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## Counterpoint: Distinguishing between perception and judgment of spatial layout

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### Abstract

Claims about alterations in perception based on manipulations of energetics (and other influences) are often framed as interesting specifically because they affect our perceptual experience. Many control experiments conducted on such effects suggest, however, that they are the result of attribution effects and other kinds of judgmental biases influencing the reporting process rather than perception itself. Schnall (in press), appealing to Heider's work on attribution, argues that it is fruitless to try to distinguish between perception and attribution. This renders the energetics hypothesis of less interest.

### Keywords

embodied perception; space perception; glucose; demand characteristics

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Schnall (in press) argues that theories of attribution can help explain why some labs report data that seems inconsistent with the energetics hypothesis of space perception. I will argue that Schnall's position not only neglects the important role of control experiments that seek to test alternative hypotheses, but that it also trivializes the energetics hypothesis by conflating explicit judgment with perceptual experience. Energetic considerations must affect choices, but they probably contribute directly rather than by affecting the perception of spatial layout.

Why do hills look so steep (Durgin & Li, in press, Kammann, 1967; Ross, 1974)? A hill of 5° is normally perceived to be about 20°, even measured implicitly (Li & Durgin, 2010, 2013). Proffitt, Bhalla, Gosweiler and Midgett (1995) proposed that the perceptual exaggeration of hills is the result of energetic considerations being embedded in perception so as to affect decisions about navigation. In contrast, Li and Durgin (2010) have proposed that perceptual slant exaggerations, which are experienced underfoot even by the congenitally blind (Hajnal, Abdul-Malak & Durgin, 2011), represent perceptual scale expansion that contributes enhanced sensitivity to the immediate control of action (Durgin & Li, 2011; Durgin, 2014).

These two theories differ in how malleable they expect perception to be. The scale expansion hypothesis depends on a predictable (exaggerated) coding of slant so that action can be calibrated. The energetics hypothesis argues that changes in physiological state can

immediately alter perceived slant, as illustrated by Bhalla and Proffitt's (1999) famous study using heavy backpacks. So do backpacks affect how steep things look?

Durgin et al. (2009) reported a novel control condition in a backpack study. The control showed that carrying a heavy backpack full of scientific equipment was insufficient to produce changes in estimated slant, whereas participant beliefs that the experimenter expected the heavy weight to affect estimates seemed to matter<sup>1</sup> – a finding replicated later using multiple variations to control for various alternative hypotheses (e.g., Durgin, Klein, Speigel, Strawser & Williams, 2012a; Durgin, Ruff & Russell, 2012b; Shaffer, MacManama, Swank & Durgin, 2013). These results are problematic for the energetics account of perceptual experience (Firestone, 2013).

Moreover, Shaffer et al. (2013) showed that when participants were insightful about the energetics hypothesis, but misconstrued the experimental manipulation, their judgments went opposite to those predicted by energetics. Specifically, participants who arrived in the lab after fasting and were administered a sweetened drink that did not contain sugar both (1) typically assumed that the drink had contained sugar (a misconstrual) and (2) often (25%) believed that the sugar was supposed to affect their estimates of slant<sup>2</sup> (were insightful despite an elaborate cover story). This insightful group of misconstruers gave lower estimates than everyone else, rather than higher ones.

Schnall suggests we can't tell why people made these lowered judgment, but the insightful participants affected in this experiment were precisely the ones mistaken about the condition they were in (due to their misconstrual). If they had resisted cooperation (as Schnall proposes), they would have given *higher* estimates of the hill; but they didn't. Their lower estimates, which cannot be predicted by energetics (they hadn't been given sugar), nor by anti-cooperation (they thought they had been given sugar), are thus either a sign of cooperation with their insightful beliefs about the energetics theory (given the misconstrual of what condition they were in) or something else. Crucially, these estimation biases only occurred for those with low blood sugar (not for insightful participants who had actually received sugar), consistent with the previously hypothesized role of (low) sugar in increasing likelihood of cooperation with experimental demand (e.g., Durgin, Hajnal, Li, Tonge & Stigliani, 2010, 2011).

Schnall (in press) mentions our subsequent work (Williams, Ciborowski & Durgin, 2012) on attribution effects: Participants (all in state of low blood sugar) behaved differently after drinking diet ginger ale<sup>3</sup> poured from a non-diet bottle rather than from a diet bottle. The misconstrual condition led to judgmental bias: They gave higher estimates of the slant of

<sup>1</sup>Note that Durgin et al. (2009) did not take participant reports at face value. On the contrary, they observed that people who reported that they thought their perception had been affected by the backpack manipulation had indeed been the ones to give high estimates. Durgin et al. interpreted this affirmation as an implicit admission of cooperation rather than as an explicit insight into a real perceptual effect. How could those participants have known their perception had been affected if they only saw the slope when wearing the backpack?

<sup>2</sup>Shaffer et al. (2013) eliminated the Stroop task that typically intervenes between the drink manipulation and the hill estimation task because we had observed that many participants in Durgin et al. (2012a) assumed the sugary drink was supposed to influence (only) the Stroop task, and that the backpack (only) was supposed to affect the hill task. Shaffer et al. simply had participants wait ten minutes for the "electrolytes" in the liquid to be absorbed. As expected, removing the Stroop task allowed some people to think the drink was relevant to the hill estimation task despite our deception. The rate of reported suspicion was similar to that in the deception condition of our original backpack study (25%: Durgin et al., 2009).

stairs and gave higher estimates of the number of Stroop trials they had done between having the drink and making the estimate. Many studies of low blood sugar and cognition may inadvertently confound low blood sugar (the intended manipulation) with misconstrual by participants (who tend to assume that drinks they are given contain sugar). Construals matter, and they can sometimes be controlled implicitly.

But Schnall argues that attribution (when consistent with the energetics hypothesis) actually affects perception, pointing out that there are established theories that can predict why control experiments might conceal perceptual attributional differences that are revealed by prior experiments. This argument seems problematic for at least two reasons.

First, Schnall seems to have some predictions backwards. Schnall discusses primarily the Durgin et al. (2012a) instructional manipulation, but Schnall's conclusion requires that the use of a deceptive cover story in our many other studies also disrupts the normal attributional processes by making the backpack salient. (By Schnall's hypothesis, this would allow people not to be affected by the backpack.) The weakness of Schnall's framing, however, is that the original experimental procedure of Bhalla and Proffitt (1999) – asking people to wear a heavy backpack to estimate its weight, and then leaving it on – is already abnormal compared to the typical human purpose for wearing backpacks (to carry things). So how do you get people to wear a heavy backpack without calling attention to it? If people normally wear backpacks in order to carry things, then being asked to wear a backpack to carry equipment – as the various deceptions we have used typically do (e.g., Durgin et al., 2009; Durgin et al., 2012b; Shaffer et al., 2013) seems much more plausibly generalizable to the normal use of backpacks. Our three deception manipulations lend force to the conclusion of Durgin et al. (2012a) that backpacks, when explicitly worn for the purpose of carrying things, typically have no effect on *estimates* of slant, let alone perception.

The second fundamental problem with Schnall's argument is that suggesting that perceptual experience is the same as attribution trivializes the energetics hypothesis. Should we be interested in this work if it is just about judgment? Isn't it the purported effect on perception that made the theory interesting? Conflating (judgmental) attribution effects with perception has been a common artifact of the energetics approach, and this is why many psychologists have rightly lost interest in it. To the extent that energetics theorists have stopped asking Koffka's (1935) question, "Why do things look as they do?", their theories aren't really about perceptual experience at all.

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<sup>3</sup>Ginger ale was selected because its strong flavor very effectively masks the taste of the sweetener used in these sodas, though the haptic consistency is detectably different (less syrupy) in side-by-side comparison.

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