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The power within: The experimental manipulation of power interacts with trait BDD symptoms to predict interoceptive accuracy☆

Jonathan W. Kunstman [1], Elise M. Clerkin*, [1], Kateyln Palmer, M.Taylar Peters, Dorian R. Dodd, April R. Smith

Department of Psychology, Miami University, United States

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ABSTRACT

Background and objectives: This study tested whether relatively low levels of interoceptive accuracy (IAcc) are associated with body dysmorphic disorder (BDD) symptoms. Additionally, given research indicating that power attunes individuals to their internal states, we sought to determine if state interoceptive accuracy could be improved through an experimental manipulation of power..
Method: Undergraduate women (N = 101) completed a baseline measure of interoceptive accuracy and then were randomized to a power or control condition. Participants were primed with power or a neutral control topic and then completed a post-manipulation measure of state IAcc. Trait BDD symptoms were assessed with a self-report measure.
Results: Controlling for baseline IAcc, within the control condition, there was a significant inverse relationship between trait BDD symptoms and interoceptive accuracy. Continuing to control for baseline IAcc, within the power condition, there was not a significant relationship between trait BDD symptoms and IAcc, suggesting that power may have attenuated this relationship. At high levels of BDD symptomology, there was also a significant simple effect of experimental condition, such that participants in the power (vs. control) condition had better interoceptive accuracy. These results provide initial evidence that power may positively impact interoceptive accuracy among those with high levels of BDD symptoms..
Limitations: This cross-sectional study utilized a demographically homogenous sample of women that reflected a broad range of symptoms; thus, although there were a number of participants reporting elevated BDD symptoms, these findings might not generalize to other populations or clinical samples.
Conclusions: This study provides the first direct test of the relationship between trait BDD symptoms and IAcc, and provides preliminary evidence that among those with severe BDD symptoms, power may help connect individuals with their internal states. Future research testing the mechanisms linking BDD symptoms with IAcc, as well as how individuals can better connect with their internal experiences is needed..

Body dysmorphic disorder (BDD) is characterized by an intense preoccupation with and shame regarding perceived flaws in one's physical appearance (American Psychiatric Association, 2013). Unlike the focus on overall weight and shape seen in eating disorders, concerns in BDD tend to be focused on specific body features such as one's hair, nose, or skin (Phillips, 2005). Importantly, the shame and preoccupation associated with BDD leads to significant distress and/or impairment, in spite of the fact that perceived flaws in one's appearance are either not observable or appear very slight to others (APA, 2013; Buhlmann & Wilhelm, 2004). Hence, there is a discrepancy between perceived and objective appearance.

The present study investigated this paradox in perception by evaluating interoceptive accuracy (IAcc)—or the ability to accurately detect internal bodily sensations (Garfinkel, Seth, Barrett, Suzuki, & Critchley, 2015)—as a correlate of BDD symptoms.[2] We hypothesized that in addition to biased perceptions of their

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* Corresponding author. Department of Psychology, Miami University, 90 N. Patterson Avenue, Oxford, OH 45056, United States.
E-mail address: clerkiem@miamiOH.edu (E.M. Clerkin).
[1] Jonathan W. Kunstman and Elise M. Clerkin contributed equally to this work.

[2] Note that although this study focused on interoceptive accuracy, recent research suggests that there are meaningful distinctions between aspects of interoception. In particular, Garfinkel et al. (2015) outline differences between interoceptive accuracy (i.e., internal assessments of physiological indices like heart rate) vs. interoceptive sensibility (i.e., self-evaluated interoception ability) vs. interoceptive awareness (i.e., confidence–accuracy relationship).

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physical appearance, those high in BDD symptoms might also be out of touch with their inner bodily experience, resulting in relative deficits in IAcc. Additionally, given the established importance of interoception to emotion and psychological well-being (e.g., Damasio, 1998; Pollatos, Herbert, Matthias, & Schandry, 2007; Wiens, Mezzacappa, & Katkin, 2000), we also attempted to temporarily improve interoceptive accuracy with an experimental manipulation of power that has been found to sensitize people to their inner states (e.g., Guinote, 2010). Since power improves many of the psychological deficits at the root of BDD symptoms (e.g., low self-esteem, self-criticism, negative self-perceptions; Fast, Sivanathan, Mayer, & Galinsky, 2012; Kifer, Heller, Perunovic, & Galinsky, 2013; Phillips, 2005; Wojciszke & Struzynska-Kujalowicz, 2007), those high in BDD symptoms may have the most to gain from the psychological experience of power. Thus, we tested whether power's capacity to improve state interoceptive accuracy would increase with BDD symptom severity.

1. Interoceptive accuracy and BDD symptoms

Integrating external and internal cues may be important in body image formation. For instance, researchers found that individuals who had poorer interoceptive accuracy, assessed with a heartbeat monitoring task, were more likely to be tricked into believing that a rubber hand was a part of their body, as compared to those with better interoceptive accuracy (Tsakiris, Tajadura-Jiménez, & Costantini, 2011). This finding illustrates a basic disconnect between body representation and inner, tactile experiences for those low in IAcc. Moreover, this disconnect with inner experiences suggests that those low in interoceptive accuracy are vulnerable to external influences that may undermine accurate body image and contribute to BDD symptoms. In contrast, those with the capacity to "anchor" their body image and sense of self by integrating accurate information about their internal cues, such as the steadiness of their breathing or heart rate, are presumably less influenced by potentially harmful external information. Consistent with this idea, researchers have found that although individuals with BDD ($n = 17$) did not differ from healthy controls ($n = 17$) or individuals with schizophrenia ($n = 17$) in susceptibility to the rubber hand illusion (i.e. being tricked into believing a rubber hand was a part of their own body), significant positive correlations existed between participants' susceptibility to the rubber hand illusion and BDD-relevant symptoms and traits such as body dissatisfaction (Kaplan, Enticott, Hohwy, Castle, & Rossell, 2014). Further, positive associations trending towards significance were found between susceptibility to the illusion and dysmorphic concerns. Although speculative, one explanation for these findings is that interoceptive accuracy may connect people with their inner emotional and physiological experiences (e.g., Damasio, 1998), and armor them against the types of external influences that can otherwise undermine body perception and satisfaction (e.g., Thompson & Stice, 2001).

By comparison, diminished interoceptive accuracy may partially explain why individuals with heightened BDD symptoms persist in having such distorted negative views of their physical appearance. For instance, poor interoceptive accuracy could inadvertently lead someone with BDD to focus more on what his nose or skin *visually* looks like, as opposed to how it *feels* on his face. This is problematic because individuals with little internal input to ground their sense of self will presumably be more likely to "over-focus" and fixate on the small visual details and perceived flaws of their noses (or skin, hair, etc.). Indeed, this lack of connection to one's internal experience may be one reason that cognitive-behavioral models of BDD predict that individuals "interpret normal visual input, such as minor flaws, in a biased way that results in further negative mental, emotional, and behavioral consequences" (Wilhelm & Neziroglu, 2002, p. 210; see also Buhlmann & Wilhelm, 2004). In other words, it may be that relative deficits in interoceptive accuracy make it difficult to effectively process physical cues like hair and skin due to a disconnect between the self and one's inner physiological states. Further, consistent with cognitive-behavioral conceptualizations of BDD that emphasize that body image is "constructed" (Veale, 2001), one who lacks the ability to synthesize external and internal cues may be more susceptible to catastrophic misinterpretations (e.g., "my date thinks I'm hideously unattractive") and subsequently, unhealthy behavioral patterns (e.g., avoidance and social withdrawal).

2. Interoceptive accuracy and power

In addition to evaluating the link between BDD symptoms and interoceptive accuracy, we also employed a subtle power manipulation with the goal of temporarily enhancing state IAcc. Social psychological research demonstrates that power—operationally defined as asymmetric control over interpersonal resources (see Fiske, 1993; Overbeck, 2010) —fundamentally changes cognition and behavior (see Keltner, Gruenfeld, & Anderson, 2003; Magee & Smith, 2013 for review). When people have power over others, their access to social and material resources increases and they are immunized to the actions, evaluations, and objections of others. Consequently, by providing individuals with the capital to achieve their goals and freeing them from the sanctions of others, power attunes people to their inner states. This theoretical prediction is supported by a wealth of empirical evidence that illustrates that objective and imagined social power puts people in touch with their emotions, attitudes, goals, and even some physiological states (e.g., Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008; Guinote, 2010; Hecht & LaFrance, 1998). For instance, compared to controls, hungry people eat and happy people smile more when in power (Guinote, 2010; Hecht & LaFrance, 1998). Power increases flirtatiousness among sexually unrestricted individuals, selfishness among the egocentric, and responsibility among communally-oriented people (Chen, Lee-Chai, & Bargh, 2001; Kunstman & Maner, 2011). Power amplifies self-directed goal pursuit and sensitizes individuals to personal states (e.g., Chen et al., 2001; Guinote, 2010; Kunstman & Maner, 2011). In keeping with this past work, we predict that like other personal cues, power will also increase sensitivity to bodily states like breathing and heart rate, ultimately leading to temporary increases in state interoceptive accuracy.

In addition to sensitizing individuals to their inner states, power has also been shown to improve mental health and reduce maladaptive behaviors. For instance, among healthy samples, experimental manipulations of power increase positive affect, self-esteem, and well-being, satisfy basic psychological needs for autonomy, choice, and personal control, and reduce self-criticism and negative self-perceptions (Briñol, Petty, Valle, Rucker, & Becerra, 2007; Fast, Gruenfeld, Sivanathan, & Galinsky, 2009; Fast et al., 2012; Inesi, Botti, Dubois, Rucker, & Galinsky, 2011; Kifer et al., 2013; Magee & Galinsky, 2008; Wojciszke & Struzynska-Kujalowicz, 2007). Power has even been shown to decrease caloric restriction among those at risk for developing eating disorders (Kunstman, Smith, & Maner, 2014). Collectively, this research suggests that power leads people to see the best in themselves while simultaneously reducing both self-criticism and compensatory behaviors associated with mental illness. Based on the suggestive evidence from these healthy samples, the psychological experience of power may be particularly beneficial for those high in BDD symptoms, because power attenuates the negative affect and self-criticism that is fundamental to this disorder