

BRIEF REPORT

An effect of mood on the perception of geographical slant

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Previous research has shown that hills appear steeper to those who are fatigued, encumbered, of low physical fitness, elderly, or in declining health (Bhalla & Proffitt, 1999; Proffitt, Bhalla, Gossweiler, & Midgett, 1995). The prevailing interpretation of this research is that observers' perceptions of the environment are influenced by their capacity to navigate that environment. The current studies extend this programme by investigating more subtle embodied effects on perception of slant; namely those of mood. In two studies, with two different mood manipulations, and two estimates of slant in each, observers in a sad mood reported hills to be steeper. These results support the role of mood and motivational factors in influencing spatial perception, adding to the previous work showing that energetic potential can influence perception.

Keywords: Mood; Slant perception; Emotion and perception; Space perception; Embodied perception.

The world of those who are happy is different from the world of those who are not.

Ludwig Wittgenstein (1922), 6.43.

Wittgenstein gives voice to a common belief; not only does our mood affect our thoughts and feelings, but mood can affect the experienced

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world. Recent research supports this belief, showing that one's affective state can influence attention (Phelps, Ling, & Carrasco, 2006), decision making, and memory (Storbeck & Clore, 2005), thereby changing our experience of the world. But do happy people *see* the world differently? Contemporary research on perception of surfaces in the world (such as the slant of a hill) often focuses on environmental properties as detected by mechanisms of the eyes and visual system, rather than internal, non-optical, properties of the observer (Sedgwick, 2001). This paper offers evidence for the role of one such internal property: mood. People in positive or negative moods may see the basic geometry of the world differently.

Previous research has shown that an observer's capacity to walk up a hill affects their perception of that hill's slant (Proffitt, 2006). We hypothesise that mood also influences hill-slant perception. While previous factors of burden, fatigue, old age, and declining health have a direct effect on capacity to ascend a hill (Bhalla & Proffitt, 1999), changes in affective state do not have the same sort of direct effect. Although moods may influence judgements of task difficulty (Gendolla, Abele, & Krusken, 2001), they do not have direct influences on energetic states (Silvestrini & Gendolla, 2009). Therefore, finding that moods influence perceptions of slant could not be explained by changes in energetic states as previous findings have been. Indeed mood can exercise its influence by appearing to be embodied information about one's prospects (Clore & Huntsinger, 2007). The current research asked whether such affective information could influence perceptions of the effort required to ascend a hill without any actual change in energetic capacity. Whereas fatigue from a long run may influence perceptions of slant because of depleted energy, the experience

of negative mood might do so by serving as information that one's situation is not advantageous.

A bit of background is necessary before describing our current study. First, people systematically overestimate hill slant (Proffitt, Bhalla, Gossweiler, & Midgett, 1995). A 7-degree hill is reported to be between 25 and 30 degrees on average. Proffitt (2006) has argued that overestimation is useful because it allows increased sensitivity of judgement within the range of hills that potentially afford climbing. Thus, people are able to distinguish a 4-degree hill from a 5-degree hill (two navigable hills that require different amounts of energy) by emphasising the difference between them.¹ While this normative overestimation of hill slant hints at a relationship between our ability to scale a hill and our perception of its slant, several studies conducted by Proffitt and colleagues offer more direct evidence of this relationship (Bhalla & Proffitt, 1999; Proffitt et al., 1995; Stefanucci, Proffitt, Banton, & Epstein, 2005). These studies show that perception of a given hill varies with the perceiver's capacity to scale that hill. For example, hills are rated as steeper by those who have just gone on a long run, or those who are relatively less physically fit. Hence, not only are hills systematically overestimated, but that overestimation is modulated by changes in energetic capacity (see Proffitt, 2006, for a review).

According to this account, explicit perception of geographical slant is recruited for planning purposes, and the biases observed are due to increases in anticipated effort. The current studies seek to extend or constrain such an explanation. One recent study with similar goals has extended the previous energetic account into the domain of social resources. Schnall, Harber, Stefanucci, and Proffitt (2008) showed that being with a friend at a

¹ Although it is useful to consciously overestimate the slant of the hill, when one ascends the hill, actions must be appropriate to the physical slant of the hill. In the present studies (as in past ones), we distinguish between explicit awareness of the hill slant, assessed by a verbal measure ("How many degrees is that hill?"), a visual matching device, and an understanding of slant that supports action, reflected in a haptic measure. In previous experiments (Proffitt, 2006), the explicit awareness measures (verbal and visual) exhibit large overestimations, but the haptic measure evokes relatively accurate responses. Despite overestimation of slant, we still are able to act on the hills appropriately (i.e., we do not place our foot as if a hill were overestimated), and the palmboard measurement seems to reflect this fact.

hill or simply imagining a friend before judging the slant of a hill made hills seem less steep to the observer. All participants wore heavy backpacks while viewing the hill, but participants with a friend, or imagining a friend, estimated the hill to be less steep than those who were not thinking of a friend. The authors argued that psychosocial resources can influence the perception of hill slant, just as the physiological resources studied previously. The current studies suggest that mood may have a similar effect. Given that changes in mood can influence rated effort of certain tasks (Gendolla, 2000), can they likewise change the perception of slant?

In our studies we sought to manipulate mood, rather than induce emotional reactions. As opposed to moods, emotions, such as fear, anger, and disgust, are discrete reactions to particular objects or events (such as fear of a snake). A mood, on the other hand, generally has a valence (positive or negative) and a magnitude (strong or weak), but not a salient source, nor a discrete interval (Batson, Shaw, & Oleson, 1992; Clore, 1992). While emotional reactions such as fear (Stefanucci, Proffitt, Clore, & Parekh, 2008; Stefanucci & Proffitt, 2009) have been shown to influence perception of both slant and distance, mood, the subject of the current studies, has not yet been investigated in relation to the perception of spatial layout.

There are two major underlying dimensions to mood, valence (the pleasantness or unpleasantness of a mood; Watson & Clark, 1992) and arousal (Larsen & Diener, 1992; Russell, 1980). There is some disagreement about whether each dimension represents a distinct component of affect, or whether valence alone is sufficient to describe mood, and arousal should be considered separately (Barrett, 2006; Watson & Clark, 1997). Whether or not arousal belongs as a component of affect, it could present an alternative explanation for an effect of a mood manipulation on perception (see Stefanucci & Storbeck, 2009). For this reason, we administered a questionnaire (Larsen & Diener, 1992) based on the circumplex model proposed by

Russell (1980), that assessed both positive and negative affect, as well as arousal.

One purpose of the current studies was to determine whether changes in mood can influence perception of slant, independently of direct changes in energetic potential. Given that Bhalla and Proffitt (1999) have shown the robust effect of energetic states (such as fatigue and fitness), it would be a novel contribution to show that affect can influence perception, using manipulations that do not directly influence energetic state. This finding would extend the evidence from Schnall et al. (2008a) and Stefanucci et al. (2008), that affect can indeed influence slant perception.

EXPERIMENT 1: MOOD INFLUENCES THE PERCEPTION OF SLANT

The first study demonstrated the existence of the effect of mood on perception of slant using a simple paradigm. A common method was chosen that used music as a mood induction, with pieces that had previously been shown to influence mood (Niedenthal & Setterlund, 1994). The slant measures used were those described in studies by Proffitt and colleagues (e.g., Bhalla & Proffitt, 1999).

Method

Participants. Fifty-seven (33 female, 24 male) undergraduates participated in the study for course credit or payment. There were 28 in the negative mood group (17 females, 11 males), and 29 (16 females, 13 males) in the positive mood group.

Design. Participants assessed the slant of a 5-degree hill near the psychology building. They did so by verbally reporting the slant of the hill in degrees (where 0 is flat and 90 is a vertical cliff), by adjusting the visual matching disk and by adjusting the haptic palmboard (both

devices were used in previous slant studies, e.g., Bhalla & Proffitt, 1999).

Participants listened to music through headphones. They were randomly assigned to either the happy music (Mozart's *Eine Kleine Nachtmusik*) or sad music (Mahler's *Adagio*) condition. The music was looped to be continuously presented throughout the experiment. Participants also completed a mood questionnaire by rating how well mood-related adjectives, adapted from the Current Mood Report (Larsen & Diener, 1992), described their feelings at that moment.

Procedure. Participants were told that they would be listening to music for the entire experiment. They believed that the experiment concerned the role of music in a variety of perceptual tasks. To begin, they sat in a room with dimmed light and listened to the music for five minutes. They were urged to listen to the music, and to "really get into it", but not to fall asleep. After five minutes, still listening to the music through headphones, they were led outside to a hill and asked to judge its slant, verbally (how many degrees, when 0 is flat and 90 is a vertical cliff), visually and by adjusting a haptic device in which they matched the angle of their palm to the slant of the hill (while looking at the hill, not at their hand). The order of the verbal and visual measures was counterbalanced. Then, participants came back into the lab, stopped the music, and completed the mood questionnaire. Finally, participants were fully debriefed.

Results

Participants who responded with a verbal estimate of 10 degrees or less were excluded from the analysis. Very few people respond with such a low estimate without prior knowledge of actual hill slants. When directly questioned after the study, many who responded in this way admitted to knowing that hills are typically overestimated. There were 11 participants excluded because of a verbal estimate of 10 degrees or less. Five were in the positive mood condition and 6 in the

negative mood condition. Three additional participants (2 positive, 1 negative) were excluded from the analysis because their estimates were more than 2 standard deviations greater than the mean.

Slant. A one-way analysis of variance (ANOVA) indicated that participants in the negative mood condition visually estimated ($M = 23.4$, $SE = 1.4$) the hill to be steeper than those in the positive mood group ($M = 18.78$, $SE = 1.44$), $F(1, 41) = 5.22$, $p = .03$, $\eta_p^2 = .09$ (see Figure 1). A similar, but slightly smaller, trend was found for the verbal measure (positive: $M = 26.95$, $SE = 2.00$; negative: $M = 22.52$, $SE = 1.46$), $F(1, 41) = 3.31$, $p = .08$. The haptic estimates were not different across condition, $p = .33$.

Mood. The mood questionnaire was analysed by computing a composite z -score for valence and arousal by weighting the adjectives in the list depending on their relative valence and arousal (Larsen & Diener, 1992). There were no differences across condition in either the valence score, $p > .5$, or the arousal score, $p > .4$.

When participants listened to sad music (Mahler's *Adagio*), they estimated the hill to be steeper on average than those who listened to happy music (Mozart's *Eine Kleine Nachtmusik*). In Experiment 1, the visual measure was influenced by the music, while the verbal measure showed a non-significant trend. However, responses on the mood questionnaire showed no significant differences between the groups. There are several alternative explanations for these results. The difference in slant estimates between the groups may have been due to changes in mood that were too subtle to be reflected in the mood questionnaire. Or perhaps mood was dampened either by responding to the slant measure or by returning to the lab before responding to the mood measure. Finally, it is possible that the mood manipulation was ineffective and some other factor is responsible for the difference in slant estimates between the groups. In Experiment 2, we used a different mood manipulation, and added more adjectives to the

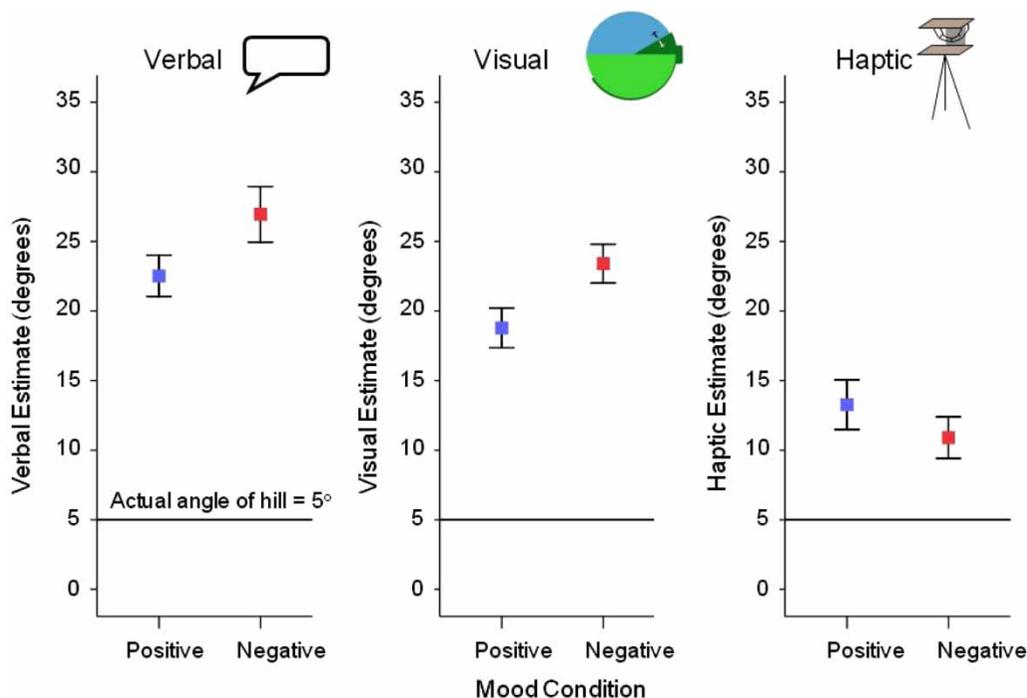


Figure 1. Mean estimates of hill slant by mood (music) condition. Bars represent one standard error of the mean.

mood questionnaire to address these possible alternatives.

EXPERIMENT 2: A DIFFERENT MOOD MANIPULATION ALSO INFLUENCES JUDGEMENTS OF SLANT

For the following study, we manipulated mood in a more direct way, while introducing a cover story designed to mask the intention of the mood induction. Specifically, participants wrote an emotional story (Schwarz & Clore, 1983) but were told that we were interested in the effect of outlining on the quality of writing.

Method

Participants. Twenty-five University of Virginia undergraduates (17 female, 8 male) participated in the study for course credit. There were 13 in the

happy condition (4 males and 9 females) and 12 in the sad condition (4 males and 8 females).

Design. The same hill was used as in Experiment 1. Instead of music, the mood manipulation involved writing an outline of a personal story of an emotional nature, and then later writing that story. Participants in the sad condition wrote of a negative personal experience, and participants in the happy condition wrote of a positive personal experience. The words “negative” and “positive” were used so as to not call participants’ attention to mood (e.g., being happy or sad). Participants wrote their outlines and stories on a legal pad on a clipboard. The circumplex questionnaire was used to assess mood, but more adjectives were added to increase the reliability of the separation of arousal and valence.

Procedure. Participants first heard instructions for the entire experiment and then spent 5 minutes outlining and thinking about either a very positive

event or a very negative event in their lives (Schwarz & Clore, 1983). The mood manipulation was masked by telling the participants that we were interested in how the quality and character of their writing was influenced by outlining, then taking a short break, as opposed to outlining and writing without a break. The measures of slant were presented to the participants as a “distractor task” between the outlining and writing about the event. Participants were asked to continue to think about their outline and their story, as they went outside to do the “other” tasks. This procedure was intended to maintain the mood elicited by the writing manipulation as participants went outside.

After outlining for 5 minutes, participants were led outside to the hill to make three estimates of slant. Verbal and visual measures were presented in counterbalanced order, while the haptic measure was presented last.²

Again, by informing participants at the beginning of the study that they would return and continue to write after the task outside, the intention was to maintain the emotional experience. After making the slant judgements, they returned to the lab and wrote about the emotional event for another 5 minutes. After the 5 minutes of writing, participants were interrupted, and told that it was okay if they were not finished with their story. They were then given the Current Mood Report to assess their emotional state.

Results

Slant. Six participants were excluded (3 in each condition), based on the criteria of verbal estimates of 10 degrees or less. A one-way ANOVA indicated that those in the negative mood group reported the hill to be steeper than those in the positive mood group in both verbal (negative: $M = 23.4$, $SE = 2.5$; positive: $M = 16.56$, $SE = 1.2$), $F(1, 17) = 5.66$, $p = .03$, $\eta_p^2 = .21$ and visual estimates of slant (negative: $M = 21.80$, $SE = 2.05$; positive: $M = 14.56$, $SE = 1.06$), $F(1, 17) = 9.23$,

$p < .01$, $\eta_p^2 = .31$ (see Figure 2). Haptic estimates were no different across conditions, $p > .5$.

Mood. The mood questionnaire also indicated significant differences between the groups. Participant ratings on the adjectives were again split into weighted z -scores for valence and arousal. Those in the positive mood condition reported themselves to be significantly happier (higher valence) than those in the sad condition, $F(1, 17) = 18.80$, $p < .001$, $\eta_p^2 = .53$).

To assess the independent contribution of valence and arousal we conducted a separate multiple regression for each slant measure, with simultaneous entry of valence and arousal. Valence but not arousal was a significant predictor of the verbal measure, and had a unique contribution—valence: $b = -3.32$, $t(2, 16) = -2.26$, $p = .04$; arousal: $b = -1.56$, $t(2, 16) = -1.03$, $p = .32$. The visual measure had significant and unique contributions from both valence and arousal—valence: $b = -2.6$, $t(2, 16) = -2.28$, $p = .04$; arousal: $b = -2.8$, $t(2, 16) = -2.37$, $p = .03$).

GENERAL DISCUSSION

The experiments, as a pair, lend support to the hypothesis that mood can influence slant perception. Experiment 1 induced mood using music. Those who listened to sad music (Mahler’s *Adagio*) reported the hill to be steeper than those who listened to the happy music (Mozart’s *Eine Kleine Nachtmusik*). Did the music influence mood, as was intended, or did it change something else? Experiment 2 replicated the difference in slant judgements between the mood groups using a different manipulation of mood. In this experiment, participants wrote about a positive or negative personal experience, and then judged the slant of the hill. Those in the negative mood group estimated the hill to be steeper than those in the positive mood group.

² The conscious estimates were of more interest for the current studies, and were therefore first, to minimise influence of the haptic estimate, which in previous studies (Proffitt, 2006) has been found to be unaffected by manipulation of physiological state. The verbal and visual estimates were counterbalanced to account for any influence they might have on each other.

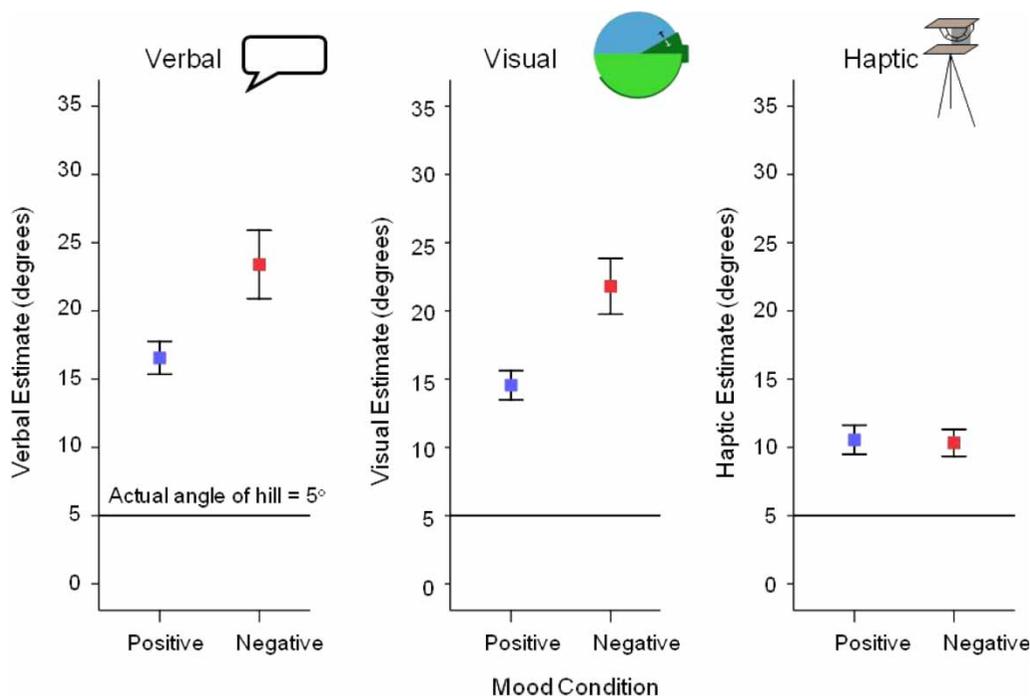


Figure 2. Mean estimates of hill slant by mood (writing) condition. Bars represent one standard error of the mean.

If perception is indeed being affected, and mood is instrumental in this change in perception, how does this effect occur? We consider three possibilities.

The effect may be mediated by differences in attention. Bridgeman and Hoover (2005) have shown that directing observers' attention to different locations (elevations) on the hill affects estimates of the slant. For example, looking up toward the top of the hill makes the hill look steeper than looking closer to where one is standing. In the current studies, if sad mood caused participants to look at the top of the hill, it should have looked steeper ("Gosh, look at that huge hill I have to walk up"). On the other hand, if happy mood caused them to look at the hill right in front of them it should have looked shallower ("Take life one step at a time"). Bar Anan and colleagues (Bar-Anan, Liberman, & Trope, 2006) documented a similar effect, in which individuals in a happy mood were faster to notice an object in the foreground than in the background, whereas sad participants attended to the background.

The second possible mechanism involves affect as information. Schwarz and Clore (1983) first proposed that mood can have an informational influence on judgement, and that this informational influence was not due to mood-congruent memory effects (Bower, 1981). When people make an evaluative judgement, rather than engaging in a biased search of memory for affect-congruent memories, they may ask themselves, "How do I feel about this?" Basic to this position is the assumption that the strength of the informational impact corresponds to the diagnosticity of the affective reaction for assessing the object of judgement. Gendolla and colleagues (Gendolla, 2000) suggested that mood is especially diagnostic for evaluative judgements such as, "How much effort do I have to mobilise?" In several studies (Gendolla et al., 2001; Gendolla & Krusken, 2002), Gendolla and colleagues demonstrated that for people in positive moods, the subjective demands of various tasks are lower than for people in negative moods. In short, for happy people, tasks are generally judged as easier. In the current studies, mood may

have influenced effort perceptions as participants looked at the hill. Those in a sad mood may have perceived it to be more effortful to climb and therefore more steep.

A third possible mechanism is based on an energetic account involving blood glucose levels. The effort explanation proposed by Proffitt (2006) has shown influences of depleted energy (fatigue) or capacity (lesser physical fitness) on perception of slant, but has not until recently linked this to the biology of how the body stores and metabolises energy. In a recent set of experiments, Schnall, Zadra, and Proffitt (in press) did just that. Participants began by depleting blood glucose during a self-control task. Then energy was replenished (with a sugared drink) for some participants, but not for others (with a diet drink). All participants then viewed a hill while wearing a backpack. Those participants who remained glucose-depleted reported the hill to be steeper than those who drank the sugared drink.

This finding could apply to the current results, if being in a negative mood requires (or depletes) more blood glucose than being in a positive mood. This possibility is supported by a series of studies by Gailliot et al. (2007), showing that self-control tasks deplete glucose. Given that blood glucose is used for demanding executive tasks, perhaps a negative mood engages regulatory processes that increase glucose use.

Alternatively, one might combine the glucose and affect-as-information explanations. Whether or not sad mood depletes resources, negative affect seems likely to serve as embodied information about scarce resources (or about the danger of resource depletion), leading to a conservative policy with respect to the perception of environmental affordances. Thus, actual resource depletion and embodied experiences of mood that signal likely resource depletion may both contribute to perceptions of physical layout.

While the mechanism remains to be discovered, the current studies indicate that the world can appear differently to those in different moods. We suggest that mood not only changes our interpretations of social or emotional events, but can also change our perceptions of the scale of the

world. These findings help expand our understanding of non-optical influences on perception, as well as of the power of mood to shape our experience.

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REFERENCES

- Bar-Anan, Y., Liberman, N., & Trope, Y. (2006). The association between psychological distance and construal level: Evidence from an Implicit Association Test. *Journal of Experimental Psychology: General*, *135*(4), 609–622.
- Barrett, L. F. (2006). Valence is a basic building block of emotional life. *Journal of Research in Personality*, *40*(1), 35–55.
- Batson, D., Shaw, L. L., & Oleson, K. C. (1992). Differentiating affect, mood and emotion: Toward functionally based conceptual distinctions. In M. Clark (Ed.), *Emotion. Review of personality and social psychology* (No. 13, pp. 294–326). Thousand Oaks, CA: Sage.
- Bhalla, M., & Proffitt, D. R. (1999). Visual-motor recalibration in geographical slant perception. *Journal of Experimental Psychology: Human Perception and Performance*, *25*(4), 1076–1096.
- Bower, G. H. (1981). Mood and memory. *American Psychologist*, *36*, 129–148.
- Bridgeman, B., & Hoover, M. (2005, November). *Perception of slopes of hills is more accurate in near space*. Talk presented at the Annual Meeting of the Psychonomic Society, Vancouver, BC.
- Clore, G. L. (1992). Cognitive phenomenology: Feelings and the construction of judgment. In L. L. Martin & A. Tesser (Eds.), *The construction of social judgments* (pp. 133–163). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Clore, G. L., & Huntsinger, J. R. (2007). How emotions inform judgment and regulate thought. *Trends in Cognitive Science*, *11*, 393–399.
- Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., et al. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology*, *92*, 325–336.

- Gendolla, G. H. E. (2000). On the impact of mood on behavior: An integrative theory and a review. *Review of General Psychology, 4*(4), 378–408.
- Gendolla, G. H. E., Abele, A. E., & Krusken, J. (2001). The informational impact of mood on effort mobilization: A study of cardiovascular and electrodermal responses. *Emotion, 1*(1), 12–24.
- Gendolla, G. H. E., & Krusken, J. (2002). Mood state, task demand, and effort-related cardiovascular response. *Cognition and Emotion, 16*(5), 577–603.
- Larsen, R. J., & Diener, E. (1992). Promises and problems with the circumplex model of emotion. *Review of Personality and Social Psychology, 13*, 25–59.
- Niedenthal, P. M., & Setterlund, M. B. (1994). Emotion congruence in perception. *Personality and Social Psychology Bulletin, 20*(4), 401–411.
- Phelps, E., Ling, S., & Carrasco, M. (2006). Emotion facilitates perception and boosts the perceptual benefits of attention. *Psychological Science, 17*(4), 292–299.
- Proffitt, D. R. (2006). Embodied perception and the economy of action. *Perspectives on Psychological Science, 1*(2), 110–122.
- Proffitt, D. R., Bhalla, M., Gossweiler, R., & Midgett, J. (1995). Perceiving geographical slant. *Psychonomic Bulletin & Review, 2*(4), 409–428.
- Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology, 39*(6), 1161–1178.
- Schnall, S., Harber, K., Stefanucci, J. K., & Proffitt, D. R. (2008). Social support and the perception of geographical slant. *Journal of Experimental Social Psychology, 44*, 1246–1255.
- Schnall, S., Zadra, J., & Proffitt, D. R. (in press). Direct evidence for the economy of action: Glucose and the perception of geographical slant. *Perception*.
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology, 45*(3), 513–523.
- Sedgwick, H. A. (2001). Visual space perception. In E. B. Goldstein (Ed.), *Blackwell handbook of perception* (pp. 128–156). Oxford, UK: Blackwell.
- Silvestrini, N., & Gendolla, G. H. E. (2009). Mood-regulative hedonic incentive interacts with mood and task difficulty to determine effort-related cardiovascular response and facial EMG. *Biological Psychology, 82*, 54–63.
- Stefanucci, J.K., & Proffitt, D.R. (2009). The roles of altitude and fear in the perception of heights. *Journal of Experimental Psychology: Human Perception & Performance, 35*, 424–438.
- Stefanucci, J. K., Proffitt, D. R., Banton, T., & Epstein, W. (2005). Distances appear different on hills. *Perception & Psychophysics, 67*(6), 1052–1060.
- Stefanucci, J. K., Proffitt, D. R., Clore, G. L., & Parekh, N. (2008). Skating down a steeper slope: Fear influences the perception of geographical slant. *Perception, 37*, 321–323.
- Stefanucci, J. K., & Storbeck, J. (2009). Don't look down: Emotional arousal elevates height perception. *Journal of Experimental Psychology: General, 138*, 131–145.
- Storbeck, J., & Clore, G. L. (2005). With sadness comes accuracy, with happiness, false memory: Mood and the false memory effect. *Psychological Science, 16*, 785–791.
- Watson, D., & Clark, L. A. (1992). Affects separable and inseparable: On the hierarchical arrangement of the negative affects. *Journal of Personality and Social Psychology, 62*(3), 489–505.
- Watson, D., & Clark, L. A. (1997). Measurement and mismeasurement of mood: Recurrent and emergent issues. *Journal of Personality Assessment, 68*(2), 267–296.
- Wittgenstein, L. (1922). *Tractatus Logico-Philosophicus* (C.K. Ogden, Trans.) (6.43). London: Kegan Paul Ltd.

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