

Research Article

Implicit energy loss: Embodied dryness cues influence vitality and depletion

Idit Shalev

Department of Education and Zlotowski Center of Neuroscience, Ben Gurion University of the Negev, POB 653, Beer Sheva 84105, Israel

Received 8 March 2013; received in revised form 10 September 2013; accepted 27 September 2013

Available online 10 October 2013

Abstract

Consumers have long recognized that thirst motivates beverage consumption, however little is known of the consequences of dryness-related cues and experienced energy. Based on the embodied cognition view (Landau et al., 2010; Meier et al., 2012) and motivational perspective for energy (Clarkson, 2010; Inzlicht & Schmeichel, 2012), four studies examined the idea that activation of different levels of the dryness–thirst metaphor (e.g., semantic primes, visual images, or physical thirst) will influence perceived energy. In Study 1, participants primed with dryness-related concepts reported greater physical thirst and tiredness and lower subjective vitality. In Study 2, participants who were physically thirsty were less persistent in investing effort in an unsolvable anagram task. In Study 3, images of arid land influenced time preference regarding when to begin preparation to make a monetary investment. Finally, in Studies 4a and 4b, exposure to the names of dryness-related products influenced impressions of the vitality of a target person. Overall, the findings suggest that physical or conceptual dryness-related cues influence perceived energy and may have consequences on consumer behavior.

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Keywords: Embodied cognition; Implicit processes; Vitality; Energy; Depletion; Homeostasis

Introduction

The psychological literature has long recognized the consequences of water dehydration (Sawka, Chevront, & Carter, 2005), indicating that the homeostatic need for satiation (Farrell et al., 2006; Hull, 1943) motivates basic acts of consumption (Wadhwa, Shiv, & Nowlis, 2008). Research has demonstrated that people explicitly associate beverage with energy (Vartanian, Schwartz, & Brownell, 2007). Likewise, subliminal priming of drinking cues increased beverage consumption among thirsty participants (Karremans, Stroebe, & Claus, 2006; Strahan, Spencer, & Zanna, 2002). However, little is known of the association between dryness-related cues and the experience of depletion. Models of psychological energy, both past (Selye, 1975) and present (Baumeister & Vohs, 2007), suggest that subjective energy states are a byproduct of both physical-somatic and psychological factors. Building upon the perspective of embodied cognition (Landau, Meier, & Keefer, 2010; Meier, Moeller, Riemer-Peltz, & Robinson, 2012; Meier,

Schnall, Schwarz, & Bargh, 2012), we argue that perceptual or physical input of thirst/dryness triggers perceived homeostatic dysregulation that activates an associative cluster of depletion, such as the automatic evaluation of energy and behavioral schemata to procrastinate or withdraw specific behaviors and to reduce effort in performance based on perceived energy level (Bargh & Morsella, 2010; Hofmann, Strack, & Deutsch, 2008). In the sections that follow, we will first describe the existing notion of depletion and then explain the tenets of the present research.

Motivational influence on depletion

The capacity of organisms to successfully implement goal-consistent responses despite distracting or countervailing influences is defined as self-regulation (Baumeister & Vohs, 2007). Extensive research based on the ego depletion model has repeatedly demonstrated that energy available for self-regulation could be depleted by a temporary reduction in the willingness to engage in volitional action caused by prior exercise of volition (Baumeister, Bratlavsky, Muraven, & Tice,

E-mail addresses: shalevid@bgu.ac.il, shalev.idit@gmail.com.

1998; Baumeister & Vohs, 2007; Hagger, Wood, Stiff, & Chatzisarantis, 2010). Some studies indicate that this energy is mostly physical and relies on glucose metabolism and that glucose supplementation to depleted individuals replenishes resources (Gailliot et al., 2007). However, research also suggests that the effects of carbohydrate consumption are not necessarily due to a direct increase in the energy available to execute self-control, but rather to an indirect increase in motivations to engage in self-control (Molden et al., 2012).

Pursuing this line of thought, ample research indicates that motivational factors moderate depletion effects (Inzlicht & Schmeichel, 2012; Job, Dweck, & Walton, 2010; Muraven & Slessareva, 2003; Ryan & Deci, 2008). For example, there is evidence that one's perception of available regulatory capacity influences one's self-regulatory ability independent of objective capacity measures (Clarkson, Hirt, Jia, & Alexander, 2010). Likewise, a subjective feeling of aliveness and energy, defined as subjective vitality (Ryan & Frederick, 1997, p. 529), has been directly linked with behavioral outcomes in ego depletion paradigms, mediating changes in behavioral measures of self-control performance (e.g., Muraven, Gagne', & Rosman, 2008) which helps replenish self-control at a much quicker rate (see Muraven, Shmueli, & Burkley, 2006). Vitality represents energy that one can harness or regulate for purposive actions, entailing positively toned, energized states (Ryan & Deci, 2008).

This prior research demonstrates that motivational aspects—but not necessarily motivation originating from a conscious volitional source—influence the experience of depletion. Research suggests that environmental conditions influence the experience of energy without conscious awareness. For instance, there is evidence that being outdoors is associated with greater subjective vitality (Ryan et al., 2010; Weinstein, Przybylski, & Ryan, 2009). However, little is known of the effect of different environmental cues on perceived energy and the mechanisms underlying these effects.

Embodied cognition

Embodied cognition research (e.g., Barsalou, 2008; Meier, Moeller, et al., 2012; Meier, Schnall, et al., 2012; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005) provides additional insight into the automatic activation of the body–mind association in different environments and its possible influence on perceived energy. This perspective suggests that there are strong associations between metaphorically-related physical and psychological concepts (Lakoff & Johnson, 1980; Landau et al., 2010), such that activation automatically spreads from concepts driven by experiences in the physical world to their metaphorically-related social concepts (for reviews, see Barsalou, 1999, 2008; Meier, Moeller, et al., 2012; Meier, Schnall, et al., 2012; Niedenthal et al., 2005; Spellman & Schnall, 2009). Embodied concepts activate mental representations that influence behavior indicating that this process of concept activation carries motivational value to approach or avoidance behavior (Eitam & Higgins, 2010; Ferguson & Bargh, 2004). For example, exploring the metaphorical links

between physical and social temperatures (e.g., “warm smile,” “cold as ice”), researchers found that participants perceive others as “warmer” after they have held a warm rather than a cold cup of coffee (Bargh & Shalev, 2012; Williams & Bargh, 2008) and, conversely, experience a room as physically colder after having been socially rejected (Zhong & Leonardelli, 2008). Similarly, washing one's hands also “washes away” feelings of guilt (Lee & Schwarz, 2010, 2011; Zhong & Liljenquist, 2006), and sweet taste preferences and experiences predict pro-social inferences, personalities, and behaviors (Meier, Moeller, et al., 2012; Meier, Schnall, et al., 2012).

Following the logic of embodied cognition, there is evidence that firming one's muscles can help firm willpower and that firming willpower mediates one's ability to invest energy in long-term goals (Hung & Labroo, 2011). However, little is known of the association between physical or environmental cues and reduced energy for action.

To understand the source of embodied concepts, some note that higher mental processes reuse evolutionarily older programs (Anderson et al., 2012); others suggest that this type of embodiment appears to be rooted in early associated experiences in the physical world (Bargh, Schwader, Hailey, Dyer, & Boothby, 2012). Studies indicate that more than one mechanism is probably involved in producing embodiment effects—semantics (e.g., the physical concept of “dryness” is also a synonym for the concepts “drained” and “exhausted”), pan-cultural perceptions (see Fiske, Cuddy, & Glick, 2007), or hard-wired mechanisms (Kang, Williams, Clark, Gray, & Bargh, 2010).

In harmony with the embodied cognition perspective, we hypothesized that another potential influence on energy is concept activation of thirst/dryness, a subjective sensation aroused by liquid deprivation of a person or environment. The dryness metaphor is associated with feeling drained, empty, and depleted in many languages (e.g., Arabic, Hebrew, Spanish).

According to the embodied cognition perspective, the thirst/dryness metaphor could be activated on the conceptual or physical level. The physical level of dryness is associated with thirst, a basic homeostatic need, which signals the need for immediate satisfaction. There is evidence that the physical discomfort induced by moderate dehydration negatively influence subjective perceptions of mental energy. For example, deterioration of cognitive performance during mild water restriction has been observed for a lower performance in tasks involving sustained concentration or short-term memory when compared to hydrated controls (Labbe et al., 2009). Research has demonstrated the association between physical thirst and cognitive accessibility of drinking-related cues, suggesting that basic homeostatic needs such as thirst cause a heightened motivation and perceptual readiness to environmental cues that is instrumental in satisfying immediate needs. For example, evidence for the thirst body–mind association indicates that participants who were made thirsty responded faster to drinking-related items in a lexical decision task and performed better on an incidental recall task of drinking-related items relative to a control group (Aarts, Dijksterhuis, & Vries, 2001).

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