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or alternatively

- (1) Nettle, Andrews, and Bateson
- (2) Word counts. Abstract: 58 ; Main text: 835 ; References: 387 ; Entire text: 1359
- (3) Eating and body image: Does food insecurity make us feel thinner?
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- (10) Abstract

Body image distortions are common in healthy individuals and a central aspect of serious clinical conditions, such as eating disorders. This commentary explores the potential implications of body image and its distortions for the insurance hypothesis. In particular, we speculate that body image may be an intervening variable mediating the relation between perceived food scarcity and eating behavior.

(11) Main Text

In this target article, Nettle and colleagues integrate different domains of research from epidemiology, animal studies, and human psychology to explain eating behavior in humans. We are especially intrigued by the speculations the authors make about the implications of the insurance hypothesis for understanding the aetiology of eating disorders, particularly anorexia nervosa. Here, we wish to highlight research from the field of body representations, which we believe has interesting connections with, and implications for, the insurance hypothesis.

Given that it forms the core of the insurance hypothesis, the authors appropriately focus on the role of food insecurity in shaping eating behavior. However, their model includes one other important variable, which receives less attention, namely the current fat reserves of the organism. Consider, for example, two scenarios. In the first scenario, the probability of finding food equals 0.5 and the organism has substantial current fat reserves (3 units). In the second scenario, the probability of finding food also equals 0.5 but the current reserves are now lower (1 unit). In the model proposed by Nettle and colleagues these two scenarios would result in a very different eating behavior, even though food insecurity (i.e., the probability of finding food) stays the same. Thus, in order to decide whether fat storage is beneficial, an organism must be able not only to predict the food supply but also accurately evaluate its current reserves. In other words, to act optimally the organism needs to know its own body size. It needs a body image.

The distinction between actual levels of fat reserves and the mental representation thereof would be largely academic if body representations were largely veridical. In fact, however, there is substantial evidence for large distortions of body representation in many neurological and psychiatric conditions, most pertinently in the present context in eating disorders such as anorexia (e.g., Bruch, 1978; Cash & Deagle, 1997), as well as in obesity (e.g., Powell et al., 2010). In the case of anorexia, moreover, body image distortions are a strong predictor of poor prognosis for recovery (Casper, Halmi, Goldberg, Eckert, & Davis, 1979) and of relapse following recovery (Fairburn, Peveler, Jones, Hope, & Doll, 1993; Keel, Dorer, Franko, Jackson, & Herzog, 2005).

Recent research has suggested that even healthy people maintain highly distorted body representations (for review, see Longo, in press). For example, perceptual abilities such as tactile distance perception (Taylor-Clarke, Jacobsen, & Haggard, 2004; Longo & Haggard, 2011) and position sense (Longo & Haggard, 2010; Longo, Long, & Haggard, 2012) appear to rely on highly distorted representations of body size and shape. Similarly, distortions have also been found in explicit judgments

of body part length (Longo & Haggard, 2012) and even in judgments about the spatial configuration of body landmarks (Fuentes, Longo, & Haggard, 2013; Longo, 2015). Further, a clear pattern of body image distortions has been shown in normal-weight adolescent girls, with a tendency to overestimate body width and underestimate body length (Halmi, Goldberg, & Cunningham, 1977).

Thus, distorted body representations appear to be a normal part of human cognition, as well as central to serious clinical conditions involving disordered eating. We believe these findings have interesting and important implications for the model proposed by Nettle and colleagues. We speculate that a distorted body image may be an intervening variable mediating the relation between perceived food scarcity and eating behavior. More specifically, distortions of body image may function to modulate eating behavior: perceiving oneself as thin may motivate increased consumption, whereas perceiving oneself as fat may discourage consumption.

If both food insecurity and perceived fat reserves (body image) are important contributors to eating behavior, what is the relation between these two factors? One possibility is that body image and food insecurity are independent of each other, have different causes, and affect eating behavior separately. In this case, body image may modulate the effect of food insecurity influence on fat storage. For example someone who perceives themselves as fat will not eat (or eat less) even when the food supply is insecure. In the target article, Nettle and colleagues predict that anorexia occurs when a person's estimate of food security is unusually high, and propose that introducing food insecurity may promote weight gain in anorexia patients. However, if body image is independent of perceived food insecurity, this proposed treatment may prove inefficient.

Alternatively, body image may be shaped by environmental cues and serve as an intervening variable mediating the relation between perceived food scarcity and eating behavior. In this case, perceiving the supply of food as secure should lead people to perceive themselves as fat, while perceiving the supply of food as scarce should lead people to perceive themselves as thin. In this case,

the treatment proposed by Nettle and colleagues would not only affect eating behavior but also the body image. To our knowledge, no research has specifically investigated the relationship between body image and perceived food insecurity. This opens a new possible line of future research and provides a potential way of empirically testing the implications of the insurance hypothesis.

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