., homeopathy)*?" A five-point Likert scale was used, with 1 referring to "*none at all*" and 5 referring to "*a great deal.*" CAM familiarity was measured by asking "*Are you familiar with alternative and complementary medical treatment options (e.g.,*

Homeopathy)?" A five-point Likert scale was used, with 1 referring to "*not familiar at all*" and 5 referring to "*extremely familiar.*" A total of 486 participants (50% women; M_{age} = 31) were recruited on MTurk and similar data preparation techniques were followed as in the previous studies. A linear regression was employed to predict CAM use based on BPI scores, controlling for CAM familiarity. Multicollinearity was high while running all of the BPI dimensions together and the variance inflation factor (VIF) reached 8.5, severely warranting corrective measures (Mansfield & Helms, 1982). Each dimension of BPI was separately regressed on CAM use to avoid this problem. The VIF between CAM familiarity and the BPI dimensions, in each model, equaled 1, requiring no further adjustment for multi-collinearity.

Table 10. Study 10A: Results of regression analyses on CAM use after controlling for CAM familiarity.

Variables entered	Model 1	Model 2	Model 3	Model 4
TEIM	.306**			
NEWI		.017ns		
CFBI			.169*	
PEBI				.21**
CAM familiarity	.427**	.454**	.448**	.442**
R^2	.352	.323	.336	.336

Note: **TEIM** = total emotion immunity dimension, **NEWI** = negative emotion weakens immunity dimension, **CFBI** = cognitive feelings boost immunity dimension, **PEBI** = positive emotion boosts immunity. Model 1 – CAM use regressed on TEIM and CAM familiarity; Model 2 – CAM use regressed on NEWI and CAM familiarity; Model 3 – CAM use regressed on PEBI and CAM familiarity; Model 4 – CAM use regressed on CFBI and CAM familiarity. (**) significant at 0.01 level; (*) significant at 0.05 level.

A significant regression equation was found ($F(2,285)$ =77.54, $p < 0.001$), with an R^2 of 0.35 (acceptable model fit). Two dimensions of BPI, "cognitive feelings boost immunity" and "positive emotion boosts immunity," predicted CAM use at a significant level, while "negative emotion weakens immunity" did not. One reason for this might be that the type of dominant marketing message communicated in holistic remedies matches that of BPI. The most saliently promoted marketing messages in holistic remedies were framed more positively than negatively, e.g., "*feel good about the product and make it work*" rather than "*feeling sad worsens your healing*" (Gilovich,

2008). People whose thoughts are consistent with this, i.e., those high on the PEBI and CFBI scales rather than on the NEWI scale, were therefore predicted to be those more open to initiating or becoming involved in CAM use.

Study 10B: Criterion validity – BPI and vaccine acceptance rate

BPI and vaccine acceptance rate. Since BPI is based on a prescientific school of belief, individuals with high scores on the BPI scale might approve of other non-scientific explanations or thoughts or be inclined to disapprove of scientific notions. Vaccination is one of the many topics of debate between the pro-science and anti-science communities. I predicted that individuals with a high (vs. low) score on the BPI scale would tend to have a low (vs. high) vaccine acceptance rate. I used a seven-item scale to measure vaccine acceptance (Marlow et al., 2007).

I designed Study 10B as a survey with scales of BPI and vaccine acceptance rate. The eight-item vaccine acceptance measure had two dimensions. The first dimension contained five items that measured an individual's agreement with the importance of vaccinations. For example, "vaccination is one way that parents can make a positive contribution to their children's health." The second dimension had three items that measured general vaccine concerns. For example, "I am afraid of vaccinations for my children." This measure was scored on a seven-point Likert scale, where 1 referred to strong disagreement and 7 referred to strong agreement (full scale items can be found in Appendix D). A total of 137 respondents (39% women) were recruited on MTurk and similar data preparation techniques were followed as in the previous studies. A linear regression was employed to predict the vaccine acceptance rate based on BPI scores. Multicollinearity was an issue while running all of the BPI dimensions together with a VIF ranging up to 7.7, which was above the threshold value of 4 (O'brien, 2007). In addition, intercorrelations among the dimensions of BPI reached 0.92, warranting corrective measures (Mansfield & Helms, 1982). The problem of multicollinearity was resolved by removing the variable with the highest VIF score in the regression equation, TEIM, and the composite score of the BPI measure. Therefore, this time, the three dimensions of BPI were separately regressed on the dimensions of the vaccine acceptance rate with acceptable VIF scores of less than or equal to 2.0 (See Table 11). Partial support was obtained

for the hypothesized prediction, with respondents with a high (vs. low) BPI score (PEBI) tending to have low (vs. high) approval of vaccine importance.

Table 11. Study 10B: Results of regression analyses on vaccine acceptance.

	Vaccine Acceptance	
Variables entered	DV = IOF	DV = GVC
NEWI	0.08^{ns}	0.27^{ns}
CFBI	1.16**	-0.24^{ns}
PEBI	-0.405*	-0.23^{ns}
R^2	0.25	0.05

Note: Unstandardized regression coefficients. **Significance at 0.001 level, *Significance at 0.05 level. Dimensions of vaccine acceptance measure (**IOF =** importance of vaccinations, **GVC =** general vaccine concerns; 1 = strongly disagree, 7 = strongly agree). **NEWI** – negative emotion weakens immunity dimension, **CFBI** – cognitive feelings boosts immunity dimension, **PEBI** – positive emotion boosts immunity.

Study 10C: Criterion validity – The placebo effect of BPI

The placebo effect of BPI. One manifestation of the BPI belief is the conviction that the holder's emotional and psychological status can alter diagnostic progress. This conviction compels individuals to make an effort to contribute their part to the diagnosis by altering how they think about the treatment or by trying to manage their emotional status. This self-alteration of mental or emotional state, or belief, might trigger desired physiological cascades that favor the course of a diagnosis, as would mere belief in the placebo effect. These cascades emanate from the generation of a perception that mental or emotional states are altered parallel to what the diagnostic situation requires. This leads to the expectation that the diagnosis will therefore be effective, ultimately resulting in the secretion of endorphins/enkephalins, which are natural pain relievers, or triggering a change in other physiological functions in the body (Peciña & Zubieta,

2015). Therefore, in addition to high BPI people tending to initiate use of CAM, I predicted that such individuals can also respond better to placebo treatments.

In Study 10C, 111 respondents (37% women) from MTurk underwent an online placebo treatment. The kind of medical practice used in the scenario design is called "eye movement desensitization and reprocessing" (EMDR) therapy, which is supposed to boost mental energy by making participants move their eyes in different directions. I mentioned that I wanted to test a new version of the EMDR medical practice, which I hypothetically named SUKOR. As part of this, respondents went through three exercises that together lasted for three minutes, mentioning that past research suggests that three minutes is sufficient for the treatment to have an effect. The three exercises involved participants following the movement of a light ball with their eyes in three videos that each played for one minute, with each involving different ball movement directions. After the three-session treatment exercises, participants were told that they would be asked to solve puzzles and take an eye performance quiz as a test of the effectiveness of EMDR. Participants were allowed to solve 52 word-jumble puzzles in 10 minutes as a measure of mental acuity (Berns, 2005). For example, when shown the word jumble TUPPIL, participants were asked to rearrange the letters to form a word, such as PULPIT. Participants also performed four eye test tasks. I controlled for gender, familiarity with EMDR therapy, the accuracy and precision of participants in following instructions, and their experience in solving puzzles and performing an eye test. Multicollinearity was an issue while running all of the BPI dimensions together with a VIF ranging up to 4.8, which was above the threshold value of 4 (O'brien, 2007). In addition, intercorrelations among the dimensions of BPI reached 0.85, warranting corrective measures (Mansfield & Helms, 1982). Therefore, each dimension of BPI was separately regressed on mental acuity to solve the issue of multicollinearity.

Of those who were given a placebo EMDR therapy that lasted for three minutes, those with high scores of PEBI (positive emotions boosts immunity) and CFBI (cognitive feelings boost immunity) dimensions of BPI derived an actual increase in mental acuity as measured by a greater number of puzzles solved. This result was achieved controlling for the effects of gender, previous trials of EMDR therapy, familiarity with EMDR therapy, how good and experienced respondents

were in solving puzzles, and how accurately/precisely respondents followed up the treatment instructions on mental acuity (See Table 12).

Table 12. Studies 10c and 10d: The placebo effect of BPI (Study 10c) and the differential effect of BPI on consolation (Study 10d).

		Placebo effect (Study 10c)				Consolation tendency (Study 10d)		
		Unstandardized B coefficient				Pearson correlation coefficient		
						Cancer	Chronic pain	Infertility
		DV = Mental Acuity				DV = Mind–Body Emphasis Score		
BPI	TEIM	0.39				-.41	.02	-.19
	PEBI		2.05*			.18	-.17	-.52
	NEWI			.24		.75*	-.27	-.25
	CFBI				2.59*	.39	.15	.00
Covariates	I am good at solving puzzles, such as word jumbles	1.94	2.13	1.96	2.11			
	I am experienced at solving puzzles, such as word jumbles	1.41	1.51	1.41	1.20			
	Familiarity with EMDR therapy	2.5	2.5	2.56	2.68*			
	Accurate/precise follow up of the treatment instructions	3.22*	1.38*	3.20*	2.74*			
	Previous trial of EMDR therapy	4.93	5.05	4.90	4.21			
	Gender	4.8**	4.71**	4.79**	4.68**			
R^2		.28	.30	.28	.30			
R^2 adjusted		.23	.26	.23	.26			

*Significance at 0.05 level; ** Significance at 0.001 level

Note. The first–fourth columns refer to findings for Study 10c. Of those who were given a placebo EMDR therapy, those with high scores of BPI (PEBI, CFBI) derived an actual increase in mental acuity controlling for six variables. The fifth up to the last column refer to findings for Study 10d. The respondents who scored high on BPI (NEWI) tended to offer advice to cancer sufferers that emphasized mind over matter.

Discussion

The cascade of the placebo effect is triggered when psychosocial signals, including conditioning and verbal and observational cues, are detected by the brain, interpreted, and translated into neural inputs crucial to forming expectations and placebo responses, resulting in behavior and clinical changes (Meissner et al., 2011). Findings from Study 10c demonstrated that people with high PEBI and CFBI convictions respond better to inert substances. It appears that these individuals are better at interpreting observational cues or forming expectations, the crucial

first step in the placebo cascade. Hence, they respond much more effectively to a placebo treatment than do individuals with low PEBI and CFBI convictions. Yet, an interesting question remains: Why was the same effect not reported for NEWI?

I speculated that perceived effortfulness (Deuter et al., 2014) might play a role here. For example, which of the following is perceived to be more effortful: trying not to feel sad (NEWI), trying to hope for something positive (CFBI), or trying to feel delightful (PEBI)? I postulated that individuals might perceive the alteration of negative emotions as relatively more effortful (e.g., trying not to feel sad) and thus tend to be demotivated in trying to self-alter. This would mean that the expectancy of treatment benefit would be less. On the contrary, I presumed that individuals might perceive the attainment of positivity (e.g., hoping for something, aspiring for delight) to be relatively more effortless and thus tend to be motivated to try to achieve it. This would mean that the expectancy of treatment benefit would be high. That it still cannot be known whether expectancy made participants more alert and consequently increased blood flow to the brain, thereby resulting in greater mental acuity, is a limitation of this study. I leave that investigation to future research, but I was able to successfully validate the criterion validity for BPI in this study. I added more studies that corroborated the criterion validity of the BPI scale.

Study 10D: Criterion validity – BPI and expression of consolation

Beliefs shape behavior, or behavior is a reflection of beliefs (Madsen, 2019). Accordingly, in addition to BPI predicting other related variables, the assessment of BPI as expressed in people's behavior or in how people interact is a confirmation of criterion validity (Jaccard et al., 1979). Therefore, I predicted that people who score high (vs. low) on BPI tend to offer advice/consolation (e.g., to people who suffer from an illness) that places greater emphasis on mind–body aspects.

Procedure. A total of 21 participants (38% women; M_{age} = 27) were recruited from Prolific in exchange for modest compensation (£[11]4.96/hr). I randomly assigned the participants to one of three conditions (cancer vs. infertility vs. chronic pain). Participants in the cancer condition were asked to imagine that their friend had been diagnosed with cancer. Participants in the infertility

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[11] Pound sterling

condition were asked to imagine that a friend of theirs wanted to have a child but was experiencing infertility. Participants in the chronic pain condition were asked to imagine that a friend of theirs was suffering from chronic pain. Participants in all conditions were then asked "*You want to say something to be helpful, maybe by offering words of understanding, encouragement, or advice. What would you say to a friend in this situation? Please write out in the box below what you would say or write to your friend*." At the end of the experiment, participants filled out the 20-item BPI scale.

Results. Each piece of advice was text-edited and modified for linguistic errors by two Cornell faculty members who were not familiar with the project. Once the editing was finished, each piece of advice was graded by two independent judges from Cornell faculty on a scale of "*How much does the advice emphasize that the body will conform to what the mind does*?" The rating scale ranged from 1 to 7, where 1 referred to advice that did not imply that the sufferer could beat the condition through the right thoughts, such as "I'm here for you." On the other end, a rating of 7 referred to pieces of advice that implied "mind over matter," such as "have faith." Respondents who scored high (vs. low) on the NEWI (negative emotion weakens immunity) dimension of BPI (See Table 12) tended to offer advice to cancer patients that placed greater emphasis (vs. less emphasis) on mind over matter ($r(7) = 0.75$, $p = 0.05$).

Study 10E: Criterion validity – BPI and product perseverance

In addition to assessing the role played by BPI in the initiation of CAM use, I also tested whether BPI predicted use maintenance. Because people high in BPI embrace mind–body integration, they have a higher tendency for causal assignment of failure to the self than to the product. This in turn increases the likelihood of such individuals reconsidering product reuse. Therefore, I reiterated Hypothesis 7: People who score high (vs. low) on BPI have a higher (vs. lower) tendency to attribute blame to the self and consequently to persevere more (vs. less) with using a product in the event of non-recovery.

Procedure. A total of 82 participants (29% women; $M_{age} = 35$) were recruited from MTurk for modest compensation (7.25$/hr). I recruited respondents who replied "*I am an occasional*

user" or "*I am a frequent user*" to the question "*Which one choice describes you the most concerning use of a holistic or other unconventional treatment (for example, an herbal remedy not recognized by the American Medical Association, a homeopathic remedy, etc.)?*" I excluded participants who answered "*I am not a user at all*" or "*I use some.*" I replicated Study 3, in which I randomly assigned participants to one of the two experimental conditions (alternative remedy vs. conventional remedy) in a between-participants experiment. In the alternative (vs. conventional) condition, respondents were asked to imagine that they had diabetes and were told by someone they respected to try an alternative (vs. conventional) remedy. They were further told that the illness was not initially overcome. As a measure of perseverance, participants were asked an open question about how long they would stick with the treatment until they gave up and concluded that the treatment did not work. Finally, participants' BPI scores were measured with the 20-item BPI scale.

Results. Open replies to product perseverance were converted to the number of days the participants would stick with the treatment before they concluded that it did not work.[12] A correlational analysis between perseverance and respondents' BPI scores was estimated for both alternative and conventional remedy conditions. Respondents with a high (vs. low) BPI score on the PEBI dimension tended to persevere more (vs. less) for a larger number of days on an alternative remedy until they gave up and concluded that the treatment did not work ($r(21) = 0.61$, $p = 0.01$. A similar relationship between BPI and product perseverance was not found when the manipulated product was a conventional remedy.

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[12] Most participants wrote replies to perseverance in terms of numerical terms like the number of days (e.g., 15, 30 days) or weeks (e.g., 4 weeks) or months (e.g., 3 months) or years (e.g., 1 year, 2 years), while three participants wrote non-numerical terms (e.g., until cure, end of life care). Similar data preparation techniques were followed as in the previous studies.

Table 13. Study 10E: Correlational relationship between BPI and product perseverance.

| | | Product Perseverance | |
| | | (tendency to stick with a failed remedy for longer) | |
		When the manipulated product is an alternative remedy	When the manipulated product is a conventional remedy
	CFBI	0.28	0.02
		(p = 0.29)	(Sig = 0.93)
	NEWI	-0.08	0.14
		(Sig = 0.75)	(Sig = 0.55)
BPI	PEBI	**.61****	-0.08
		(Sig = 0.01)	(Sig = 0.72)
	TEIM	0.45	-0.07
		(Sig = 0.08)	(Sig = 0.77)

Note: Reported values are Pearson correlation coefficients. **Correlation is significant at the 0.01 level. TEIM = total emotion immunity dimension, NEWI = negative emotion weakens immunity dimension, CFBI = cognitive feelings boosts immunity dimension, PEBI = positive emotion boosts immunity. Respondents with a high (vs. low) BPI score (the PEBI) tended to persevere more (vs. less) for a longer number of days on an alternative remedy until they gave up and concluded that the treatment did not work. A similar relationship was not significant when the manipulated product was a conventional remedy.

Discussion

I found evidence that both the convergent and divergent tests validated the BPI scale with the construct validity test. The indicators of BPI under each of the three dimension converged with good and acceptable values of AVE (> 0.05; 0.52–0.62). In addition, there was a significant and moderate correlation of BPI with the variables (locus of control, superstitious belief, religiosity, and political orientation) that were presumed to be theoretically related with BPI, while not correlating with other variables that were theoretically different (need for cognition, impulsivity). The strongest correlation recorded was between BPI and locus of control (r = 0.44, p < 0.001). Participants who believed that health was determined by factors over which one had little control, e.g., luck, fate, chance, or powerful others, had higher BPI scores than those who believed that becoming healthy or sick resulted from one's own behavior. This might imply that intentionally

switching between psychological aspects might be as difficult as intentionally changing one's luck or fate. As part of the same pattern of results, BPI also had a significant positive correlation with superstitious beliefs ($r = 0.32$, $p < 0.001$) and religiosity ($r = 0.22$, $p < 0.001$).

The relationship between BPI and the external dimension of locus of control shed more light on BPI as a form of prescientific belief. One aspect of this interpretation is the tendency among high BPI people to externalize psychological aspects. This implies the difficulty of intentionally switching between psychological aspects, as it is difficult to intentionally change other external aspects, such as luck or fate. An interesting question raised by this is why, then, do high BPI people continue to believe in a psychological aspect being responsible for their health and still make an effort to self-alter their emotions or feelings. In superstitious and religious beliefs, it is a quite common tendency to believe in the importance of external factors as determinants of one's destiny but still make a personal effort to alter destiny in favor of oneself. Hence, it would not be surprising if participants who scored high on BPI score high on superstition, where fate and luck are believed to be crucial factors. Neither would it be surprising if such participants scored high on religiosity where powerful others like the creation is believed to guide all aspects of life including health.

This finding is in line with a previous study by Dag (1999), who found a positive relationship between superstitious beliefs and external locus of control. Building on Dag (1999) study, it was expected that if BPI correlated with external locus of control, it would also relate to superstitious belief. In addition, participants who scored high on the conservative end of the political orientation scale scored high on the two dimensions of BPI ("positive emotion boosts immunity" and "negative emotion weakens immunity"). A high score on the conservative end of the political orientation scale refers to having a conservative personality and social beliefs closely related to Christian or otherwise religious values (e.g., abortion, marriage, family unit, religion).

The BPI measure also received support from the criterion validity test. There is evidence to claim that participants high on BPI have a higher propensity for unconventional medicine use, a lower likelihood of vaccine acceptance, a higher tendency for offering consolation to people who suffer from an illness like cancer that places greater emphasis on mind–body aspects, and a higher tendency for being responsive to a placebo treatment. The four model specifications showed that

only the positive and cognitive dimensions of BPI predicted CAM use. One reason for this might be that the type of dominant marketing message communicated in holistic remedies matches that of BPI. The most saliently promoted marketing messages in holistic remedies are framed more positively than negatively, e.g., "*feel good about the product and make it work*" rather than "*feeling sad worsens your healing*" (Gilovich, 2008). People whose thoughts are consistent with this, those high on the PEBI and CFBI scales rather than on the NEWI scale, are therefore those most open to initiating or becoming involved in CAM use. With the BPI score correlating with product perseverance, this section also offers one possible explanation as to why specific users of inert substances might develop strong loyalties to particular products, become regular users, and develop strong beliefs in their usefulness, with some becoming highly engaged in public advocacy of those treatments (Astin, 1998).

9. The combined effect of both situational and dispositional factors on attribution and product perseverance

For a product with claims that are less clear-cut, un-evaluable, or difficult to evaluate (with more credence aspects), causal assignment becomes ambiguous in the event of non-improvement. In this case, several plausible candidates may be the cause. Contextual cues that make specific causes salient therefore draw attention. For example, in the context of holistic remedies, cues that promote "the self" as one prominent cause for failure are prevalent. It is common to hear practitioners promoting "the product alone could not heal, if the user is negative about them," or "without faith, the product can't help." This is one example of how holistic remedy practitioners, whether they do or do not know for themselves that their remedy does not work, rationalize and use these and several other factors to divert blame away from the product (Macdougall, 1983).

When the low evaluability of product claims gives little information about clear candidates for the cause, and thus causal assignment becomes ambiguous, individuals rely on other salient sources of information. Belief traits are used as a source of information (Kramer & Block, 2008) or guide causal decisions (Wilson & Darke, 2012). BPI that promotes a causal link between psychological and bodily states could therefore be a relevant source of information in such

situations to guide causal decisions. People with high BPI traits might tend to consider their psychological states to be a plausible candidate for the experience of non-recovery in their bodily states. Hence, this makes them more prone to attribute blame to themselves. Second, prevalent contextual cues mentioned before, like "without faith, the product cannot help," seem to be more congruent with the beliefs of high BPI individuals. Therefore, it is also very likely that such cues facilitate causal attributions to "the self" for individuals with high BPI traits.

Hypothesis 8: *When the product is less evaluable (vs. more evaluable), individuals with a higher (vs. lower) BPI score tend to attribute more (vs. less) blame to themselves.*

I reiterate the previous argument of Hypothesis 3 in Study 4, which discussed consequences of attribution assignment. It was described that, according to the failure response literature, causal attributions have consequences for future decision-making (Folkes, 1984). For example, consumers tend not to complain about a product ordered online but arriving late if they attribute the failure to factors other than the retailer (Hocutt et al., 1997). Such attributions are also less likely to harm future purchase intentions. Similarly, if consumers consider themselves to be part of the cause for a failed remedy, I hypothesize that they would tend to make every effort to make the product work. Thus, the tendency of retrying a failed remedy, which is one manifestation of self-effort, becomes more actual.

Hypothesis 9: *Individuals with a higher (vs. lower) BPI score tend to persevere more (vs. less) with a failed less-evaluable (vs. more-evaluable) product because they attribute more (vs. less) blame to the self.*

In Study 11, I developed a manipulation for BPI that served as a pretest for Study 12. In Study 12, I tested Hypotheses 8 and 9, the interaction effect of evaluability and BPI on causal attribution and product perseverance. Study 12 also tested whether the interaction effect was consistent for both an alternative and conventional remedy.

Study 11: Creating a manipulable BPI

Procedure. I formulated the BPI manipulation in a way similar to the trust-in-feelings manipulation (TFM) (Avnet et al., 2012). The theoretical basis behind this manipulation is the ease-

of-retrieval effect (Schwarz, Bless, Strack, et al., 1991), which assumes that by making retrieval difficult (vs. easy), beliefs can be made weak (vs. strong). Retrieval difficulty was manipulated by asking participants to recall two to 10 experiences where they trusted in their beliefs (e.g., trust-in-feelings) and it was the right thing to do. The assumption was also that within a given time frame, seven minutes in the TFM, people would tend to find it relatively easy to retrieve two such situations but difficult to retrieve 10. It was therefore expected that participants who were asked to describe two situations would find it easy and hence infer that such situations were common.

In the TFM, it was found that participants in the high trust-in-feelings condition found it easy to identify two situations in which they were correct in trusting their feelings, and they, therefore, inferred that their feelings were trustworthy. In contrast, participants in the low trust-in-feelings condition found it difficult to identify 10 similar situations, and they therefore inferred that their feelings were not trustworthy (Avnet et al., 2012; Chang & Tuan Pham, 2013; Menon & Raghubir, 2003). A similar procedure was followed for the BPI manipulation. A total of 239 participants (63% women; M_{age} = 34) were recruited on MTurk for modest compensation (7.25$/hr). Participants were randomly assigned to one of three conditions (high BPI, low BPI, or control). Participants in the high- and low-BPI conditions were first given a neutral explanation about belief in psycho-immunology: *"The link between human's emotional states, feelings, thoughts, and their role in illness recovery is so far not clear. Whether these different emotional states, feelings, and thoughts affect illness recovery is mostly up to the person's personal experiences."* After receiving the explanation, participants in the high-BPI condition (vs. low-BPI condition) were asked to describe two (vs. 10) similar situations that happened to them in which they felt quite confident that their emotions/feelings helped or hindered illness recovery and that it was the right thing to do. In the control condition, participants were asked to list five things that they did last week. All participants in each condition were given seven minutes to complete the task. At the end of the survey, BPI was measured with the 20-item scale as a manipulation check.

Results. On average, those participants in the 10-experience condition described seven situations in which they felt quite confident that their emotions/feelings helped or hindered illness recovery. In comparison, those in the 2-condition described two situations. The measured BPI score of respondents across conditions varied significantly (F(2,238) = 6.75, p = 0.001). I ran a contrast

analysis to observe differences between conditions. The measured BPI score of respondents in the high-BPI and low-BPI conditions was significantly higher than in the control group: $t_{\text{high vs control}}$ (236) = -3.32, p = 0.001; $t_{\text{low vs control}}$ (236) = 2.27, p = 0.02. However, there was no statistical difference in measured BPI scores between the high- and low-BPI conditions: t(236) = 0.057, p = 0.95. The results were not consistent with the TFM findings, but they were consistent with a priming effect. Those participants in the low-BPI and high-BPI conditions, in which psycho-immunology aspects were elaborated, registered a higher score on measured BPI than those for which psycho-immunology aspects were not discussed. In my forthcoming studies, I considered manipulating BPI by taking one condition where I elaborated aspects of psycho-immunology (as the high-BPI condition) and another condition where I asked nothing related to psycho-immunology aspects (the low-BPI condition).

Figure 11. Study 11: BPI manipulation
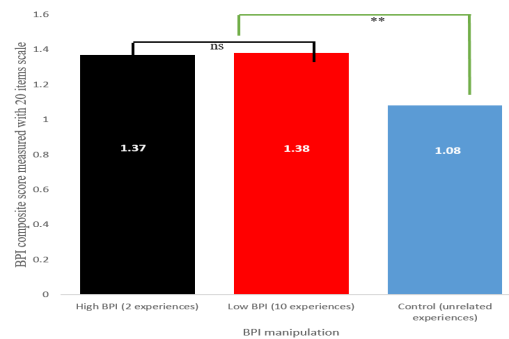
Note. The measured BPI score of survey respondents in the high-BPI condition and low-BPI condition was higher than for those in the control condition.

The probable justification for why the 2- versus 10-experience condition manipulation did not work in Study 11 might have arisen from subjective difficulty. In the original ease-of-retrieval studies (Schwarz, Bless, & Bohner, 1991), it was found that participants who had to describe 12 examples of situations in which they behaved assertively surprisingly rated themselves as less assertive than participants who had to describe only six examples. This is because the subjective difficulty of retrieving a large number of instances from a certain class causes people to infer that such instances are relatively uncommon, whereas the subjective ease of retrieving a small number

of instances of the same class causes people to infer that such instances are relatively common (Schwarz, 2004).

Subjective difficulty likely did not vary between the high-BPI (2-experience) and low-BPI (10-experience) conditions. This is because participants in the 10-experience condition retrieved nearly as many experiences as they were requested to describe in the allocated seven minutes. Therefore, they probably inferred that such experiences were common, similar to the inferences by participants who retrieved two experiences. Actions that probably increase the difficulty of retrieval—for example, increasing the number of experiences to retrieve from 10 to 15 or 20 in the 10-experience condition—could probably make the 2 versus 10 manipulation work.

Study 12. The interaction effect of BPI and product evaluability

Procedure. A total of 699 participants (54% women; M_{age} = 34) were recruited from MTurk for modest compensation ($7.25/hour). Participants were randomly assigned to one condition of a 2 x 2 x 2 between-participants experiment: BPI (high vs. low) x evaluability (high vs. low) x product type (alternative vs. conventional). The experimental sessions lasted for approximately 15 minutes. First, the BPI manipulation was presented. Participants in the high-BPI condition were given a neutral explanation about belief in psycho-immunology: *"The link between human's emotional states, feelings, thoughts, and their role in illness recovery is so far not clear. Whether these different emotional states, feelings, and thoughts affect illness recovery is mostly up to the person's personal experiences."* After receiving the explanation, participants in the high-BPI condition were asked to describe two similar situations that happened to them in which they felt quite confident that their emotions/feelings helped or hindered illness recovery and that it was the right thing to do. Participants in the low-BPI condition were requested to list five things they did last week. After the BPI manipulation, participants in all conditions answered questions unrelated to the experiment for the purpose of avoiding guessing in the follow-up scenarios.

Following this, participants were presented with treatment scenarios. In the conventional product type condition, participants were asked to imagine that they had to see a practitioner for hay fever and get treatment with a conventional remedy named Coryzalia. In the alternative

product type condition, participants were asked to imagine that they had to see a homeopathic practitioner for hay fever and get treatment with an alternative remedy named Coryzalia. Manipulation of product evaluability was designed based on product claims. The product claims chosen in the current study were consistent with Study 5, in which 200 product claims that were collected from 200 product types were rated on an evaluability index. There is also evidence from participants' recall experience in Study 4 that low or high product evaluability emanates from the difference in product claims. In the low-evaluability condition, the product claimed *"Coryzalia increases the efficiency of your white blood cells, which fight allergic inflammation (hay fever*)." In contrast, in the high-evaluability condition*, "Coryzalia mitigates the production of mucus in your nose and hence relieves allergic inflammation (hay fever)."* The claims were put on the package of Coryzalia as a text note.

Table 14. Study 12: The four conditions to which participants were randomly assigned after completing the BPI manipulation.

	Conventional remedy	Alternative remedy
Low evaluability	Imagine that you had to see a practitioner for hay fever (allergic rhinitis). The practitioner prescribed you the conventional medication Coryzalia, which increases the efficiency of your white blood cells (WBCs) to fight allergic inflammation (hay fever).	Imagine that you had to see a homeopathic practitioner for hay fever (allergic rhinitis). The practitioner prescribed you the homeopathic medication Coryzalia, which increases the efficiency of your white blood cells (WBCs) to fight allergic inflammation (hay fever).
High evaluability	Imagine that you had to see a practitioner for hay fever (allergic rhinitis). The practitioner prescribed you the conventional medication Coryzalia, which mitigates the production of mucus in your nose and hence relieves allergic inflammation (hay fever).	Imagine that you had to see a homeopathic practitioner for hay fever (allergic rhinitis). The practitioner prescribed you the homeopathic medication Coryzalia, which mitigates the production of mucus in your nose and hence relieves allergic inflammation (hay fever).

After the product presentations, the failure scenario followed. Participants were informed that a desired level of improvement was not achieved after receiving the treatment for the recommended period of time. They were then asked to allocate 100 points to four probable causal factors ("*Mistake by practitioner,*" "*ineffective product,*" "*my fault,*" "*other factors*") for the likelihood of contributing to the lack of progress. The attribution questionnaire required subjects to rate the relative importance of the four attributions by allocating percentage values to each of the four attributions so that they totaled 100%. This procedure is similar to point allocation procedures used in causal attribution papers (Arkin et al., 1978; Crombie, 1983). The attribution percentage for "my fault" was considered for future analysis as a measure of attribution of blame to the self.

As a measure of product perseverance, participants were asked to attribute weight regarding what choices they would make for the lack of progress out of four possible decisions totaling 100% ("*retaking Coryzalia,*" "*switching Coryzalia,*" "*substituting a practitioner,*" "*something else*"). The percentage of weight on the choice "retaking Coryzalia" was considered for future analysis as a measure of product perseverance. For the manipulation check, participants filled out the 20-item BPI scale that measured BPI previously developed in this project. The composite score for TEIM (total emotion on immunity) with values ranging from 0 (no belief) to 3 (high belief) was used for the manipulation check. As a manipulation check for evaluability, participants in the high-evaluability condition were asked how easily they thought that they would know whether or when Coryzalia (the product) mitigated mucus production in their nose and consequently heal their inflammation. Similarly, participants in the low-evaluability condition were asked how easily they thought they would know whether or when Coryzalia (the product) increased the efficiency of their white blood cells and consequently healed their inflammation. Participants filled out a seven-point Likert scale (1 = extremely easy to 7 = extremely difficult).

I controlled for participants' views toward practitioners, alternative and modern health products, participants' experience and education in the health science field, participants' familiarity, previous use, or previous user experience specifically with Coryzalia or other similar products for hay fever.

Results. The manipulations of both evaluability and BPI worked as required. An ANOVA analysis confirmed that participants in the low-evaluability condition, rather than those in the high-evaluability condition, perceived that it was more difficult to know or evaluate with complete accuracy if the product had worked or not: $M_{low-evaluability}$ = 4.45; $M_{high-evaluability}$ = 2.65; $F(1,698)$ = 253.15, p < 0.001. This implies that, in the low-evaluability condition more than in the high-evaluability condition, there was ambiguity among the participants about inferring the product's effectiveness. BPI manipulation was also successful. The composite score of measured BPI was significantly higher in the high-BPI condition than in the low-BPI condition: $M_{High-BPI}$ = 0.71; $M_{Low-BPI}$ = 0.59; $F(1,698)$ = 35.04, p < 0.001.

Figure 12. Study 12: Manipulation of Evaluability and BPI
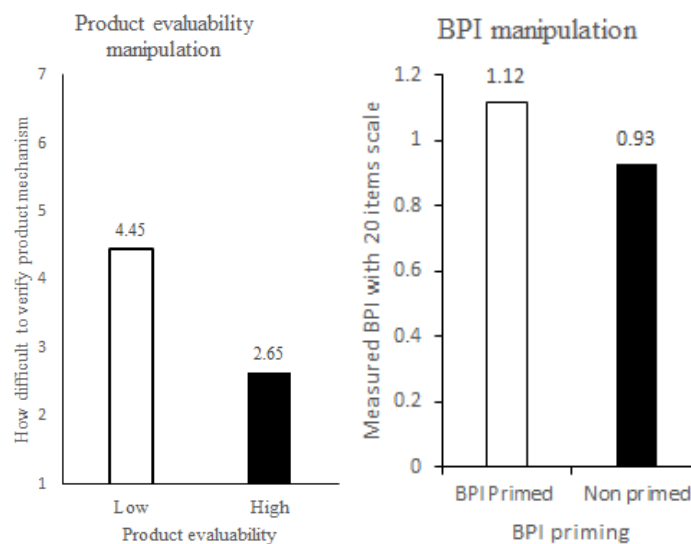
Attribution of blame. A three-way analysis of covariance was conducted to investigate the impact of BPI (0 = low BPI, 1 = high BPI), product evaluability (0 = high evaluability, 1 = low evaluability), and product type (0 = conventional remedy, 1 = alternative remedy) on the self-attribution of blame. Participants' familiarity with Coryzalia, the manipulated product, and participants' attitude toward alternative health products and modern health practitioners were

controlled, and were thus included as covariates.[13] A significant main effect for BPI was obtained ($F(1,690) = 6.17$, $p = 0.01$), with confidence levels for the high-BPI group ($M = 25.69$, $SD = 1.4$) being significantly higher than for the low-BPI group ($M = 21.30$; $SD = 1.08$). A significant main effect for product evaluability was not found: $F(1,699) = 0.94$, $p = 0.33$. A significant interaction effect between BPI and product evaluability was reported: $F(1,699) = 7.32$, $p = 0.007$. For participants in the low-evaluability condition, attribution of blame to the self was higher for those with high BPI ($M = 28.95$; $SD = 2.11$) than for those with low BPI ($M = 19.77$; $SD = 1.54$). However, for participants in the high-evaluability condition, the self-attribution of blame did not differ based on participants' BPI level: $M_{Low-BPI} = 22.84$, $SD = 1.50$; $M_{High-BPI} = 22.44$, $SD = 1.84$. The three-way interaction effect was insignificant, implying that the interaction effect of BPI and product evaluability was consistent regardless of whether it was presented with a conventional or an alternative remedy: $F(1,690) = 0.09$, $p = 0.77$.

Figure 13. Study 12: Interaction effect between BPI and evaluability.

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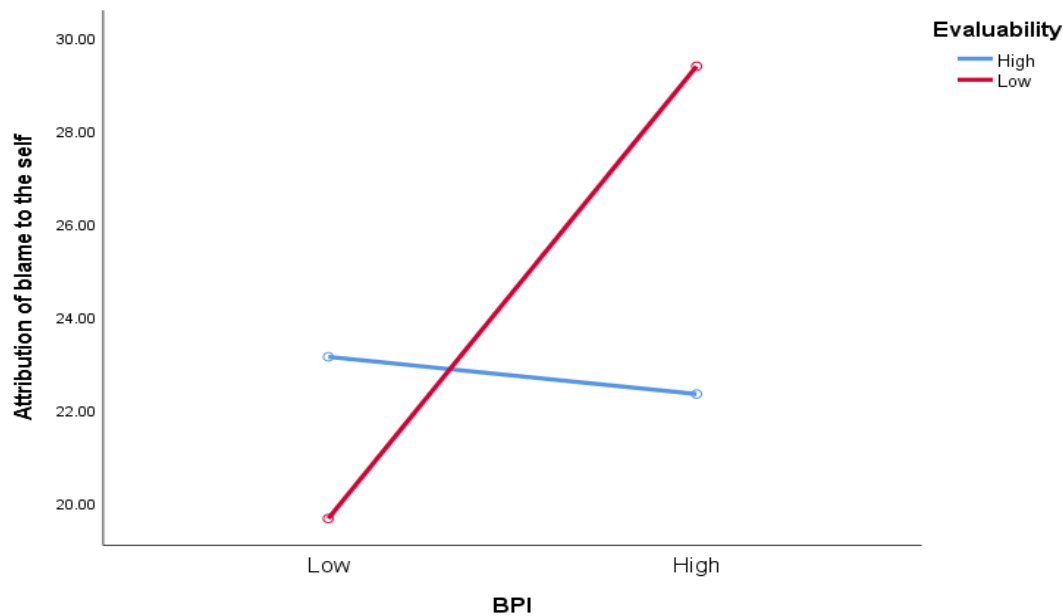
[13] All other control variables were the same across conditions; therefore, they were not included as covariates. Participants' previous use of similar products for hay fever, participants' attitude toward modern health products, participants' attitude toward traditional health practitioners, participants' level of education in health or health-related subjects, and participants' level of practical experience in health science fields were found to be the same across conditions. Participants' familiarity with Coryzalia ($p = 0.006$; $p = 0.014$), participants' attitude toward alternative health products ($p = 0.058$), and participants' attitude toward modern health practitioners ($p = 0.031$) were found to vary across conditions and were thus included as covariates in the main ANCOVA analysis.

Note. Respondents presented with a product of low evaluability, rather than a product of high evaluability, attributed blame more to the self when primed with BPI than not: $F(1,699) = 7.315$, $p = 0.007$. This interaction effect was consistent regardless of whether respondents were in the unconventional or conventional condition: $F(1,690) = 0.086$, $p = 0.770$.

Product perseverance. To test Hypothesis 9, the effect of evaluability (0 = high evaluability, 1 = low evaluability) and BPI (0 = low BPI, 1 = high BPI) on causal attribution of blame to the product and, consequently, on product perseverance, I used the PROCESS macro model 7 ((Hayes, 2017); 95% confidence level; 5,000 bootstrap samples).[14] The indirect effect of evaluability on product perseverance through attribution of blame to the self was dependent on BPI level (moderated mediation index: 3.13, CI from 0.83 to 5.75; see Figure 15).

Figure 14. Study 12: The moderated mediation effect of evaluability on product perseverance.
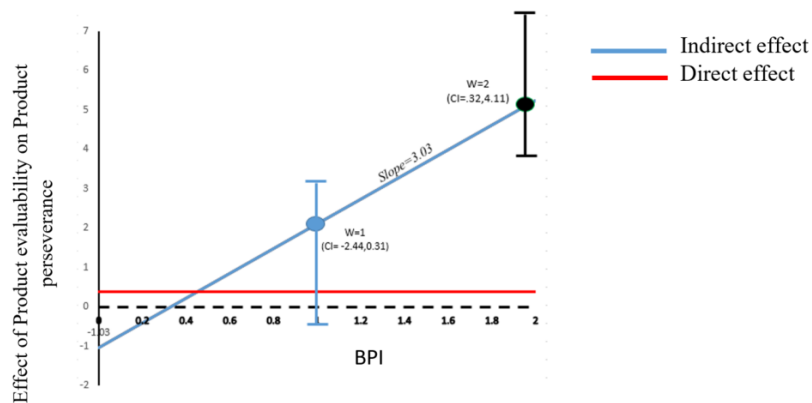
Note. The indirect effect of evaluability on product perseverance through self-attribution of blame was moderated by levels of BPI ($y = -1.03 + 3.03W$). At moderator level 1 (low-BPI group), the indirect effect was not different from zero. However, at moderator level 2 (high-BPI group), the indirect effect was significant. The direct effect ($y = 0.3952$) was not significant.

For respondents in the high-BPI condition, presentation of the product as less evaluable (rather than more evaluable) increased product perseverance after unsuccessful therapy by 2.107 units through attribution of blame to the self (point estimate: 2.107, 95% CI from 0.32 to 4.11). However, such changes in product evaluability had no similar effect on product perseverance

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[14] Similar covariates were included as described earlier.

among those in the low-BPI condition (point estimate: -1.03, 95% CI from -2.44 to 0.31). The direct effect of evaluability on product perseverance was not significant (point estimate: 0.3952, 95% CI from -2.3 to 3.09), implying a fully moderated mediation effect (see Figure 14).

Figure 15. Study 12: Relative indirect effect of low evaluability (vs. high evaluability) on product perseverance through self-attribution of blame.
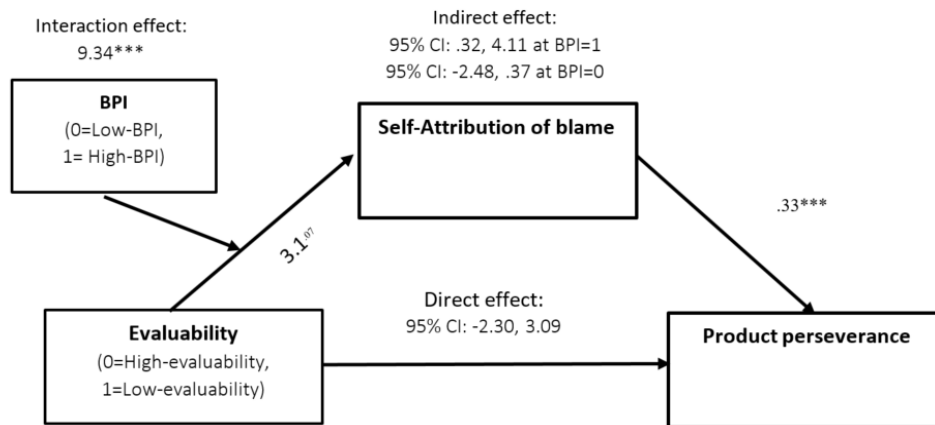
Note. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$. **Condition** (0 = high evaluability, 1 = low evaluability). **BPI** (0 = low BPI, 1 = =high BPI). **Self-attribution of blame** *(Blame weight attribution on "my fault" for the likelihood of its contribution to the lack of progress; 0 = less responsible, 100 = highly responsible).* **Product perseverance** *(0 = no possibility of retaking Coryzalia, 100 = high possibility of retaking Coryzalia).*

Discussion

Participants in the low-evaluability and high-BPI condition tended to attribute blame to themselves for the failure to recover from an illness, thus leading to persistence with the same product. This lends evidence to both Hypotheses 8 and 9. Attribution of blame did not vary in the high-evaluability condition despite a change in participants' BPI scores. This implies that when product claims are highly evaluable, they will adequately offer information about clear candidates for the cause of failure, and hence causal assignment will not be ambiguous. Therefore, individuals' reliance on other salient sources of information, like belief traits, would be minimal, or would become secondary.

The interaction effect was also consistent on both alternative and conventional remedies. This makes it evident that the phenomenon of persevering with a product after unsuccessful

therapy might not be only limited to alternative remedies. As long as any product is crafted with a less-evaluable claim and it targets consumers whose BPI can be manipulated, such individuals might be susceptible to developing loyalty to ineffective products despite treatment success not being achieved. In Study 13, I explored the consequences of BPI and evaluability in terms of monetary value.

10. Marketing consequence of product evaluability, BPI, and causal attribution (on willingness to pay)

Study 13. Dependence of willingness to pay on BPI and evaluability

In the previous study, I showed that individuals with high BPI have a greater tendency to reuse a low-evaluability remedy even when an illness had not been overcome. I replicated this tendency of reuse in terms of monetary unit. I operationalized the monetary unit using a key outcome variable of relevance to marketing managers, namely willingness to pay (WTP). WTP is a measure of the value assigned by a person to a consumption or usage experience in monetary units (Homburg et al., 2005).

Hypothesis 14; *For a product with low evaluability (vs. high evaluability), individuals with a high (vs. low) score on BPI are more (vs. less) willing to repay for a product that failed to heal an illness.*

Procedure. A total of 102 survey respondents (47% Women; M_{age} = 31 years) were recruited from the online participant recruitment platform MTurk in exchange for modest compensation. Respondents were randomly assigned to one of the two experimental conditions (low evaluability vs. high evaluability) in a between-participants experiment. Similar evaluability manipulation procedures were followed as in the previous study. Participants in each condition were asked to imagine that they saw a practitioner for hay fever/allergic rhinitis and received a treatment with a product. They were informed that after taking the medication for the recommended period of time, their illness was not overcome. In the low-evaluability condition, the product was represented as one that "*increases the efficiency of your white blood cells, which fight the allergic*

inflammation/hay fever." In the high-evaluability condition, the product was represented as one that "*mitigates the production of mucus in your nose and hence relieves the allergic inflammation/hay fever.*"

Respondents in all conditions were then asked to indicate their WTP for the product once knowing that their illness had not been overcome. I measured WTP in US dollars[15] with the following two open-ended questions as formulated by Marbeau (1987): (1) Above which price would you definitely not buy the product because you did not think it was worth the money? and (2) Below which price would you say you would not buy the product because you would start to suspect the quality? The higher the upper-bound value, the higher one would perceive the product to be worth much money. Likewise, the lower the bottom-bound value, the less suspicion one would have about product quality (Breidert, 2007). One would be more willing to pay the more they thought the product was worth much money and the less they suspected its quality (Breidert, 2007). Therefore, the difference between the upper and lower bounds offered a more meaningful interpretation of WTP than taking averages of the two bounds (Sahabeh, 2019).

As a manipulation check for evaluability, participants in the high-evaluability condition were asked how easily they thought they could know whether or when the product mitigated mucus production in their nose and consequently healed their inflammation. Similarly, participants in the low-evaluability condition were asked how easily they thought they could know whether or when the product increased the efficiency of their white blood cells and consequently healed their inflammation. Participants replied on a seven-point Likert scale that ranged from 1, which referred to extremely easy, to 7, which referred to extremely difficult. At the end, participants replied on a 20-item BPI scale that measured belief in psycho-immunology as previously developed in this project. The composite score of BPI TEIM (total emotion on immunity), which was estimated earlier in the scale development stage, with values ranging from 0 (no belief) to 3 (high belief), was used for the manipulation check.

Results. Respondents had very different opinions about the price they would be willing to pay, depending on whether they were presented with the low-evaluability versus the high-

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[15] The choice of the currency was optimal with regard to the location of participants.

evaluability product. Those in the low-evaluability condition were willing to pay significantly more (*M* = 24.78 USD, *SD* = 20.37) than those in the high-evaluability condition (*M* = 17.05 USD, *SD* =12.49), $F(1,101)$ = 5.33, *p* = 0.02. H14 predicted that the influence of evaluability on WTP would be moderated by belief in psycho-immunology. I regressed WTP on evaluability, BPI, and the evaluability × BPI interaction to test for moderation. Consistent with H14, I observed a significant effect of the evaluability × BPI interaction (β = 10.9, $t(101)$ = 1.9, *p* = 0.06) on WTP. I graphed this interaction in Figure 16 using the Johnson–Neyman technique for identifying regions in the range of the moderator variable in which the effect of the independent variable on the dependent variable was and was not significant (Hayes & Matthes, 2009; P. O. Johnson & Neyman, 1936). The Johnson–Neyman point for *p* < 0.05 (*t* = 1.98) for the BPI moderator occurred at a value of 0.64. This indicated that low evaluability results in significantly higher levels of WTP than high evaluability for all values of BPI above 0.64. In addition, there were no significant differences between the low- and high-evaluability conditions below the Johnson–Neyman point, owing to the larger confidence intervals at lower levels of BPI. As such, these data are consistent with the conclusion that people with high BPI are influenced more by the low evaluability of product claims.

Figure 16: Study 13: BPI moderates the influence of low evaluability on WTP
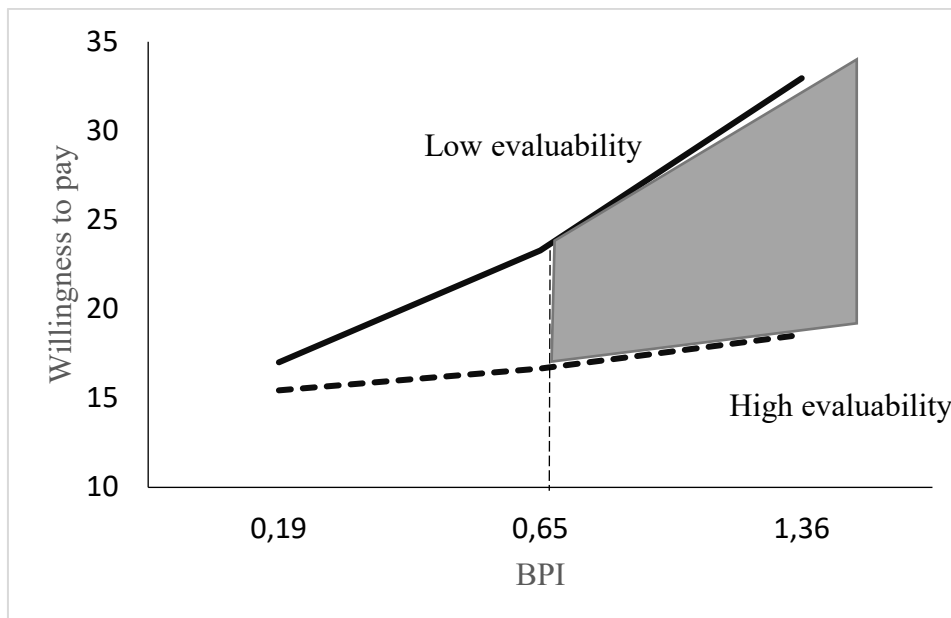
Note. Low evaluability results in significantly higher levels of WTP than high evaluability for all values of BPI above 0.64.

Discussion

Study 13 sought to conceptually replicate the findings of Study 12 in terms of monetary value outcomes. I showed that the interaction effect of evaluability and BPI was also robust when the dependent variable was operationalized as WTP. Individuals with high BPI are more willing to pay for a low-evaluability remedy even when the illness had not been overcome.

In the previous sections, I gave an account of the phenomena of self-attribution of blame and product perseverance and further explored how product evaluability and BPI predicted them. In the next sections, I explore another demographic or dispositional list of variables that might play an important role in predicting these phenomena.

11. Miscellaneous predictors of self-attribution of blame and product perseverance

Study 14. Socioeconomic status, religiosity, and shared BPI worldview.

Socioeconomic status (SES)

Social class refers to the amount of wealth, education, and occupational prestige enjoyed by individuals and their families. According to recent studies, within a particular culture or ethnicity, people at different levels on the socioeconomic ladder arrive at very different causal explanations for events. For example, in an investigation by Kraus et al. (2009), after having had participants make attributions for positive life events (getting into a desired graduate program) and negative life experiences (suffering a health problem), lower and working-class participants were more likely to invoke situational causes, whereas those higher up on the socioeconomic ladder tended to invoke dispositional causes. In another study by Kraus and Keltner (2013), class-related differences in attribution extended to how people from different class backgrounds explained why some people were rich and some were poor. It was found that wealthy participants were more likely to endorse the belief that a person's standing in society was determined by genetic factors and a person's temperamental inclination to succeed or fail, while working class

individuals were more likely to cite situational factors. I hypothesized that similar attribution inclinations could predict how individuals respond to the outcome of an unsuccessful therapy and the extent of their perseverance with a failed remedy.

Hypothesis 10: Higher (vs. lower) socioeconomic status individuals will stick with a failed remedy for longer because they attribute the failure to themselves.

Religiosity

Research has also shown that as people become more concerned with the state of their souls, or more religious, they are more likely to make internal, dispositional attributions for behavior (Li et al., 2012; Yelderman & Miller, 2016). For example, it was found that participants who scored higher on the emphasis they placed on the soul were more inclined to attribute dispositional factors to their behavior than were participants who scored lower on the emphasis they placed on the soul (Li et al., 2012). Even more, when these participants were primed to think about the soul, their internal attributions increased even further. I suggest that the soul is very much a salient concept for religious people and that belief in a soul promotes a tendency to attribute behavior to dispositions, not situations.

Hypothesis 11: More (vs. less) religious people tend to stick with a failed remedy for longer because they tend to attribute lack of success in recovery to internal factors.

Shared BPI worldview

Theories of group size and conformity have demonstrated that individual psychological processes are subject to social influences (Bond, 2005). Particularly, individuals are prone to informational social influence, which may be defined as an influence to accept information obtained from another as evidence about reality (Deutsch & Gerard, 1955). If it is true that difference in BPI predicts product perseverance, which I documented in the previous studies, then according to the theories of conformity, it is also possible that individual decisions concerning perseverance can be influenced by the prevalence of other individuals within one's social group

who have BPI convictions. I coined "Shared BPI worldview" as the extent and magnitude of BPI conviction within one's social domain, constituting friends, family, or other acquaintances. This further implies how commonly and passionately members of an individual's social group hold BPI beliefs. Therefore, I hypothesized that the more one has friends/family/acquaintances who have strong BPI convictions, the more one would be influenced by this belief trait and thus have a higher tendency to make decisions that are consequential for the belief trait, such as self-attribution of blame or product perseverance.

Hypothesis 12: *Individuals whose social group contains more (vs. fewer) friends, family, and acquaintances who have convictions that thoughts, feelings, and attitudes affect a person's ability to recover from an illness have a greater (vs. lesser) tendency to persevere with a product.*

Procedure. A total of 151 participants (54% women; M_{age} = 38) were recruited from MTurk for modest compensation. I recruited respondents who replied "*I am an occasional user*" or "*I am a frequent user*" to the question "*Which one choice describes you the most in relation to use of a holistic or other unconventional treatment (for example, an herbal remedy not recognized by the American Medical Association, a homeopathic remedy, etc.)?*" Participants who answered "*I am not a user at all*" or "*I use some*" were excluded.

Participants were randomly assigned to one of the two experimental conditions (alternative remedy vs. conventional remedy) in a between-participants experiment. In the alternative (vs. conventional) condition, respondents were asked to imagine that they had diabetes and that they were told by someone they respected to try an alternative (vs. conventional) remedy. They were further told that the illness was not initially overcome. As a measure of perseverance, participants were asked an open question about how long they would stick with the treatment until they gave up and concluded that the treatment did not work.

I measured causal attribution by asking the respondents how much of a role they thought the five choices played in their not getting better initially. The choices were "The treatment itself," "My body's reparative systems," "My belief that the treatment would work," "My ability to maintain a positive attitude and avoid stressful emotions," or "My own effort." They rated the scores from 0 to 100%, with 100% meaning that they thought the choice was responsible for the

failure to see an improvement and 0% meaning that it played no role in the failure to see an improvement. Participants totaled their answers to 100% for the five choices.

Finally, subjective socioeconomic status (SSES), religiosity, and shared BPI worldview were measured. To measure SSES, I used a scale developed by Singh-Manoux et al. (2003). A picture of a clickable ladder was presented to respondents, who were then asked questions with the following description: "*Think of this ladder as representing where people stand in our society. At the top of the ladder are the people who are the best off, those who have the most money, most education, and best jobs. At the bottom are the people who are the worst off, those who have the least money, least education, and worst jobs or no job. Click on the rung that best represents where you think you stand on the ladder.*" At the end, I used the 10-item measure by Worthington Jr et al. (2003) to measure religiosity.

To measure shared BPI worldview, participants were asked three questions: "*1. Among your friends, family, and acquaintances, how common is the belief that thoughts, feelings, and attitudes affect a person's ability to recover from an illness? (1 = hardly anyone I know believes that ... 7 = nearly everyone I know believes that). 2. Among your friends, family, and acquaintances, how passionate is the belief that thoughts, feelings, and attitudes affect a person's ability to recover from an illness? (1 = not passionately held ... 7 = very passionately held). 3. Among your friends, family, and acquaintances, how common is the belief that maintaining the proper attitude and 'staying positive' can enable a person to recover from almost any illness? (1 = hardly anyone I know believes that ... 7 = nearly everyone I know believes that).*" The factor loadings of all three items ranged from 0.88 to 0.89, which is above the threshold of the 0.32 cut-off point (B. G. Tabachnick et al., 2007). In addition, all three items loaded on a single factor. The Cronbach's alpha value of the three items was 0.86 and the composite reliability was 0.91, confirming the consistency of the items and the reliability of the measure. The results of the Pearson correlation indicated that there was a significant positive association between shared BPI worldview and the theoretically related construct BPI: $r(151) = 0.42$, $p < 0.001$. The AVE values for the three items of shared BPI worldview was 0.78, greater than the 0.5 threshold, which thus established support for the convergent validity of the shared BPI worldview scale (Hair Jr et al., 2017; Odou & Schill, 2020). An average composite

score was calculated for shared BPI worldview by taking the average score of the three replies for further analysis.

Results. The text replies to perseverance were converted to number of days. A composite score for attribution to the self was calculated by taking the average score of the four choices: "*My body's reparative systems*," "*My belief that the treatment would work*," "*My ability to maintain a positive attitude and avoid stressful emotions*," and "*My own effort.*" A hierarchical multiple regression was conducted. Prior to conducing the regression, the relevant assumptions of this statistical analysis were tested. First, a sample size of 151 was deemed adequate given three independent variables to be included in the analysis (B. Tabachnick & Fidell, 2001). The assumption of singularity was also met as the independent variables were not a combination of other independent variables. An examination of correlations (see Table 15) revealed that no independent variables were highly correlated, with the exception of religiosity and shared BPI worldview. However, as the collinearity statistics (i.e., tolerance and VIF) were all within accepted limits, the assumption of multicollinearity was deemed to have been met (Hair, 2009). Extreme univariate outliers identified in initial data screening were modified. An examination of the Mahalanobis distance scores indicated no multivariate outliers. Residual and scatterplots indicated that the assumptions of normality, linearity, and homoscedasticity were all satisfied (Hair, 2009). A three-stage hierarchical multiple regression was conducted with self-attribution of blame and product perseverance as the dependent variables. Shared BPI worldview was entered at stage one of the regression. SSES was entered at stage two, and religiosity was entered at stage three. Intercorrelations between the multiple regression variables are reported in Table 15 and the regression statistics are reported in Table 16.

Table 15. Study 14: Intercorrelations between SSES, shared BPI worldview, religiosity, self-attribution of blame, and perseverance

		SSES	BPI_World_View	Religiosity	Self_Attribution	Perseverance
	SSES	-	.03	.08	.14	.10
Alternative remedy	BPI_World_View	.16	**.81**	.18	.08	.07
	Religiosity	.29**	.42**	**.97**	.21	.07
	Self_Attribution	.38**	.28**	.46**	-	.05
	Product Perseverance	.32**	.26*	.27*	.23*	-
	SSES	-	.06	.10	.13	.00
Conventional remedy	BPI_World_View	.25*	**.92**	.07	.02	.01
	Religiosity	.32*	.27*	**.97**	.03	.00
	Self_Attribution	.36**	.13	.18	-	.01
	Product Perseverance	-.02	.09	-.06	-.09	-

Note. The diagonal elements (bolded) are composite reliability. Upper off-diagonal elements are squared correlations. Lower off-diagonal elements are the correlations among constructs. SSES and perseverance are one-itemed, while self-attribution items are treated as formative and therefore no reliability values are reported for the three variables. ** Refers to a Pearson correlation coefficient significant at the 0.01 level, while * refers to significance at the 0.05 level. **SSES** = subjective socioeconomic status. **BPI_World_View** = the composite score on the BPI_World_View items. **Religiosity** = 10 items of Worthington Jr. et al.'s (2003) measure. **Self-Attribution** = Participants' average response on four choices: "*My body's reparative systems,*" "*My belief that the treatment would work,*" "*My ability to maintain a positive attitude and avoid stressful emotions,*" and "*My own effort.*" **Perseverance** = how long participants would stick with the treatment until they gave up and concluded that the treatment did not work.

The hierarchical multiple regression revealed that at stage one, shared BPI worldview contributed significantly to the regression model ($F(1,84) = 7.1$, $p < 0.01$) and accounted for 8% of the variation in self-attribution of blame (see Table 16). Introducing SSES explained an additional 11% of the variation in self-attribution of blame, and this change in R^2 was significant: $F(2,84) = 10.1$, $p < 0.001$. Adding religiosity to the regression model explained an additional 9% of the variation in self-attribution of blame, and this change in R^2 was significant: $F(3,84) = 10.9$, $p < 0.001$. When all three independent variables were included in stage three of the regression model, only shared BPI worldview became a non-significant predictor of self-attribution of blame. The most important predictor of self-attribution of blame was religiosity, which uniquely explained 11% of the variation in self-attribution of blame. Together, the three independent variables accounted for

26% of the variance in self-attribution of blame. Similar findings were not reported for the conventional remedy condition, where it was only SSES that significantly predicted self-attribution of blame.

Table 16. Study 14: Summary of hierarchical regression analysis for variables predicting self-attribution of blame and product perseverance for alternative remedy and for conventional remedy.

Independent Variables	Alternative remedy						Conventional remedy					
	Model-1		Model-2		Model 3		Model-1		Model-2		Model 3	
	SA	PP	SA	PP	SA	PP	SA	PP	SA	PP	SA	PP
BPI Worldview	.28**	.26*	.22*	.22*	.09	.16	.13	.09	.04	.10	.03	.12
SSES			.35**	.28**	.27**	.26*			.35**	-.04	.33**	-.02
Religiosity					.34**	.14					.06	-.08
R^2	.08	.07	.19	.15	.29	.16	.02	.01	.13	.01	.14	.02
Adjusted R^2	.07	.06	.18	.12	.26	.13	.00	-.01	.10	-.03	.10	-.04
F	7.1**	5.4*	10.1**	6.2**	10.9**	4.5**	1.1	.44	4.8*	.25	3.2*	.27

Note. **SA** = self-attribution of blame, **PP** = product perseverance, **SSES** = subjective socioeconomic status
$+p < 0.10$
$*p < 0.05$
$**p < 0.01$
Beta standardized coefficients

With regard to the second dependent variable, product perseverance, the hierarchical multiple regression revealed that at stage one, shared BPI worldview contributed significantly to the regression model ($F(1,74) = 5.4$, $p < 0.05$) and accounted for 7% of the variation in product perseverance. Introducing the SSES explained an additional 8% of the variation in product perseverance, and this change in R^2 was significant: $F(2,72) = 6.2$, $p < 0.05$. Adding religiosity to the regression model explained an additional 2% of the variation in product perseverance, and this change in R^2 was significant: $F(3,74) = 4.5$, $p < 0.001$. When all three independent variables were included in stage three of the regression model, only SSES was a significant predictor of product perseverance. Together, the three independent variables accounted for 16% of the variance in product perseverance. All three models were not significant in explaining the variation in product perseverance for conventional remedy conditions.

Study 15. Incremental mindset and self-attribution of blame for failure

Believing that abilities and attributes are fixed and stable versus dynamic and malleable has been shown to have a profound effect on the way in which people interpret failure (John & Park, 2016; Molden & Dweck, 2006; Park & John, 2010). If attributes are seen as fixed, then failure provides diagnostic information about how many of these fixed attributes one possesses (and will ever possess). Therefore, failure often signifies that abilities are permanently lacking in some way, and that individuals are prone to blame their abilities. Following failure, any self-regulation in which these individuals are engaged is thus likely to focus primarily on suppressing the importance of this failure or coping as best as possible with the negative emotional impact. On the contrary, it is so much more psychologically disturbing to blame oneself for a fixed attribute of the self. Therefore, individuals with a fixed mindset might be motivated to think that they do not have what it takes to pray effectively, do not have what it takes to please the Lord, or do not have what it takes to feel positive about the treatment. This might lead to the attribution of their failure to other sources. In contrast, if attributes are seen as malleable, then failure provides diagnostic information about the level to which these attributes have thus far developed. Therefore, failure may signify that abilities require improvement through further attention and effort in individuals with a growth mindset who perceive ability as an attribute to be developed. Following failure, any self-regulation in which these individuals are engaged is thus more likely to focus on determining how to bring about this improvement (Dweck, 2000).

Hypothesis 13: Individuals with an incremental (vs. fixed) mindset tend to blame themselves more (vs. less) in the event of non-recovery from illness after product use.

Procedure. A total of 219 survey respondents (44% women; M_{age} = 37) were recruited from the online participant recruitment platform MTurk in exchange for modest compensation ($7.25/hour). I replicated Study 2, the prayer as a remedy and causal attribution study. However, this time, I included the measure for mindset. In Study 2, it was documented that individuals have the tendency to attribute more blame to the self than to the prayer during failure. In this study, it was explored whether the differential self-attribution of blame documented in Study 2 was a result

of inter-individual differences in the personality characteristics of those with an incremental mindset. Similar respondents were recruited as in Study 2. Respondents who chose their religious affiliation as "*Christianity (e.g., Baptist, Church of England, Roman Catholic, Methodist, Jehovah Witness, etc.)*" and their Christianity affiliation as "*Apostolic Pentecostal, Protestant, Baptist, Methodist, Lutheran, Anglican/Episcopalian, Calvinist/Reformed/Presbyterian*," and who answered 60 and above for the question "*How devoted a Christian are you? 100% means that you are a devout Christian; 0% means that you are not devout at all*," and who responded 3 and above on a seven-point Likert scale of "*How much do you believe in prayer? 1 = Not at all; 7 = Far too much*" were included in the study.

Respondents who fulfilled the inclusion criteria were randomly assigned to one of the two (failure vs. success) experimental conditions in a between-participants experiment. Participants were asked to imagine having a physical ailment or illness of some kind and, to get better, they asked the minister at their church or someone else to pray for them or they prayed for themselves. In the failure condition, participants were told to imagine that the illness or ailment did not get better or was not overcome after receiving the prayer. In the success condition, participants were told to imagine that the illness or ailment got better or was overcome after receiving the prayer. As a measure of attribution, participants were asked to rate four choices with regard to how much of a role they thought each of four possible causes played in their getting better (for the success scenario) or not getting better (for the failure scenario). The choices "*Something about the prayer itself*," "*My own faith in the power of the prayer*," "*My belief that the prayer would work*," and "*My own feelings about the prayer*" appeared in a randomized order. The scale ranged from 0 to 100 points. In the success scenario (vs. failure scenario), 100 meant that they thought the choice selected was responsible for their improvement (vs. for the failure to see an improvement), while 0 meant that it played no role in their improvement (vs. played no role in the failure to see an improvement). Finally, mindset was measured with Plaks et al. (2001) eight-item scale.

Results. I computed an average of the three self-measures ("*My own faith in the power of the prayer*," "*My belief that the prayer would work*," and "*My own feelings about the prayer*") and created a composite self-attribution of blame score. The scale of mindset was a continuum from 0 to 6. Individuals near the value of 0 had a higher fixed mindset, while individuals near the value of

6 had a higher growth mindset. A simple regression was used to predict self-attribution of blame from growth mindset. Growth mindset explained a significant amount of the variance in self-attribution of blame both during failure ($F(1,106) = 4.07$, $p = 0.04$, $R^2 = 0.04$, $R^2_{adjusted} = 0.03$) and during success ($F(1,109) = 3.65$, $p = 0.05$, $R^2 = 0.03$, $R^2_{adjusted} = 0.02$). The regression coefficient ($B = -.19$, 95% CI [-12.44,-0.11]) indicated that an increase in growth mindset leads to a decrease in self-attribution of blame during failure, which was found to be the opposite of what was hypothesized. Correlations between the variables are reported in Table 17.

Table 17. Study 15: Correlational relationship between incremental mindset and causal attribution.

Failure Attribution tendency

Condition	Mindset	Something about the prayer itself	My own faith in the power of the prayer	My belief that the prayer would work	My own feelings about the prayer	Self-Average
Failure	Growth Mindset (vs. Fixed)	ns	ns	**-.204***	**-.194***	**-.192***
Success	Growth Mindset (vs. Fixed)	ns	ns	ns	**.211***	ns

Note. Respondents with a growth (vs. fixed) mindset attributed less (vs. more) of a role to themselves for their not getting better but more (vs. less) of a role only to one of the self-measure dimensions for their getting better.

Discussion

In Hypothesis 13, I explained the relationship between an incremental or fixed mindset and the self-attribution of blame for failure. I based the hypothesis on two opposing arguments. The first argument is in line with the findings. Since individuals with a fixed mindset see attributes as fixed, failure provides diagnostic information about how much of these fixed attributes one

possesses (and will ever possess). Therefore, failure often signifies that abilities are permanently lacking in some way, and that individuals are prone to blame their abilities.

My second argument comes from the fact that making oneself responsible for failure in fixed mindset individuals would be psychologically disturbing. For example, fixed mindset individuals might have a tendency to think that they do not have what it takes to feel positive about the treatment. As such, there would be no reason for them to attribute blame to themselves but rather to other sources. However, the findings were the opposite, supporting the first argument instead: Individuals with a fixed (vs. growth) mindset tend to blame themselves more (vs. less) for failure.

12. General discussion

Today, we have a variety of options for treating our medical conditions. One of these are complementary and alternative health remedies, which constitute diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine (Kessler et al., 2001). Depending on their underlying healing philosophies, these remedies can be classified into five categories (Waldman & Terzic, 2009). For example, herbs and dietary supplements are categorized as biologically based therapies, while homeopathy and Ayurveda are categorized as holistic remedies. While this study explored ineffective alternative treatments in general, particular emphasis was also placed on holistic therapies that promote healing as mind–body regulation. Some alternative remedies have been proven to be pharmacologically ineffective and therefore unable to heal any illness (Ventola, 2010b). Some have even been reported to be unsafe for use, predisposing users to severe health complications (Ernst, 2011).

Nevertheless, the market for such remedies is steadily growing and is predicted to reach a global market size of around USD 404 billion by 2028, posing a global health burden (GVR, 2021). It is therefore imperative to explore why people engage in the use of such products. A vast amount of literature has explored why people initiate the use of alternative remedies. For example, it has been reported that people initiate the use of such remedies because they have become desperate due to treatment failures by conventional medicine, a phenomenon referred to by some authors as a push effect (Barnes et al., 2004). It has also been documented that intimate practitioner–

patient interactions in the context of unconventional medicine attract users, which some authors have described as a pull effect (Vapiwala et al., 2006).

Moreover, some segments of the population have belief traits that favor an inclination toward alternative remedies. For example, having intuitive reasoning, paranormal beliefs, self-transcendence values, anti-science attitudes, and a holistic orientation to health are related to an individual's tendency to use alternative remedies (Lindeman, 2011; Saher & Lindeman, 2005; Siahpush, 1999). Once use is initiated, individuals quit or sustain use depending on particular treatment outcomes. In successful treatment outcomes, some individuals sustain use because, for example, they are susceptible to the "Post hoc ergo propter hoc" logic: If every healing followed product use, then the healing must have been caused by the product (Gilovich, 2008). But in practice, many individuals recover via the use of ineffective remedies for two reasons. First, because nearly half of all medical illnesses are self-limiting, meaning that they go away without needing medical intervention. Such spontaneously resolving diseases increase the belief that ineffective treatments work (Blanco & Matute, 2020). Second, the mere thought of taking a product prompt the human body to produce natural analgesics that help relieve mild illnesses like pain and stress for a brief period of time (Peciña & Zubieta, 2015). Hence, such products are not much more than placebos.

In another type of situation, which was the focus of this dissertation, case reports have indicated that users persevere with a product even when the illness it is intended to treat is not overcome (Simonton et al., 1992). This seemingly results from causal attribution bias, in which users attribute the cause of non-recovery more to themselves than to the product. This tendency is counterintuitive to elementary knowledge about consumer behavior, in which consumers tend to attribute product success to themselves and product failure exclusively to the product or service (Folkes, 1984). Until now, the factors that drive this phenomenon have received little research attention. In this dissertation, I documented evidence of this counterintuitive form of causal attribution as well as the propensity on the part of consumers to persevere with a failed remedy. Moreover, I explored the predictors of individuals' susceptibility to such behavior and investigated the consequences with respect to consumption variables relevant to marketing management.

The following section provides a summary of the empirical investigation. The remainder of this chapter is structured as follows: The first section contains a summary of all of the studies presented in this dissertation, after which, in the following sections, the theoretical and managerial implications of the findings of these studies are described.

12.1 Summary of results

Chapter 3 introduced multiple research objectives. This section will briefly summarize the results from 15 empirical studies in order to determine whether the research objectives were met in the course of this research.

Research objective 1: To show whether there is experimental evidence of reported cases of causal attribution bias and product perseverance.

In Study 1, I described how alternative users attribute failure less (vs. more) to the treatment and more (vs. less) to the self for unconventional (vs. conventional) treatments. The direction of this behavioral pattern supports my proposed hypothesis, but it failed to reach conventional standards of statistical significance. I speculated that this arose from the low degree of emphasis placed on mental control over physical states by the type of manipulated alternative remedy used in Study 1. This led to pretest 1, in which 26 types of alternative treatments were rated in terms of the "*importance of a person's attitude and belief in influencing the effectiveness of the practice*" and their "*effectiveness as a treatment for certain illnesses.*" As one of the 26 alternative remedies on the list, prayer emerged as one of the top remedies on the scale, for which a person's attitude and belief were believed to be important in influencing the effectiveness of prayer and, at the same time, were considered to be an effective treatment for certain illnesses. In Study 2, with prayer used as the alternative remedy, a statistically significant pattern that supported the causal attribution bias was demonstrated. It was shown that people cite themselves more than the prayer when it comes to failure, but not when it comes to success. This change in pattern, which was more evident in Study 2 than in Study 1, implies that the tendency for susceptibility to causal attribution bias differs depending on how much each remedy emphasizes mind–body integration and to what extent the users of each remedy embrace this ideology. In

Study 3, the phenomenon of product perseverance was sufficiently demonstrated. It was documented that alternative users tend to persevere for a longer (vs. a shorter) number of days with alternative (vs. conventional) remedies until they give up and conclude that it does not work even after knowing that the illness was not initially overcome. On the contrary, this was not observed in regular users, who tend to persevere to the same extent with alternative and conventional remedies.

Research objective 2: To show whether low evaluability, a situational factor unique to alternative remedies, and BPI, a dispositional belief trait held by every individual to a greater or lesser extent, predict causal attribution bias and product perseverance.

From a collection of 200 remedy claims, I documented in Study 5 that alternative remedies are in general less evaluable than conventional remedies. Moreover, it was shown in Study 4 that such a feature of low evaluability caused less attribution of failure to the product and made participants persevere longer with an unsuccessful therapy. From Study 7 to Study 10D, I developed and validated a scale for the BPI construct. In Study 10E, this scale was used to predict an individual's tendency for product perseverance after unsuccessful therapy. Individuals with high (vs. low) BPI belief traits persevered for a longer (vs. shorter) number of days on unsuccessful alternative remedies than on conventional remedies. In Study 12, three important aspects were explored. First, a significant interaction effect of low evaluability and BPI on self-attribution of blame and product perseverance was documented. It was shown that the impact of low evaluability on self-attribution of blame and product perseverance increased with an increase in an individual's BPI level. Second, the effect from low evaluability on product perseverance was mediated by self-attribution of blame. Last, this interaction effect held for both alternative and conventional remedy manipulations. This implies that as long as products are designed to be less evaluable and are presented to individuals with high BPI traits, these individuals will be susceptible to causal attribution bias and will persevere on unsuccessful remedies.

Research objective 3: To show whether low evaluability and BPI have consequences on WTP.

With Study 13, a significant effect of the evaluability × BPI interaction on WTP was demonstrated. Low evaluability resulted in significantly higher levels of WTP than high evaluability for all scores of BPI above 0.64, while no significant differences between the low- and high-evaluability conditions were recorded for individuals who had low BPI traits.

Research objective 4: To show whether sociodemographic and other personality variables, like religiosity, socioeconomic status, and incremental mindset, predispose individuals to causal attribution bias or product perseverance.

In Study 14, religiosity and socioeconomic status together explained 26% of the variation in self-attribution of blame only when the manipulated product was an alternative remedy. Moreover, socioeconomic status alone predicted product perseverance on both alternative and conventional remedies. In Study 15, contrary to my hypothesized prediction, individuals with fixed (vs. incremental) mindsets blamed themselves more (vs. less) for failure. This accords with the theoretical elaboration that individuals with a fixed mindset see attributes as fixed. Failure provides diagnostic information about how many of these fixed attributes one possesses (and will ever possess), making individuals with a fixed mindset (vs. an incremental mindset) more prone to blaming their abilities.

12.2 Implications for theory

12.2.1 Implications for research on causal attribution

I contribute to the literature on causal attribution by increasing understanding about the tendency for self-attribution of blame for failure. Prior causal attribution literature has focused on circumstances in which product failure occurs due to external factors (Folkes 1988; Hocutt et al., 1997). For example, when a product fails, consumers typically blame the company (Richins, 1983), the product (Valerie A. & Krishnan, 1979), the manufacturer, or the retailer (Su & Tippins, 1998). This tendency has been subject to the self-serving attributional bias (Payszczynski & Solomon, 1982; Mullen & Riordan, 1988; Mezulis et al., 2004), in which people are prone to being self-serving in their attributions because doing so makes them feel good about themselves or at least prevents them from feeling bad about themselves. The self-serving attributional bias, then, is a motivational

bias stimulated by the desire to maintain self-esteem. This bias is common not just in the consumer domain but also in various fields, such as academia, in which professors have been shown to engage in self-serving behaviors when their manuscripts are evaluated for possible publications (Wiley et al., 1979), or sports, in which professional athletes (Roesch & Amirkhan, 1997) often externalize their defeats and internalize their victories. Contrary to previous explanations, I found in Study 2 that for remedies with a high emphasis on mind–body regulation, there is weaker susceptibility to self-serving bias when people cite themselves more than prayer when it comes to failure, but not when it comes to success. It is therefore compelling to determine why the self-serving bias is reversed in domains like mind–body regulation remedies.

Given that the need to preserve self-esteem is assumed to be a motivational factor for self-serving bias, I speculate that anything that attenuates this need can diminish the tendency for self-serving bias. For instance, religious people care less about defending their self-esteem because they believe that their feelings of self-worth come only from God's unconditional love and acceptance for all people (Krause, 1995). Consistent with this explanation, my findings from Study 14, in which religiosity uniquely explained 11% of the variation in self-attribution of blame, adds to the literature by demonstrating conditions in which self-serving bias is diminished. A similar tendency for self-attribution of blame was recorded recently among consumers engaged in co-production activities (Pacheco et al., 2017). The mechanism that explained this occurrence was that co-production led to perceived control (Hui & Toffoli, 2002), consequently with internal attributions. This suggests that when consumers feel that they have control over an outcome, they will take some part of the blame for failure themselves. Consistent with this, the inter-individual personality trait named "belief in psycho-immunology" (BPI) elicits the feeling that psychological aspects control body states and predicts occurrences of self-attribution of blame, as revealed in Study 11. One interesting topic for future research is the relationship between BPI and the external dimension of locus of control documented in Study 9A. If consumers externalize psychological components of BPI, then it is counterintuitive to think that they make internal attributions of responsibility.

I also contribute to the understanding causal attribution research by exploring how fixed (vs. incremental) mindsets are associated with the self-attribution of blame. Given that internal

attributions of product failure could be viewed as a self-threat (Dunn & Dahl, 2012), consumers may seek to justify outcomes or reestablish self-worth when evaluating products. Indeed, in this instance, complaints are centered on external sources and fail to incorporate the self. This demonstrates the ascription of blame that is characteristic of consumer reactions to self-threat. However, the causal attribution literature has not revealed the boundary conditions responsible for this phenomenon, i.e., whether failure is perceived as a self-threat for *every* personality. For example, in fixed mindset personalities, does failure still provide information about self-threat or instead information about the fixed attributes one possesses? This is important to answer because each assumption has different consequences. While this question is still unresolved and as such represents a compelling area for future research, the findings from Study 15 in the current research suggest that the latter is true. For a fixed-mindset personality, it seems that failure provides diagnostic information about the fixed attributes one possesses, not perceptions of self-threat. Hence, in Study 15, individuals with a fixed mindset tended to blame themselves more (vs. less) for failure.

Generally, the findings from Studies 2 and 15 add to the growing evidence for self-attribution of blame, which is completely opposite to the causal attribution predictions made by Folkes (1984) that have been dominant in consumer research for so long.

12.2.2 Implications for consumer loyalty

I add to the consumer loyalty literature by documenting a domain of consumption in which extreme consumer loyalty can be observed and by identifying low evaluability as a factor that can lead to consumer loyalty. As defined by Oliver (R. L. Oliver, 1999), consumer loyalty is a deeply held commitment to re-buying or re-patronizing a preferred product or service consistently in the future despite situational influences and marketing efforts intended to cause a shift in consumer behavior. According to Study 3, alternative remedy users were committed to rebuying alternative remedies despite a situational influence—in this case, non-recovery—that should have had the potential to cause a shift in behavior. It was previously documented that multiple consumer- and product-related variables lead to consumer loyalty: customer satisfaction (Garbarino & Johnson, 1999), trust (Chaudhuri & Holbrook, 2001), psychological commitment (Bloemer & De Ruyter,

1998), perceived value (M. D. Johnson et al., 2006), perceived quality (Boulding et al., 1993), perceived fairness (Seiders & Berry, 1998), switching costs (Dick & Basu, 1994) and brand reputation (Edvardsson et al., 2000). I add "evaluability" as a product-related variable to this list of antecedents.

12.2.3 Implications for placebo effect studies

For centuries, it has been common knowledge that sick people given a substance known to be inert by a doctor frequently get better. For good or ill, this has long been labeled the ''placebo effect'' (Moerman, 2002). The placebo effect is defined as the generation of objective changes without the action of an actual treatment (Meissner et al., 2011). The cascade of the placebo effect is triggered when psychosocial signals, including conditioning and verbal and observational cues, are detected, interpreted, and translated into neural inputs crucial to forming expectations and placebo responses, resulting in behavioral and clinical changes. The findings from Study 10c contribute to a better understanding of the placebo research by distinguishing a personality type that responds better to inert substances. Ostensibly, it appears that high BPI people are better at interpreting observational cues or forming expectations, the crucial first step in the placebo cascade, and hence respond much more effectively to a placebo treatment than do low BPI people.

12.2.4 Implications for patient decision-making

In the patient decision-making literature, it has been reported that people initiate the use of alternative medicine because they have become desperate due to treatment failures in conventional medicine (Barnes et al., 2004), because they are attracted to the intimate practitioner–patient interactions in the context of unconventional medicine (Vapiwala et al., 2006), or because they have specific belief traits that favor an inclination toward alternative remedies, such as intuitive reasoning, paranormal beliefs, self-transcendence values, anti-science attitudes, and a holistic orientation to health (Lindeman, 2011; Saher & Lindeman, 2005; Siahpush, 1999). I add to this literature another belief trait, belief in psycho-immunology (BPI), that also predicts the decision to initiate or maintain the use of alternative remedies.

12.3 Implications for practice

The use of alternative and complementary health practices is increasing substantially. As I noted before, some alternative health practices have been proven to be pharmacologically ineffective; nevertheless, consumers continue to use them. I have shown from my studies that the increased use of ineffective health practices can be attributed to how alternative health products are designed and marketed and to the higher propensity among some segments of the population to believe in the mind–body integration central to these remedies. From the perspective of health policymaking, these findings have two implications that can help health authorities in their campaign against the proliferation of ineffective health practices. First, authorities should require alternative health remedies to be very specific about their claims before they can be sold on legit platforms. As per the request of the Food and Drug Administration (FDA), over 20,000 alternative remedies that are currently sold on Amazon have been mandated to include a label stating that "the remedy is not intended to diagnose, treat, cure or prevent any disease or health condition." However, this has not stopped consumers from making inferences about the therapeutic value of such products. This is because producers of alternative remedies, as shown in Studies 3 and 4, make claims that are not only ambiguous but that also lead consumers to form biased impressions about the ways in which the products can treat or otherwise beneficially impact illnesses. This type of marketing has made consumers more willing to persevere on an unsuccessful therapy. Hence, the design and dissemination of product ads/claims are an essential focus of policy interventions. Second, I documented that people with high-BPI personalities are more susceptible to ineffective health practices. This is because this group of consumers is more prone to believing in and thus initiating the use of alternative health practices, remaining highly loyal regardless of failure. Therefore, it is recommended that health communication efforts particularly target consumers who have high BPI convictions and related traits.

13. References

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14. APPENDIX

Appendix A. Data preparation

Study	Participants recruited	Source of data	Data cleaning techniques	Observations considered for analysis
Study1	250	Mturk	• Failed attention check questions **	222 participants giving reply on both the self and the treatment , total observations 222x2 = 444
Pretest1	57	Mturk	• Consent (Yes, <u>No</u>) • Missing data	50
Study2	100	Mturk	• Consent (Yes, <u>No</u>) • Missing data	96 participants reply on 3 'self' measures and 1 'prayer' measure and 1 average reply of the 3 self-measures compared. 96x5=480 data observations for comparison
Study3_alt	68	Mturk	• Failed attention check questions ** • Incomplete/random entry to DV	42
Study3_conv	151	Mturk	• Failed attention check questions ** • Incomplete/random entry to DV	134
Study4	130	Mturk	• Failed attention check questions **	126
Study5	21	Master Mturk	• Master mturkers recruited as judges, they were all attentive	21
Initial pretest	115	Mturk	• Failed attention check questions **	109
Study 6	5 faculty members	• Office • Qualitrics		
Study7	480	Mturk	• Failed attention check questions ** (127) • Outliers (48) • Missing values (2)	303
Study8A	422	Mturk	• Failed attention check questions ** (115) • Outliers (57)	250
Study 8B	700	Mturk	• Failed attention check questions ** (112) • Outliers (90)	498
Study9A Study9B Study10A	486	Mturk	• Failed attention check questions ** (142) • Outliers (49)	288
Study10B	137	Mturk	• Failed attention check questions ** (18) • Missing data (25)	94

	111	Mturk	• How attentively participants followed EMDR treatment instructions were inserted as a covariate.	111
Study10C				
Study10D	21	Prolific	• Missing value (2)	19
Study10E	82	Mturk	• Failed attention check questions [**] (40)	42
Study11	300	Mturk	• Failed attention check questions [**] (61)	239
Study12	1000	Mturk	• Failed attention check questions [**]	699
Study13	139	Mturk	• Failed attention check questions [**] • Lower bound -Upper bound < 0 (18)	102
Study14	200	Mturk	• Failed attention check questions [**]	151
Study15	255	Mturk	• Failed attention check questions [**]	219
Total	5230			

**Attention checkers

Attention check 1; *'To what extent do you agree with the following statements? - This item is testing how attentive you are. Click on 'I will recover considerably slower from an illness'*

Attention check 2; *'To what extent do you agree with the following statements? - For this item do not give an opinion but click on 'I will recover somewhat slower from an illness'*

Attention check 3; *Please select the option ''lavender note''; Sports car, Cosmetic box, Sofa, Lavender note*

Attention check 4; *What is the third word in this question: ''How many stars are in the American flag?''*

Attention check 5; Participants wrote a text completely unrelated to the context, copy-pasted from somewhere

Attention check C; Participants own conviction about the quality of the data ('*Realistically, I know some online survey respondents do not pay close attention to the questions they are answering. This affects the quality of our data. Please select one of the following honestly. Your answer is confidential. Did you pay attention and answer honestly? Yes, No'*)

Note; In most of my studies, not removing the inattentive observations does not change the main findings. But only to stick with standard procedures of data analysis and for the sake of data quality, the above procedures were followed.

Data is openly accessible from https://osf.io/gcpma/?view_only=2e2fcb303c344b608b8ace61e1a9872d

Appendix B. Overview of measures used in experiments

Studies	Causal attribution bias *' the tendency of attributing blame less to the treatment or the tendency of attributing blame more to the self after unsuccessful therapy '*	Product perseverance *'the tendency of willingness to repurchase or retake or persist on a treatment after unsuccessful therapy '* *'Unsuccessful therapy is conceptualized as when illness has not been overcome after use of a particular treatment'*
Study-1	**SUCCESS** 0 - played no role in the improvement 100 -fully responsible for the improvement **FAILURE** 0 - played no role in the failure to see an improvement; 100 -fully responsible for the failure to see an improvement 1) The treatment itself　　　　　　　　　　0-100 2) My body's reparative systems　　　　　　0-100 3) My belief that the treatment would work　0-100 4) My ability to maintain a positive attitude and avoid stressful emotions'　0-100 Causal attribution bias 　Self-blame ; Composite score of 2-4	
Study-3	**SUCCESS** 0 - played no role in the improvement 100 -fully responsible for the improvement **FAILURE** 0 - played no role in the failure to see an improvement; 100 -fully responsible for the failure to see an improvement 1) Something about the prayer itself　　　　0-100 2) My own faith in the power of the prayer　0-100 3) My belief that the prayer would work　　0-100 4) My own feelings about the prayer　　　　0-100 Causal attribution bias 　Self-blame ; Composite score of 2-4	How long would you stick with the treatment until you would give up and conclude that the treatment does not work? 　　　　# days
Study-4	**FAILURE** 0 - played no role in the failure to see an improvement; 100 -fully responsible for the failure to see an improvement **1) The treatment itself** 2) My body's reparative systems 3) My belief that the treatment would work 4) My ability to maintain a positive attitude and avoid stressful emotions 5) Other factors *Totaled to 100*　　　　　　　　　　　　*100%* Causal attribution bias 　Product-blame ; Score on choice 1, 'the treatment itself'	If you thought that your Vitamin-D levels/immune system was not boosted (vs headache/heartburn was not treated), How long did you stick with the treatment until you gave up and concluded that it did not work? (1= Immediately; 7= Very long) 　　　　# days
Initial-pretest	0-extremely unlikely ; 100 - highly likely 1) The doctor　　　　　　　　　　　　0-100 2) The product　　　　　　　　　　　　0-100	

	3) The hospital	0-100	
	4) My mental disbelief	0-100	
	5) My thoughts and imaginations	**0-100**	
	6) My emotion	0-100	
	7) The illness	0-100	
	Causal attribution bias Self-blame ; Composite score of 4-6		
Study-10E			How long would you stick with the treatment until you would give up and conclude that the treatment does not work? # days
Study-12	1) Mistake by practitioner 2) Ineffective product **3) My fault** 4) Other factors *Totaled to 100* *100%* Causal attribution bias Self-blame ; Score on choice 3, 'My fault'		**Retaking Coryzalia** Switching Coryzalia Substituting a practitioner Something else *Totaled to 100* *100%*

Study-14	1) The treatment itself 0-100
	2) My body's reparative systems 0-100
	3) My belief that the treatment would work 0-100
	4) My ability to maintain a positive attitude and avoid stressful emotions 0-100
	5) My own effort 0-100
	Totaled to 100 *100 %*
	
	Causal attribution bias
	    Self-blame ; Composite score of 2-5
			How long would you stick with the treatment until you would give up and conclude that the treatment does not work?
			                                    # days

Study-15	1) Something about the prayer itself 0-100 2) My own faith in the power of the prayer 0-100 3) My belief that the prayer would work 0-100 4) My own feelings about the prayer' 0-100 Causal attribution bias Self-blame ; Composite score of 2-4		

For study 1, 3, 15 and the initial pretest, a composite score was estimated for causal attribution bias (self-attribution of blame) by taking an average of indicators that were supposed to uniquely contribute to the conceptual domain of the self-attribution of blame. The meaning of the composite variable (self-attribution) is derived from its constituent parts (e.g., my own faith, my belief, my own feelings, my body's reparative,..). The constituent parts formed the composite variable, thus theoretically are treated as formative.

Appendix C. An extended list of 200 ads/claims rated by judges

Code	Ad/Claim
Conv_1	Used in the treatment of the involuntary movements of (chorea) Huntington's disease
Conv_2	Used in the treatment of severe bacterial infections
Conv_3	Used to reduce fine wrinkles
Conv_4	Used to treat mild to moderate acne (spots)
Conv_5	Used to treat blackheads, white heads and pimples (acne vulgaris).
Conv_6	Treat symptoms associated with allergic conditions, such as hay fever, year round allergies such as dust or pet allergies, chronic nettle rash. Improve symptoms of asthma and helps to control asthma
Conv_7	Used in adults and adolescents of 12 years and older to relieve the symptoms that occur with long term allergic skin reactions such as itching, swelling, rashes and hay fever marked by sneezing , runny or blocked nose and itchy, red and watery eyes
Conv_8	Used for Alzheimer's disease and other types of dementia, head trauma, cerebrovascular disease such as stroke, age related memory loss, Parkinson's disease, attention deficit hyperactive disorder and glaucoma
Conv_9	Used to treat mild, moderate, and severe Alzheimer's disease
Conv_10	Used for the treatment of adult patients with mild to moderately severe Alzheimer's dementia, which is a progressive brain disorder that gradually affects memory, intellectual ability and behavior
Conv_11	Used to treat acute and chronic intestinal amoebiasis
Conv_12	Indicated for the treatment of diarrhea
Conv_13	Indicated for hepatic amoebiasis, urethritis and vaginitis due to trichomonas vaginalis, giardiasis
Conv_14	Used in the prevention and treatment of the chest pain associated with angina
Conv_15	Used to prevent angina pectoris, angina usually feels like a tight pain in the chest, neck or arm area. The pain comes from the heart muscle and is a sign that part of it is not getting enough oxygen for work it is doing
Conv_16	Used to relieve severe allergic reactions to drugs or other substances causing allergy
Conv_17	Used to treat chronic angina (chest pain)
Conv_18	Used to relieve the pain and frequency of angina attacks, control certain types of heart failure.
Conv_19	Used to prevent or reduce painful signs of a heart disease
Conv_20	Used to treat angina pectoris
Conv_21	Used in the treatment of inflammation and pain caused by osteoarthritis and rheumatoid arthritis and acute painful musculoskeletal condition
Conv_22	Used for treating osteoarthritis, degenerative joint disorders, inflammation of connective tissues
Conv_23	Used to treat rheumatoid arthritis and psoriatic arthritis
Conv_24	Used to treat advanced breast cancer in postmenopausal women and advanced kidney cancer
Conv_25	Used to prevent your body rejecting a transplanted organ (kidney, heart or liver)
Conv_26	Used to treat moderate to severe atopic dermatitis (eczema)
Conv_27	Used to treat severe psoriasis (a skin disease with thickened patches of inflamed red skin, often covered by silvery scales) , severe arthritis due to psoriasis, rheumatoid arthritis

Conv_28	Used for the treatment of primary dysmenorrhea and in the relief of mild to moderate pain associated with menorrhagia in women
Conv_29	Used to treat male pattern hair loss , benign prostatic hyperplasia
Conv_30	Used to treat men with an enlarged prostate (benign prostatic hyperplasia)-a non-cancerous growth of the prostate gland, caused by producing too much of a hormone called dihydrotestesterone
Conv_31	Used in the treatment and control of benign non-cancerous enlargement of the prostate
Conv_32	Used in adult men to treat the urinary symptoms associated with benign enlargement of the prostate (prostatic hyperplasia)
Conv_33	Treat muscle spasms of the urinary tract, which may be a result of inflammation of the bladder, prostate gland or urethra. Treat symptoms which may occur as a result of surgery, cystoscopy or catheterization such as painful urination, excessive urination at night and the inability to control urine flow
Conv_34	Used for short term use and to treats symptoms of pain, burning, urgency , frequency and other discomforts resulting caused by lower urinary tract infection
Conv_35	Used to treat or prevent osteoporosis in women after menopause
Conv_36	Used to prevent serious complications caused by bone cancer (e.g. fracture, pressure on the spinal cord or the need to receive radiation therapy)
Conv_37	Used to treat and prevent blood clots blocking the blood vessels e.g. deep vein thrombosis (DVT)
Conv_38	Used to reduce the risk of stroke in people who have had blood clots or mini-stroke
Conv_39	Used to treat nocturnal polyuria
Conv_40	Used as an anti-inflammatory analgesic which can relieve pain and swelling, used to bring down high body temperatures and to prevent recurrence of heart attacks or strokes
Conv_41	Used to prevent atherosclerosis, peripheral arterial disease, atrial fibrillation, high cholesterol level
Conv_42	Used for peri and postmenopausal women during the menopause to treat symptoms such as hot face neck and chest (hot flush)
Conv_43	Used in preventing pregnancy
Conv_44	Used to treat skin conditions such as acne, oily skin and excessive hair growth in women of reproductive age
Conv_45	Used to treat constipation ; help maintain normal bowel function in people with hemorrhoids
Conv_46	Used to treat infrequent bowel movements, hard and dry stools
Conv_47	Used for relief of nasal and sinus congestion; relief of allergic symptoms of the nose or throat due to upper respiratory tract allergies; relief of sinus pain and headache
Conv_48	Indicated for dry cough, allergic cough, post-operative cough, smokers cough, night-time cough
Conv_49	Breaks down and loosens thick mucus making it runny and easy to cough up
Conv_50	Used to treat common cold, cough, nasal congestion, allergic rhinitis, pain and fever
Conv_51	Used to control seborrheic dermatitis(common skin condition that mainly affects your scalp which causes scaly patches, red skin and severe dandruff)
Conv_52	Used to treat dandruff ;used to treat the inflammation associated with dandruff, relieving scalp redness and itching
Conv_53	Used to treat type 2 diabetes mellitus when diet , physical exercise and weight reduction alone have not been able to control your blood sugar levels

Conv_54	Used to control blood sugar levels in type 2 diabetes mellitus
Conv_55	Used to control high blood sugar in adults with diabetes mellitus
Conv_56	Used for the treatment of sudden, short lived diarrhea
Conv_57	Treats food indigestion
Conv_58	Used to relieve colic pain and intestinal gas
Conv_59	Used for the relief of mild to moderate pain and feverish conditions such as headache, toothache, colds, influenza, joint pain and period pains
Conv_60	Used in the treatment of diabetic foot ulcers that occur as a complication of diabetes
Conv_61	Used for treating chronic infection with hepatitis B virus and active liver disease
Conv_62	Used to protect against infection by the hepatitis B virus
Conv_63	Used to correct the levels of fatty substances in the blood called lipids, the most common of which is cholesterol
Conv_64	Used to lower levels of bad type of cholesterol called LDL or triglycerides in the blood ; used
Conv_65	Used to lower lipids known as cholesterol and triglycerides in the blood when a low fat diet and life style changes on their own have failed
Conv_66	Used to treat mild to moderate essential hypertension
Conv_67	Used to treat high blood pressure and a type of chest pain called angina
Conv_68	Used to treat heart failure, reduce the risk of cardiac events such as heart attack, in patients with stable coronary artery disease
Conv_69	Used for the emergency restoration of blood pressure in cases of acute hypotension
Conv_70	Used to reduce the pain and swelling(inflammation) in the joints and muscles with osteoarthritis, rheumatoid arthritis, and gout
Conv_71	Used to treat arthritis (pain and inflammation)
Conv_72	Used to treat a number of painful conditions including flare ups of joint or back pain: attacks of gout: pain caused by kidney stones and injuries
Conv_73	Used to treat acute low back pain
Conv_74	Used to treat nasal congestion (blocked nose, including colds): perennial and allergic rhinitis (recurring inflammation of the nasal mucous membranes, including hay fever);sinusitis
Conv_75	Used to reduce the symptoms of seasonal allergic rhinitis (inflammation of the lining of the nose), such as stuffy nose, itching and sneezing
Conv_76	Used as maintenance treatment for the prevention and control of asthma symptoms
Conv_77	Used to treat dryness inside the nose; nasal allergies ,nasal irritation; upper airway cough syndrome
Conv_78	Used to decrease inflammation in the lungs which can lead to breathing problems: prevent symptoms such as wheezing, cough, chest tightness, and shortness of breath
Conv_79	Used in the treatment of dizziness, vertigo and prevention of migraine
Conv_80	Used for the symptomatic treatment of migraine; to treat any medical condition with concomitant nausea or vomiting and fever or pain
Conv_81	Used to prevent and treat malaria
Conv_82	Used in the treatment of uncomplicated falciparum malaria
Conv_83	Used for the treatment of severe falciparum malaria
Conv_84	Used to treat chronic hepatitis C virus infection
Conv_85	Used to treat bacterial infection of the brain, lungs, blood and heart; middle ear; abdomen;

Conv_86	Used to treat pimples and red bumps in severe acne vulgaris
Conv_87	Used to treat respiratory and urinary tract infections
Conv_88	Used to treat tonsillitis , sinusitis, Acute chest infection, Pneumonia
Conv_89	Used to treat common worm, pinworm, hookworm, dwarf tapeworm roundworm infection
Conv_90	Used for urinary tract infections and typhoid fever
Conv_91	Used to prevent and treat throat , sinus, eye, ear , mouth and dental infections
Conv_92	Used to treat myocardial infarctions (heart attacks)within 6 hours after the onset of symptoms
Conv_93	Used to treat inflammation of esophagus; stomach and duodenal ulcers
Conv_94	Used to treat heartburn and ulcer: gastro esophageal reflux disease
Conv_95	Used to treat nausea and vomiting
Conv_96	Used in the treatment of hemorrhoids
Conv_97	Used to treat erectile dysfunction
Conv_98	Used to treat shingles ; cold sores; herpes simplex virus
Alt_1	For Stress Relief, Immune Support, Balanced Energy Levels and Mood Support,
Alt_2	Muscle discomfort relief, helps reduce stiff joints, supports energy levels, restful sleep support
Alt_3	Digestive health support, immune support, promotes regularity, boost nutrient absorption, reduce bloating and gas
Alt_4	Aid weight loss, enhance energy, improve digestion, strengthen muscles, promote hair and skin health
Alt_5	Supports brain function, fast absorption, helps provide headache relief,
Alt_6	Promote healthy aging all the way down to the cellular level , support your cells as they age, regulates your metabolism and increases cellular energy production
Alt_7	Sustained focus and energy, Promotes mental clarity and focus,
Alt_8	Supports blood glucose metabolism, supports healthy cholesterol levels
Alt_9	Natural energy, Stress relief, memory and liver support,
Alt_10	Brain health, mood, learning
Alt_11	Vitamin-C immune boost, helps immune system, gives body a natural immune, gives body a natural immune while producing important antibodies to speed up your healing process
Alt_12	Support your immune function and reproductive health
Alt_13	Help maintain a healthy immune system, assist with muscle repair for those with active lifestyles, supports collagen production for healthier firmer skin
Alt_14	Nerve Renew Advanced Nerve Support - Alternative Nerve Pain Treatment
Alt_15	Help to Increase Energy, Performance and Mood
Alt_16	Boosts energy, immune system and libido, regulates erectile dysfunction, and balances male hormones
Alt_17	Boosts hair and nails growth, skin enhancement and joint support
Alt_18	Helps support joint health and flexibility , helps support and maintain the body's joints, helps support overall health for hair skin and nails
Alt_19	Supports prostate and urinary health, helps you to sleep without urges to urinate, supports healthy infamatory response
Alt_20	Supports immune function, supports glucose metabolism, supports cardiovascular and gastrointestinal function

Alt_21	Supports weight management, helps with digestion, supports metabolism, increase energy levels,
Alt_22	Helps you lose more weight than dieting alone (weight loss aid)- ***
Alt_23	Supports healthy energy levels, promotes heart and brain health
Alt_24	Supports immune system and digestive health
Alt_25	Strengthen body's stress response, Support healthy energy levels
Alt_26	Supports healthy blood sugar levels, supports cardiovascular health, supports healthy cholesterol levels, supports digestion and immune functions
Alt_27	Supports memory, focus, clarity and overall cognitive performance, provide immune support, reduce inflammation and provide potent antioxidant benefits.
Alt_28	Help improve memory, focus, mental clarity and alertness.
Alt_29	Supports shock absorbing capacity and lubrication of joints , promotes healthy joints and skin
Alt_30	Supports Healthy Blood Circulation, Promotes Optimal Bone Health and Proper Calcium Storage, Supports Cardiovascular Health and Arterial Elasticity & Boosts Immune Function.
Alt_31	Increases libido, sizzling sex drive and superhero satisfaction, stimulates circulation for peak performance and confidence,
Alt_32	Energy Booster, Cell Regenerator, That Supports Cognitive Decline, Anti-Aging and Helps Breaks Down Carbs & Fats
Alt_33	Reduce fat mass, Improve resting metabolic rate, Helps to increase serotonin levels in your brain helping to reduce food cravings,
Alt_34	Support healthy response to stress. Perfect for busy professionals and anyone dealing with ongoing stress, supports a healthy immune and stress response that helps you cope with stress in a healthy way, nourish and restore optimal nervous and immune system health to support a balanced mood and energy levels.
Alt_35	Supports natural stress relief, helps nervous and immune system, assists energy and mood levels, supports cortisol levels, adrenal fatigue, natural anti-anxiety, stress and mood aid
Alt_36	Promote natural weight management and acts as antioxidant support for a healthy immune system boost, help your body break down body fat and stubborn brown-adipose tissue.
Alt_37	Promotes joint comfort and flexibility
Alt_38	Support reduction in joint and muscle discomfort, faster muscle recovery, healthy immune response and circulation
Alt_39	Boosts the fatty acids in your brain's cerebral cortex, the part of your brain responsible for memory, language, creativity, emotion, and attention.
Alt_40	For immune support, liver detoxification and digestion
Alt_41	Supports brain function, help support mental performance, promote a positive mood, and boost energy
Alt_42	Supports the body's neurological function and energy production, Supports energy production, resistance to stress, neurological function, and red blood cell formation
Alt_43	support healthy cholesterol levels already in the normal range,
Alt_44	Helps healthy circulation, inflammation response, and anti-oxidant action, helps neutralize free radicals to protect against oxidative stress and cell deterioration, which can contribute to premature aging

Alt_45	Support for heart, brain, and bone health by promoting a healthy methylation process , Promotes homocysteine metabolism,
Alt_46	Supports thyroid function
Alt_47	Supports heart, brain, blood, and liver health. Supports a strong immune system and glutathione status (the body's master antioxidant), Support vital high-energy bulk demands for an active liquid lifestyle.
Alt_48	Supports immune function, supports glucose metabolism, supports cardiovascular and gastrointestinal function
Alt_49	Supports a positive mood, help to increase the production of GABA, a key neurotransmitter that works to reduce restlessness and promote an overall calming effect.
Alt_50	Supports energy and immune function
Alt_51	Used as a natural digestion aid and as an antioxidant
Alt_52	Free radical scavenger, immune system support,
Alt_53	Supports cleansing of the bladder, supports healthy liver function, promotes healthy urinary tract
Alt_54	Reduce anxiety , enhance energy , anti-depression and anxiety support, as well as cortisol calm support
Alt_55	Delivers a High Concentration of Omega-3s, Supports Joint Health – Knees, hips and shoulders not feeling like they used to, Helps Maintain Brain Health & Working Memory, Provides Protection Against Free-Radical Damage,
Alt_56	Decrease anxiety, promote relaxation, improve blood flow, boost sexual function,
Alt_57	Supports anti-inflammation and detoxification
Alt_58	Maintain prostate function
Alt_59	Safely helps reduce occasional urgency, promotes healthy metabolism to improve weight management, supports a good nights sleep, supports bladder strength and helps reduce the urge to go, day and night; supports serotonin balance and helps promote metabolic health to support healthy weight management.
Alt_60	Helps support urinary health, Boost Testosterone
Alt_61	Supports energy production, critical for enzyme function
Alt_62	Supports healthy immune response, supports normal GI Tract health
Alt_63	Ease stress and anxiety, keeps calm and alert
Alt_64	Help cope with stress in a healthy way, daily stress support, promotes balanced mood, nourish and restore optimal nervous and immune system health to support a balanced mood and energy levels
Alt_65	Supports healthy blood sugar levels, Promotes heart/circulatory health, Helps support fat metabolism,
Alt_66	Helps fight depression, assist in calming stress and anxiety, supports a relaxed positive mood
Alt_67	Supports healthy digestion, helps reduce occasional gas ,bloating and irregularity; Aids your ability to break down carbohydrates, fats, fiber and proteins to help improve nutrient absorption and energy;
Alt_68	Stimulate good gut bacteria
Alt_69	Release stress and boosts energy, rejuvenates adrenal function
Alt_70	Supports thyroid function
Alt_71	Helps support mitochondria to enhance cellular energy production ,

| Alt_72	Support your brain power
Alt_73	Promote regular, healthy, and comfortable bowel movements
Alt_74	Supports optimal heart, eye, immune and brain health
Alt_75	Helps protect against occasional bloating, constipation, digestive discomfort
Alt_76	Helps stabilize mast cells that store and release histamine
Alt_77	Supports relaxed mood, stress relief and positive vibes, calming effect, promotes serotonin increase
Alt_78	Increases mobility and flexibility, reduces joint stiffness and soreness, joint relief in as few as 7 days
Alt_79	Healthy inflammation response, supporting whole body wellness including joint support
Alt_80	Promote the maintenance of a clean waste stream
Alt_81	Relieve the symptoms associated with everyday headaches
Alt_82	support your eye health,
Alt_83	support blood pressure health & promote overall heart health, immune system support, digestion support, inflammation & detoxification
Alt_84	Helps reduce occasional inflammation due to normal daily wear and tear , support whole-body vitality & a healthy inflammatory response,
Alt_85	Support healthy eye pressure, circulation, and retinal health, Help lower intraocular pressure and support the health of your retinas
Alt_86	helps to promote overall health, and Helps Support Your Immune System
Alt_87	Improve hair care, density, thickness, and fullness while also nourishing the skin and strengthening your nails.
Alt_88	Combat numbness in fingers and toes by improving microcirculation Provides complete neurovascular support
Alt_89	helps to generate and regulate nerve impulses and aids in the maintenance of fluid balance; it is also used by the body in visual pathways, as well as in the brain and nervous system, where it works together with glycine and GABA as a neurotransmitter.
Alt_90	Stimulates Phase I and Phase II detoxifying enzyme systems
Alt_91	Cardiovascular health support
Alt_92	Provides nutrients that protect liver cells from damage from a variety of toxins
Alt_93	Improve memory and clarity, mind enhancement, enhance focus, boost concentration
Alt_94	Maintains kidney cleansing function
Alt_95	Supports Healthy Digestion of Proteins, Fats, and Carbohydrates
Alt_96	Elite gaming performance and blue light protection
Alt_97	fight back against iron deficiency by promoting the formation of healthy red blood cells
Alt_98	Help Support Heart Health and Cholesterol Already Within Normal Range
Alt_99	Supports menopausal health, helps with hot flashes
Alt_100	Treats iron deficiency
Alt_101	Antioxidant protection for the brain

Appendix D. Full list of belief in psycho-immunology (BPI) scale items (the original 24-item scale).

	I will recover **extremely slower** from an illness (-3)	I will recover **considerably slower** from an illness (-2)	I will recover **somewhat slower** from an illness (-1)	I will **neither be slower nor faster** to recover from an illness (0)	I will recover **somewhat faster** from an illness (1)	I will recover **considerably faster** from an illness (2)	I will recover **extremely faster** from an illness (3)
When I become annoyed or displeased	O	O	O	O	O	O	O
When I am disgusted with something	O	O	O	O	O	O	O
When I am worried that something bad or unpleasant might happen	O	O	O	O	O	O	O
When I feel hate for somebody	O	O	O	O	O	O	O
When I feel angry	O	O	O	O	O	O	O
When I am emotionally terrified or scared	O	O	O	O	O	O	O
When I feel furious	O	O	O	O	O	O	O
When I feel afraid	O	O	O	O	O	O	O
When I feel sad	O	O	O	O	O	O	O
When I am bored	O	O	O	O	O	O	O
When I get emotionally distracted	O	O	O	O	O	O	O
When I feel grief	O	O	O	O	O	O	O
When I feel Interested in something	O	O	O	O	O	O	O
When I feel admiration for somebody	O	O	O	O	O	O	O
When I trust somebody	O	O	O	O	O	O	O
When I pay careful attention to something	O	O	O	O	O	O	O
When I am amazed	O	O	O	O	O	O	O
When I hope for something	O	O	O	O	O	O	O
When I am surprised	O	O	O	O	O	O	O
When I accept the situation as it is	O	O	O	O	O	O	O
When I am joyful	O	O	O	O	O	O	O
When I am in delight	O	O	O	O	O	O	O
When I feel peace of mind	O	O	O	O	O	O	O
	O	O	O	O	O	O	O

Appendix E. Common method bias adjustment with common latent factor

Standardized Regression Weights: (No Common Latent Factor)			Estimate1	Standardized Regression Weights: (With Common Latent Factor)			Estimate2	Difference
Terrified	<---	NEM	0.852	Terrified	<---	NEM	0.723	0.129
Angry	<---	NEM	0.868	Angry	<---	NEM	0.758	0.11
Annoyed	<---	NEM	0.867	Annoyed	<---	NEM	0.757	0.11
Sad	<---	NEM	0.795	Sad	<---	NEM	0.65	0.145
Grieving	<---	NEM	0.806	Grieving	<---	NEM	0.661	0.145
Disgusted	<---	NEM	0.749	Disgusted	<---	NEM	0.604	0.145
Trust	<---	PEM	0.655	Trust	<---	PEM	0.384	0.271
Admirable	<---	PEM	0.666	Admirable	<---	PEM	0.294	0.372
Hope	<---	PEM	0.783	Hope	<---	PEM	0.583	0.2
Interested	<---	PEM	0.843	Interested	<---	PEM	0.564	0.279
Amazed	<---	PEM	0.798	Amazed	<---	PEM	0.566	0.232
Joyful	<---	PEM	0.666	Joyful	<---	PEM	0.505	0.161
Worried	<---	NEM	0.808	Worried	<---	NEM	0.672	0.136
Hateful	<---	NEM	0.767	Hateful	<---	NEM	0.641	0.126
Afraid	<---	NEM	0.86	Afraid	<---	NEM	0.741	0.119
Furious	<---	NEM	0.845	Furious	<---	NEM	0.732	0.113

Appendix E. BPI as a second-order construct correlated with religiosity on SEM
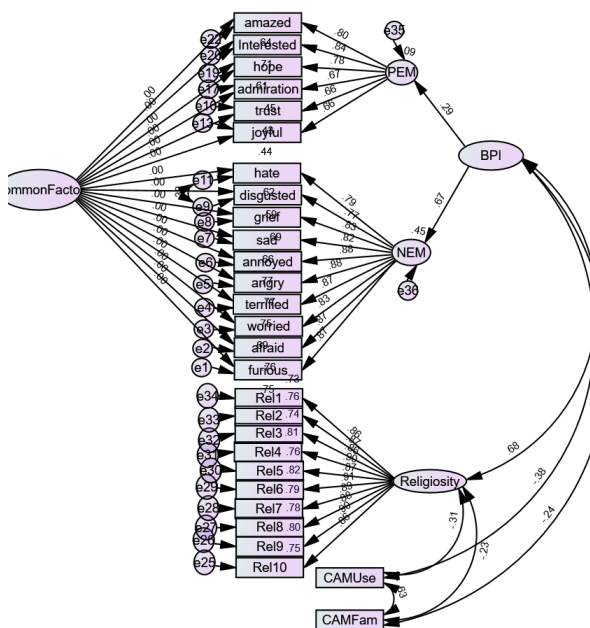
Appendix F. List of measures used in construct validity

Need for cognition scale (Cacioppo et al., 1984)

1	I would prefer complex to simple problems.
2	I like to have the responsibility of handling a situation that requires a lot of thinking.
3	Thinking is not my idea of fun. (R)
4	I would rather do something that requires little thought than something that is sure to challenge my thinking abilities. (R)
5	I try to anticipate and avoid situations where there is likely a chance I will have to think in depth about something. (R)
6	I find satisfaction in deliberating hard and for long hours.
7	I only think as hard as I have to. (R)
8	I prefer to think about small, daily projects to long-term ones. (R)
9	I like tasks that require little thought once I've learned them. (R)
10	The idea of relying on thought to make my way to the top appeals to me.
11	I really enjoy a task that involves coming up with new solutions to problems.
12	Learning new ways to think doesn't excite me very much. (R)
13	I prefer my life to be filled with puzzles that I must solve.
14	The notion of thinking abstractly is appealing to me.
15	I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
16	I feel relief rather than satisfaction after completing a task that required a lot of mental effort. (R)
17	It's enough for me that something gets the job done; I don't care how or why it works. (R)
18	I usually end up deliberating about issues even when they do not affect me personally.

Impulsivity scale (Patton et al., 1995)

1	I plan tasks carefully. (R)
2	I do things without thinking.
3	I make up my mind quickly.
4	I am happy-go-lucky.
5	I don't "pay attention."
6	I have "racing" thoughts.
7	I plan trips well ahead of time. (R)
8	I am self-controlled. (R)
9	I concentrate easily. (R)
10	I save regularly. (R)
11	I "squirm" at plays or lectures.

12   I am a careful thinker. (R)

13   I plan for job security. (R)

14   I say things without thinking.

15   I like to think about complex problems. (R)

16   I change jobs.

17   I act "on impulse."

18   I get easily bored when solving thought problems.

19   I act on the spur of the moment.

20   I am a steady thinker. (R)

21   I change residences.

22   I buy things on impulse.

23   I can only think about one thing at a time.

24   I change hobbies.

25   I spend or charge more than I earn.

26   I often have extraneous thoughts when thinking.

27   I am more interested in the present than the future.

28   I am restless at the theater or lectures.

29   I like puzzles. (R)

30   I am future-oriented. (R)

Multidimensional health locus of control scale (Wallston et al., 1978)

1   If I get sick, it is my own behavior that determines how soon I get well again.

2   I am in control of my health.

3   When I get sick I am to blame.

4   The main thing that affects my health is what I myself do.

5   If I take care of myself, I can avoid illness.

6   If I take the right actions, I can stay healthy.

1   Having regular contact with my physician is the best way for me to avoid illness.

2   Whenever I don't feel well, I should consult a medically trained professional.

3   My family has a lot to do with my becoming sick or staying healthy.

4   Health professionals control my health.

5   When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.

6   Regarding my health, I can only do what my doctor tells me to do.

1   Most things that affect my health happen to me by accident.

2	Luck plays a big part in determining how soon I will recover from an illness.
3	My good health is largely a matter of good fortune.
4	No matter what I do, I'm likely to get sick.
5	No matter what I do, if I am going to get sick, I will get sick.
6	If it's meant to be, I will stay healthy.

Superstitious beliefs scale (Dagnall et al., 2009)

1	Have you avoided walking under a ladder because it is associated with bad luck?
2	Would you be anxious about breaking a mirror because it is thought to cause bad luck?
3	Are you superstitious about the number 13?
4	Do you say "fingers crossed" or actually cross your fingers?
5	Do you say 'touch wood' or actually touch or knock on wood?
6	Do you sometimes carry a lucky charm or object?

Political orientation scale (Everett, 2013)

1	Abortion rights
2	Limited government
3	Military and national security
4	Religion
5	Welfare benefits
6	Gun control
7	Modern marriage
8	Modern values
9	Fiscal responsibility
10	Business
11	The family unit
12	Patriotism

Religiosity scale (Worthington Jr et al., 2003)

1	I often read books and magazines about my faith.
2	I make financial contributions to my religious organization.
3	I spend time trying to grow in understanding of my faith.
4	Religion is especially important to me because it answers many questions about the meaning of life.
5	My religious beliefs lie behind my whole approach to life.
6	I enjoy spending time with others of my religious affiliation.
7	Religious beliefs influence all my dealings in life.
8	It is important to me to spend periods of time in private religious thought and reflection.

| 9 | I enjoy working in the activities of my religious organization. |
| 10 | I keep well informed about my local religious group and have some influence in its decisions. |

General vaccine attitudes (Marlow et al., 2007)

Importance of vaccinations (Cronbach's alpha = 0.93)

1	Vaccination is one way that parents can make a positive contribution to their children's health.
2	More kids should be vaccinated against diseases so that outbreaks do not occur.
3	I have a responsibility to have my children vaccinated for the protection of all children.
4	It is very important that my children receive all their vaccinations.

General vaccine concerns (Cronbach's alpha = 0.81)

5	I am afraid of vaccinations for my children. (R)
6	I am concerned about vaccination side effects. (R)
7	There are too many vaccinations already included in the childhood vaccination schedule. (R)

**Causal attribution and consumer perseverance on
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Mesay Moges Menebo

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