Self-Fulfilling Prophesies, Placebo Effects, and the Social–Psychological Creation of Reality

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Abstract

In this essay, we pull together foundational research from the psychological, sociological, and medical sciences to illuminate the undeniable influence of the psychosocial context in constructing objective reality. From psychology, we review the growing body of research on how beliefs and expectations about common experiences (e.g., nutrition, stress, and aging) can fundamentally alter the impact of those experiences. From sociology, we review the role of social influence in constructing the quality and impact of cultural products and experiences. And from medicine, we review the neurological and physiological underpinnings of the placebo effect, a powerful demonstration of expectation and social context to produce physiological changes in the body. As we align evidence from these related—although currently disconnected—fields, we uncover important limitations from within each field of study and portray how an integrative approach can offer a more rich and comprehensive understanding of the phenomena underlying the social–psychological creation of reality. Combining foundational research with the interdisciplinary findings from our laboratory, we explore how psychological and social contexts can fundamentally alter the psychological, behavioral, and physiological effects of one of the most common human experiences: drinking water. To conclude, we present a series of questions and suggestions to assist and inspire further interdisciplinary collaboration. We offer a pathway for researchers to more frequently acknowledge, more thoroughly understand, and more effectively utilize the power of psychosocial influence to effect positive change in a number of disciplines including marketing, medicine, and public health.

INTRODUCTION

It is well established in social and behavioral sciences that changes in psychological states and social contexts can affect our *subjective* perceptions of reality. But can changes in the social–psychological context also alter

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objective reality? In this essay, we pull together related streams of research across a variety of contexts that demonstrate the role of social and psychological influence in determining *objective* health, performance, and wellbeing. From the psychological sciences, we review the growing body of research on how our thoughts, beliefs, and expectations about common experiences such as nutrition, stress, aging, and intelligence can fundamentally alter the impact of those experiences. From the social sciences, we review the undeniable role of social influence in constructing the quality and impact of cultural products and experiences. From the medical sciences, we point to the increasingly nuanced body of research on the neurological and physiological underpinnings of the placebo effect, where the power of expectation and social context combine to produce physiological changes in the body.

As we align evidence from the broad array of scientists studying the interplay between "subjective" and "objective" reality, it becomes clear that, although many disciplines and scholars independently hint at this exchange, it is only when these fields are synthesized that a rich and comprehensive demonstration of the social–psychological creation of reality is understood. In our own interdisciplinary collaboration, for example, we find that by simultaneously manipulating the psychology of expectation and the sociology of influence, we can affect not merely the subjective and behavioral but also the *physiological* effects of one of the most basic human experiences: drinking water.

Combining foundational research with the interdisciplinary findings from our laboratory, we offer an emerging agenda that integrates the disciplines of psychology, sociology, and medicine toward a more comprehensive and useful study of the social–psychological creation of reality. This integration emphasizes how each discipline's advances speak to shortcomings of the other areas. Moreover, this integration demonstrates how this line of research has academic promise and important practical implications in an array of contexts including public health, public policy, marketing, and medicine.

FOUNDATIONAL RESEARCH

Psychology of Mindset

It is a fundamental psychological tenant that the experience of reality is not solely constructed by sensory perceptions but is dynamically informed by our "top-down" or "subjective" constructs, such as mindsets, beliefs, and expectations. The beliefs people hold and the mindsets they adopt about omnipresent aspects of life such as nutrition, intelligence, aging, emotions, and stress have downstream effects on judgment, evaluations, and behavior.

With food consumption, for example, people like the taste of Coke better when it is consumed from a brand-named cup and strawberry yogurt and cheese spreads are enjoyed less if they are labeled low fat (cf. Crum, Corbin, Brownell, & Salovey, 2011). In the domain of aging, individuals who have a negative mindset about aging are less likely to engage in proactive measures such as eating well, engaging in physical exercise, and visiting a physician and have a diminished will to live compared to those with more positive views of what it means to grow old (cf. Levy, Slade, Kunkel, & Kasl, 2002). With respect to intelligence, students who hold a mindset that intelligence is something that can be increased demonstrate improvements in both behavior and attitude (e.g., greater appreciation of academics, motivation, improved GPAs, and enhanced enjoyment of learning) than those who believe intelligence is fixed (Blackwell, Trzesniewski & Dweck, 2007). In the domain of emotions, individuals who possess a mindset that emotions are controllable experience greater wellbeing, fewer depressive symptoms, and better social adjustment over time (Tamir, John, Srivastava & Gross, 2007). Moreover in studies on stress, individuals who believe that stress has enhancing consequences are happier, healthier, and perform better during times of stress than those who believe stress has debilitating effects (Crum, Salovey & Achor, 2013).

A growing body of research suggests that, in addition to influencing perception and behavior, these top-down processes can also alter *objective* outcomes such as sensory experience and physiological processing. In research on nutrition, for example, manipulating the perceived cost of wine to be more expensive (with the same wine) can result in heightened activity in areas of the brain related to pleasure and reward (Plassmann, O'Doherty, Shiv & Rangel, 2008). Furthermore, individuals who thought they were drinking an indulgent, high-calorie milkshake showed steeper declines in ghrelin, a hunger-inducing hormone, than when they thought that the same shake was a sensible, low-calorie milkshake (Crum *et al*., 2011). Extending this result, Cassady, Considine, and Mattes (2012) show that the mere expectation that food will turn into a liquid form (vs a solid form) in the gastrointestinal tract not only results in greater hunger and increased energy intake after consumption but also produces differential psychological responses such as lower ghrelin suppression and quicker digestion. In the domain of physical exercise, hotel room attendants who adopted the mindset that their work constitutes good exercise showed significant reductions in weight, body mass index (BMI) and systolic blood pressure (Crum & Langer, 2007). Furthermore, mindsets about stress alter cortisol and other hormonal and cardiovascular functions under stress (Crum, Salovey & Achor, 2013) and mindsets about aging have been related to both cardiovascular function and actual longevity (Levy *et al*., 2002).

The intrigue of these studies lies in their demonstration of the power of expectation and belief. They demonstrate what we believe or expect will happen to us when we stress, age, think, or eat can influence what *actually does happen* to us when we stress, age, think, or eat. This suggests that, in addition to "bottom-up" sensory effects from nutrients, genetics, and the environment, sensory effects are dynamically shaped by psychological influence.

Although this research is alluring in its assertion that expectations alter reality, it is limited in a few key ways. First, psychologists are only beginning to grasp the mediating role of psychology on physiology. Second, these studies often disregard social context. By manipulating mindset through experimental stimuli or measuring mindset through psychological assessments, psychological approaches are often silent to the sociological origin of these mindsets in the first place, thereby limiting the practical utility of that research. In the following sections, we introduce scholarship from sociological and physiological perspectives in an attempt to arrive at a more comprehensive and useful understanding of the psychological creation of reality.

Sociology of Social Influence and Valuation

Human beings depend on one another as sources of information. We turn to others for social cues about virtually everything—what to watch or listen to, what foods are good or bad for us, what will make us fat or skinny, happy or sad, and healthy or ill. Serving as both suppliers of new information and confirmers or correctors of old information, social cues act as a foundational source for the formation of our mindsets, beliefs, thoughts, and expectations. As such, social influence does not merely guide our perception of reality but can fundamentally alter reality.

A classic examine is the autokinetic experiments by Sherif (1937) autokinetic experiments. Sherif examined social influence using a common perceptual illusion, in which an objectively static light observed in a completely dark room appears to be moving. He showed that when groups of participants viewed the light in a dark room together, their perception of the (nonexistent) movement of the light converged even when they made their estimates in private. Subsequent scholars demonstrated that social consensus can be maintained across generations even after the originators of the norm have passed (e.g., Jacobs & Campbell, 1961). Influential work in sociology, such as Zucker (1987), used modification by Jacobs and Campbell (1961) to Sherif's design to test how different social and organizational settings can amplify and extend intergenerational effects.

Key to sociological approaches is how reality is constructed as a social, or intersubjective, process based in psychology. As Turner (1992) noted when reviewing the influence of Sherif's work on sociology, "the essential point in this tradition is that the objects toward which people act are not intrinsically constituted but are socially created. Their very reality as objects depends on some kind of collective support for their identification as objects. Sherif's autokinetic experiments point to a fundamental psychological process that supplies one of the necessary mechanisms through which this broader sociological conception becomes comprehensible."[1]

Thus, while social information is often seen as the product of direct sensory acquisition, this relationship is often inverted. For example, initially false beliefs or assumptions can evoke behaviors that make that false conception become true over time—the so-called self-fulfilling prophesies (Merton, 1948). In addition, these social processes can influence an object's meaning or value. In a sociological study aimed at experimentally inducing a self-fulfilling prophesy in music, Salganik and Watts (2008) gave participants the chance to listen to, rate, and download previously unknown songs from unknown bands. They then randomly assigned the listeners to two "worlds": one in which the songs were sorted from most to least popular and accompanied by the number of previous downloads for each song, and another in which this same information was given, but completely inverted. Although the very best songs were unaffected, popularity and preference for the majority of songs followed a self-fulfilling prophecy in which the inverted popularity became real over time. In related work, Phillips (2013) used recording data to show that the canon of key jazz recordings was influenced by a wide range of social processes, such as the identity of the recording's originators.

These studies exemplify growing excitement about the sociology of valuation, which draws attention to the relationship between the intersubjective construction of reality and the assignment of value and meaning to objects (see Lamont 2012 for a review). In particular, the sociology of valuation challenges the assumption that there exists an intrinsic or objective quality to objects. Instead, the ultimate quality, impact, and success of many things—from songs and restaurants to political ideologies or social policies—is more often than not, in part or fully, a product of social construction.

1. Extending this tradition, social psychologists Hardin & Higgins have argued that social consensus or convergence is driven by "shared reality," which serves to explain how, when individuals experience uncertainty or ambiguity, they seek to make sense of this information through social verification. They suggest that "once recognized by others and shared in an ongoing, dynamic process of social verification we term 'shared reality,' experience is no longer subjective; instead, it achieves the phenomenological status of objective reality" (Hardin & Higgins, 1996, p. 28).

Research on the sociology of influence and valuation adds to the psychological work on mindsets by drawing attention to the role of social interactions in constructing reality. However, when considered alone, this research is limited in two important ways. First, much of the research on social influence is observational in nature, thereby confounding the true ability of social construction to fundamentally alter reality over time. Second, like the research on mindsets and expectancy effects, it too often ignores the potential for social changes to take effect both on and through physiology. In the following section, we review the literature on the placebo effect and the growing body of scientific research that illuminates how subjective states can alter reality through physiological mechanisms.

Science of the Placebo Effect

The placebo effect has traditionally been dismissed as a nuisance variable—an inactive or inert substance used as a control condition in clinical drug trials. In recent several decades, placebo effects have moved from controversies at the periphery of medicine to a more general acceptance. Recent reviews suggest that the placebo effect yields beneficial clinical results in 60–90% of ailments and diseases including, but not limited to, pain, depression, Parkinson's disease, anxiety, cardiovascular disorders, immune deficiencies, respiratory issues, and clinical surgeries (e.g., Finniss, Kaptchuk, Miller, & Benedetti, 2010; Hróbjartsson & Gøtzsche, 2001).

Placebo effects are active and dynamic—produced by the power of expectation and social conditioning. In "open-hidden design" studies, for example, treatment is given routinely (open treatment) and without patient's awareness (hidden treatment). In the "hidden treatment" condition, the drug is infused into the patient's bloodstream via an intravenous solution, which the patient believes is saline. When medication is administered openly by a doctor who verbally tells the patient they will experience pain relief, pain reduction was significantly greater than when the medication was administered by a hidden machine (cf. Price, Finniss, & Benedetti, 2008). Stated another way, even when participants are receiving a strong acting pain medication such as morphine or buprenorphine, if they are not consciously aware that they are receiving this medication, they do not experience the effects, and the impact of that medication is dampened.

Recent research has demonstrated that the expectation to heal driven by an (inert) placebo is accompanied by complex neurobiological underpinnings including activation of distinct brain areas involving anxiety, pain, and reward circuitry as well as peripheral physiology involved in the autonomic nervous system and the immune system. Intriguingly, different placebos evoke distinct objective correlates that are selectively activated toward the

expected outcome. For example, placebo anesthesia targets endogenous opiod systems in the brain, whereas anti-anxiety placebos target corresponding changes in activity of the anterior cingulated and orbitofrontal cortices and reductions in sympathetic nervous system activation such as decreasing blood pressure and heart rate (cf. Rief, Bingel, Schedlowski, & Enck, 2011). Understanding the neuro-endrocrine mechanisms of placebo effects at such an advanced level is critical to unlocking our ability to more thoroughly understand the influence of subjective changes on seemingly objective reality.

Research on the placebo effect has made immense progress over the past several decades. However, there remain some critical limitations to its greater impact. First, the examination of placebo effect is still largely confined within the context of medicine. Its influence in domains outside of medicine remains largely untapped. Second, methodologies to explore the placebo effect are still more often than not formulated in the context of randomized clinical drug trials, thereby perpetuating the naive assumption that the placebos are inert substances that only take effect through some form of deception. Although the placebo effect is often evoked via deception, it is essential for scholars to acknowledge that this deception is triggering the power of subjective factors to dynamically alter physiological and biological properties in the body. As such, an important next step in placebo research is to work symbiotically with psychologists and sociologists to understand more broadly how expectations are set through social forces and how those forces can be more effectively harnessed to produce helpful changes in the body.

CUTTING EDGE RESEARCH

It's Just Water? an Integrative Exploration of the Social–psychological Creation of Reality

The consumption of water is a fundamental human necessity. Fortuitously, water is also a natural, renewable resource that is currently available through public and natural systems in the United States and much of the developed world. In spite of this availability, purchases of bottled water continue to grow. The world bottled water market value is estimated at US$22 billion dollars, with an annual volume of 89 billion liters sold at a price that rivals gasoline (Wilk, 2006).

The growing consumption of bottled water appears to be a logical response to unsafe municipal water and that bottled water is a significantly healthier alternative. However, a closer look challenges this explanation. First, bottled water consumption is highest in areas where high-quality and safe municipal

water is readily available and *not* in areas that have poor municipal systems. Second, bottled water quality is *less* regulated than municipal water systems resulting in a more variable and sometimes less healthy alternative (e.g., Burlingame, 2003). Finally, blind taste tests do not support the assumption that bottled water tastes better, likely due to the fact that a large majority of bottled water is bottled from municipal sources (e.g., Comrie, Evans, Gale, & Kitney, 2002).

Why does this matter to us? Well, the existence of strong demand for an often less clean, worse tasting, and markedly more expensive product to replace an otherwise similar product that literally falls from the sky for free is a stark example of the social–psychological creation of an experience. Bottled water companies have successfully employed psychological and social perception to generate demand for the product by boosting both the perceived threat of tap water and the perceived allure of bottled water from exotic, unadulterated ecosystems such as Fiji or the Icelandic glaciers. Taking the water consumption experience one step further, companies are now enriching waters with "neutraceuticals"—vitamin waters, sports waters, diet waters, waters infused with caffeine to boost your energy when you need it, and waters that contain elements to help you sleep. These products are entering the US market at a rate of approximately eight new brands per month and appear to have staying power.

In our laboratory, we are examining whether the effects that waters claim to make could be induced by social—psychological factors alone (in the absence of any actual enrichments). To do so, we created our own product, called *AquaCharge Energy Water*, a fictional product that we claimed included 200 mg of performance and energy enhancing caffeine but which was actually just regular bottled water. Our preliminary results suggest that, after drinking regular bottled water under the impression that it is caffeinated, participants report feeling significantly more alert than before the consumption. More interestingly, when these claims are paired with an affirming confederate (a member of our laboratory who verbally endorses the effectiveness of the product), subjective alertness is also accompanied by changes in *physiological* response, in this case, an increase in blood pressure. In cases where we had a disconfirming confederate (a member of our laboratory who explicitly stated that the product "was not working"), both the subjective and physiological responses were eliminated. In addition, those subjects that experienced an effect in the context of an affirming participant were willing to pay more for the product and were more likely to tell their friends about the product. These results suggest three important findings. First, mindsets and expectations can be influential on their own. Second, social valuation can further enhance or diminish impact of expectancy effects by inducing changes in physiology. And finally, social valuation also plays a role in generating

a bio-psycho-sociological spark that could generate a self-fulfilling spiral of product endorsement, potentially helping to explain how such trends catch on in a broader context.

These results open the door to a host of important considerations. If the belief that water is enriched with energy altering substances can enhance the effect of the water, it is important to explore if the reverse account is true in some form? In other words, does the expectation of poor taste or negative health effects of tap water make those negative downstream effects more likely? If social contagion can be "caught" from endorsements made about the positive effects of a product, might negative claims have a self-fulfilling effect as well? Could we alter the belief and social valuation around the experience of drinking municipal tap water?

Our study uses principles employed by marketing agencies around the world. However, our aim in studying the effects of a faux product is not to point out that marketing is deceptive or to suggest that it should not be employed. Rather we do so an attempt to further understand the social–psychological processes involved in altering the psychological, biological, and behavioral effects of a product or experience. Knowing that physiological changes can be induced in addition to illusory ones is critical. What is important is not to devalue a product or experience based on the recognition that its effects may be in part or fully socially or psychologically constructed but to learn how to harness these effects more proactively. As we will discuss in the following section, there is an increasingly important agenda to acknowledge, understand, and utilize the effect toward positive health and public good.

KEY ISSUES FOR FUTURE RESEARCH

Our hope is that this essay and our research will inspire dialog and research on the range, form, and function of the social–psychological creation of reality. The emerging interdisciplinary convergence of the psychology of mindsets, the sociology of valuation, and medicine's understanding of the placebo effect is exciting and synergistic. In consumer research and marketing, this synergy may offer more support and clarity regarding the extent to which marketing and labeling influences impact the physiological and sensory experience of a product or service. In medical sciences, it may help us better understand when and how a doctor's presence and/or relationships with other patients receiving the same drug may meaningfully impact the effect of the care or drug given. In clinical and social sciences, it may help us understand how mindsets can be changed via social contact in an effort to improve physiological and psychological wellbeing. Public health and policy professionals may benefit from a better understanding of how

their information campaigns effect perceptions, especially as policymakers' information competes with other information that citizens are exposed to.

Note

A second key agenda is to construct comprehensive models that can capture, predict, and *explain* the dynamic relationship between subjective and objective reality. Research is needed to explore the impact of mindsets on more objective outcome measures, the length and duration of impact, and the ways in which our mindsets form and have the potential to reform (e.g., how science, media, and cultural assumptions play a role in defining our mindsets) as a social process. This research should be aimed at understanding boundary conditions, in other words, for whom and when do mindset effects assert the greatest influence and what is different about cases in which they do not.

Finally, it is important that research be devoted not only to understanding the phenomenon but also to uncovering practices and strategies for *utilizing* it to induce positive benefits. This seems like a logical outcome of research in this area, but direct application of these effects is often overlooked. For example, medical scientists are only just beginning to explore ways to tap into and deliberately (i.e., nondeceptively) utilize the placebo effect in clinical settings (Kaptchuk *et al*., 2010) and metabolic and nutritional scientists continue to offer dieting solutions that ignore the role of mindset in metabolic maintenance. This research may be particularly informative for policymakers, in helping them to understand that the popularity of healthy choices depends on establishing a social psychological context that will promote the interaction of physiological and perceptual changes. Or, as we have found in the context of water, perhaps a greater understanding of the psychological and social construction of the experience of drinking water can help inform and induce environmentally and social adaptive policies such as improving the perception and consumption of municipal tap water.

CHALLENGES AND METHODOLOGICAL CONSIDERATIONS

The achievement of these goals may not come easy, as attaining a comprehensive understanding of the social psychological creation of reality requires an integration of fields and methodologies. Not only must sociologists, medical scientists, psychologists, and practitioners work to become informed on complementary theories and outcomes from diverse disciplines, but they must also work to incorporate a multimodal suite of methodologies to broaden both the scope and depth of their explorations. Psychologists must learn to incorporate basic physiological measures into their studies and begin to speak to the manner in which psychological states are dynamically informed by the social context. Sociologists must realize that observational data alone is not sufficient and work to incorporate creative experimental designs and manipulations to isolate and encapsulate the precise level of

subjective influence controlling for confounds such as one's history, genetics, and aptitude. Medical scientists must go beyond exploring the placebo as a mere control condition and recognize that ultimately it is our mindsets, often evoked through social influence, that are enabling healing.

Fortunately, technological and methodological advancements are underway that can support scientists in these interdisciplinary endeavors. Physiological acquisition methods are becoming cheaper, simpler, less invasive, and more portable. Hormones, peptides, and other physiological samples can be collected easily and noninvasively via saliva. Cardiovascular and autonomic responses can be measured dynamically outside the laboratory with the use of portable life vests. Sociological models and a macro understanding of social contagion is becoming increasingly more comprehensive with the simultaneous use of computer and mathematical network modeling on real-life (or slightly altered) social media outlets such as Twitter, Instagram, and Facebook. Together these advancements in technology, methodology, and analytics have the potential to allow scientists to increase the scale at which controlled experiments can be conducted while still retaining the ability to manipulate and measure individual level responses.

We present this essay—itself the result of a collaboration between a psychologist (Crum) and a sociologist (Phillips)—as a trailhead, a place where disparate but connected fields can begin to move together toward a shared summit. The foundational and formative research presented here, which is happening across largely disconnected fields, powerfully illuminates the influence of the psychosocial contexts in determining objective reality. We hope that this essay serves as a call to ascent for scientists and practitioners in an expedition to acknowledge, better understand, and utilize the power of mindset as a function of psychosocial contexts. Although much remains to be explored, with interdisciplinary vision and methodological rigor, the impact of this exploration has the potential to be profound.

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