# Felt Understanding and Misunderstanding Affect the Perception of Pain, Slant, and Distance

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# Felt Understanding and Misunderstanding Affect the Perception of Pain, Slant, and Distance

**Shigehiro Oishi[1], Jamie Schiller[1], and E. Blair Gross[1]**

## Abstract

We conducted two studies to examine whether the psychological states of felt understanding and misunderstanding would affect people's basic perceptions such as pain, geographical slant, and distance. As predicted, an experimentally induced sense of felt understanding relative to misunderstanding increased pain tolerance marginally and reduced the perceived distance to the target locations significantly. In Study 2, we not only replicated Study 1's findings on pain tolerance and distance perception but also found that participants in the understanding condition perceived the same hill to be significantly less steep than those in the misunderstanding condition. Our studies demonstrated that the experimentally induced feeling of misunderstanding tends to have the aversive effect on the perception of pain, geographical slant, and distance, whereas the experimentally induced feeling of understanding tends to alleviate pain, reduce the geographical slant, and the perceived distance to a target location.

## Keywords

felt understanding, perceptions, well-being

Perceptions are one's subjective experiences of sensory stimulations (e.g., how painful something feels, how steep a hill looks, Goldstein, 2007). Although objective physical conditions such as temperature and angle are the primary determinants of our perceptions, recent research shows that social conditions also affect our perceptions. Holding a husband's hand, for instance, reduces the perception of pain (Coan, Schaefer, & Davidson, 2006). Similarly, the presence of a friend reduces the perceived steepness of a hill (Schnall, Harber, Stefanucci, & Proffitt, 2008; see Balcetis & Dunning, 2010; Zhong & Leonardelli, 2008 for other examples).

But why should social conditions such as the presence of a friend affect perception? Several researchers have theorized that psychosocial conditions function just like physical conditions (Beckes & Coan, 2011; Harber, Einev-Cohen, & Lang, 2008; Harber, Yeung, & Iacovelli, 2011). Just as carrying a heavy backpack or running makes the same hill look steeper (because carrying a heavy backpack or running takes up energies; see Proffitt, 2006 for review), psychosocial conditions such as social support and self-worth alter the resources and energies available to an individual and thus alter the perception of the physical world. When an individual has lots of psychosocial resources, a potentially threatening object is not perceived as threatening because one is likely to have enough energy, resources, and support to tackle a challenge. When an individual is deprived of psychosocial resources, however, the same physical world looks more threatening because one is likely to lack energy, resources, and support. In other words, the presence of a close other provides a sense of assurance that the world is a safe place, whereas the presence of a stranger or the image of a betrayer provides a sense of vigilance that one must be careful. During the vigilance, one must spend energies in preparation for an emergency situation, whereas with the presence of a close other, one can be in an energy-saving mode (Beckes & Coan, 2011; Segerstrom, 2007).

Building on the social baseline theory (Beckes & Coan, 2011), we investigated the role of felt understanding and misunderstanding in perception. Felt understanding is the feeling that arises when one recognizes that an interaction partner has accurately and positively perceived and responded to important aspects of the self, whereas misunderstanding is the feeling that arises when one realizes that an interaction partner has inaccurately perceived important aspects of the self (Reis, Clark, & Holmes, 2004). Relationship theorists view felt understanding (i.e., the feeling of being validated, respected, and appreciated) as one of the critical steps toward the formation of intimate relationships. For instance, feeling understood by one's

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**Table 1.** Descriptive Statistics and Correlations.

| | Ice | Slope | Distance | Mean (*SD*) |
|---|---|---|---|---|
| Study 1 | | | | |
| Time in ice | ____ | −.12 | −.45** | 126.20 (63.89) |
| Slope | | ____ | −.11 | 19.73 (9.15) |
| Distance | | | ____ | −.03 (.69) |
| Study 2 | | | | |
| Time in ice | ____ | −.09 | −.23** | 120.83 (64.70) |
| Slope | | ____ | .01 | 24.34 (13.00) |
| Distance | | | ____ | .01 (.71) |

*Note.* Time in ice is in seconds. Slope is in degree. Distance is the mean of the four distance estimations (see Method section for the detail).
*$p < .05$. **$p < .01$.

romantic partner predicts relationship satisfaction (Murray, Holmes, Bellavia, Griffin, & Dolderman, 2002) and subjective well-being (Oishi, Krochik, & Akimoto, 2010).

The accurate perception provides a general feeling that there is nothing to worry about and that one can focus on the task at hand, whereas the inaccurate perception by others presents a general feeling of vigilance that one must be concerned (Swann, Rentfrow, & Guinn, 2003), which could take up lots of energies and resources. Thus, we predict that felt understanding relative to felt misunderstanding would make a typically painful task less painful, make participants perceive the same hill as less steep, and cause the same distance seem closer. We predicted that participants in the control condition who did not have an interaction partner would be similar to those in the felt understanding condition because people's default assumption is that others typically understand who they are (Beckes & Coan, 2011), just as people typically assume others to be similar to them (Byrne, Clore, & Smeaton, 1986).

## Study 1

In Study 1, we tested the causal role of felt understanding and misunderstanding in pain endurance, slant perception, and distance perception.

## Method

Participants were 49 students (29 male; 20 female; 40 European Americans) at the University of Virginia. This experiment was conducted in March and April 2010. Two participants were scheduled for each experimental session. When two participants showed up, they were randomly assigned either into the felt understanding condition ($N = 18$) or into the felt misunderstanding condition ($N = 18$; 2 were suspicious, so final $N = 16$). When only one participant showed up, this participant was assigned to the control condition, in which there was no interaction with another participant ($N = 13$).

Participants were first asked to choose 2 from a list of 10 positive personality traits that described them most accurately, and 2 that described them least accurately. The 10 traits were *hardworking*, *intelligent*, *fun loving*, *friendly*, *stubborn*, *cooperative*, *relaxed*, *leader*, *emotional*, and *rational*, which came from the earlier studies on felt understanding and misunderstanding (Oishi, Lun, & Sherman, 2007, study 2; Oishi, Koo, & Akimoto, 2008). After completing the initial questionnaire, participants in the control condition skipped to the three perception tasks described below. After completing the initial questionnaire, participants in the understanding and misunderstanding conditions moved to the center table and had an informal conversation with another participant for 8 min. Participants in the understanding and misunderstanding conditions then returned to their original seats and were instructed to give their impression of the interaction partner by circling two traits *most* descriptive and two traits *least* descriptive of their partner. The experimenter collected each impression sheet and appeared to swap them between participants but in reality gave participants a previously prepared false impression sheet: participants in the understanding condition received the sheet where the traits circled were the exact same ones they circled on the initial questionnaire when describing themselves; participants in the misunderstanding condition received the sheet where the traits circled were the exact opposite of what they chose to describe themselves. Participants then read their "partner's" impression sheet and completed a postinteraction questionnaire that asked them to rate how accurate the impression was, how much they felt understood (*understood*, *appreciated*, *validated*, and *respected* $\alpha = .90$), misunderstood (*misunderstood*, *ignored*, *alienated*, *judged*, and *misperceived* $\alpha = .88$), how much they liked the partner, how they were feeling at this time on three positive moods (*happy*, *pleasant*, and *energetic*, $\alpha = .83$) and two negative moods (*sad* and *unpleasant*, $\alpha = .73$)[1] on a scale from 1 (*not at all*) to 7 (*a lot*).

Then, each participant completed a cold pressor task (Brown, Sheffield, Leary, & Robinson, 2003). Participants were instructed to fully submerge their nondominant hand into the ice water (between 35°F and 36°F or 1.67°C and 2.22°C) for up to 3 min or as long as they could tolerate the pain, while their interaction partner remained in their original seat facing the opposite direction of the center table. Next, to test slant perception, participants followed the experimenter outside and completed a verbal hill slant estimation task at the base of a 5 degree hill (the same hill used in Bhalla & Proffitt, 1999), while their interaction partner stayed roughly 50 feet away from the participants. Four participants did not complete the slope task because of heavy rain. Finally, participants returned to their original seats in the lab and completed written distance estimation tasks where they estimated how far Thomas Jefferson's Monticello and Charlottesville's Downtown Mall are and how long it would take to walk to Monticello and Downtown, respectively. Because the distribution of distance estimates was highly skewed (Skewness > 2 and Kurtosis > 7), we used a square root transformation, standardized the scores, then took the mean of the four standardized distance estimates ($M = -.03$, $SD = .69$; Skewness = 0.88, Kurtosis = 0.51, $\alpha = .66$). Six participants ran out of time to complete the final distance task. At the end of the experiment, the experimenter probed the participants for any suspicion by asking "Was there

anything weird or unusual about the experiment that you noticed?'' Two participants thought that the partner had erroneously filled out the impression sheet, thus these participants were excluded from the following analyses.

## Results and Discussion

The manipulation was successful, as participants in the understood condition reported that the feedback was more accurate than those in the misunderstood condition, $t(32) = 6.07$, $p < .001$, $d = 2.15$. Also, as intended, participants in the understood condition indeed reported feeling more understood by the interaction partner than those in the misunderstood condition, $t(32) = 6.11$, $p < .001$, $d = 2.16$. Furthermore, those in the misunderstood condition reported feeling more misunderstood by the interaction partner than those in the understood condition, $t(32) = 4.36$, $p < .001$, $d = 1.54$.

Consistent with previous research (Brown et al., 2003), male participants were able to put their hands in the cold water for a longer period of time than female participants, $t(45) = 3.83$, $p < .001$, $d = 1.14$. Also consistent with previous research (Bhalla & Proffitt, 1999), male participants perceived the hill to be less steep than did female participants, $t(41) = -2.35$, $p = .02$, $d = 0.73$. However, we did not find any gender differences in the distance estimation, $t(39) = -.68$, $p = .50$, $d = 0.22$. The descriptive statistics and correlations among the three dependent variables are shown in Table 1.

### Hypothesis Testing

In our experiment, participants were nested within pairs and the independence assumption (all observations were independent) was likely to be violated. Thus, we tested our main hypotheses by conducting multilevel analysis using HLM 6.04. Because the preliminary analyses above revealed the effect of gender, we included it as Level 1 predictor.

Level 1 (within pair)

$$\text{Time in ice water} = \beta_0 + \text{gender} \times \beta_1 + e,$$

Level 2 (between pair)

$$\beta_0 = \gamma_{00} + \gamma_{01} \times \text{understanding} + u,$$

$$\beta_1 = \gamma_{10} + \gamma_{11} \times \text{understanding},$$

where gender was coded as follows: *female* = 0; *male* = 1. Because we predicted that control participants would fall in between the misunderstanding and understanding condition, the experimental condition was coded as follows: *misunderstanding* = −1; *control* = 0; *understanding* = +1.

This multilevel analysis showed that participants in the felt understanding condition were able to put their hands in ice water for a marginally significantly longer period of time than did those in the misunderstanding condition, $\gamma_{01} = 21.71$ ($SE = 13.02$), $t(29) = 1.67$, $p = .10$. Although the statistical significance was marginal, the effect size was far from trivial; individuals in the felt understanding condition were able to put their hands in ice water for nearly 45 s longer in a 3-min task than those randomly assigned to the felt misunderstanding condition ($d = 0.94$; see Figure 1). Next, as predicted, participants in the felt understanding condition perceived the same target locations as significantly closer than those in the felt misunderstanding condition, $\gamma_{01} = -.45$ ($SE = .168$), $t(26) = -2.68$, $p = .01$, $d = 0.76$. Participants in the felt understanding condition estimated the distance to Monticello, the home of Thomas Jefferson, to be nearly 5 miles shorter than those in the misunderstanding condition. Finally, the multilevel analysis on the slope perception did not support our hypothesis, $\gamma_{01} = -1.69$ ($SE = 2.33$), $t(27) = -0.72$, $p = .48$. Although nonsignificant, those in the understanding condition perceived the same hill to be 4.41 degrees less steep than those in the misunderstanding condition ($d = 0.49$).

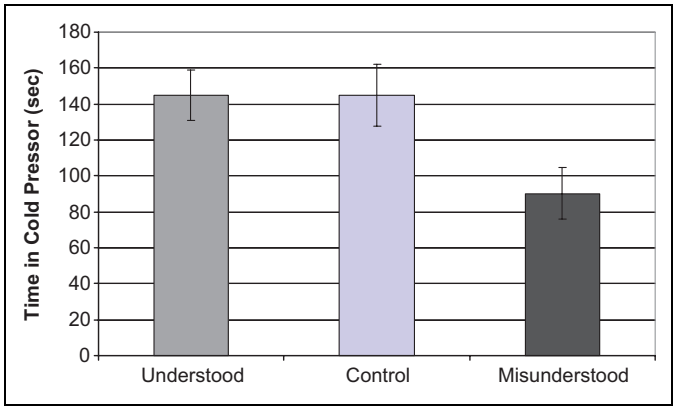


**Figure 1.** Time in the cold pressor task in Study 1.

We next considered two alternative hypotheses regarding our findings. One possibility is that our manipulation of felt understanding/misunderstanding changed the liking of the partner, which in turn affected the perceptions of pain and distance. That is, it could have been the sense of liking rather than the sense of understanding/misunderstanding per se that drove the key findings. Thus, we ran another series of HLM analyses, this time adding the liking rating to Level 1 of the model above. The addition of the liking rating in Level 1 did not affect the impact of felt understanding/misunderstanding on the distance perception, as it remained significant, $\gamma_{01} = -.52$ ($SE = .205$), $t(14) = -2.55$, $p = .02$. In the case of the cold pressor task, the addition of the liking rating in Level 1 made the effect of felt understanding/misunderstanding even stronger, $\gamma_{01} = 34.53$ ($SE = 13.22$), $t(16) = 2.61$, $p = .02$. Thus, our findings are not due to the liking of the partner.

The second alternative explanation is that the felt understanding/misunderstanding feedback changed participants' moods, which in turn influenced pain perception and distance perception. Previous studies showed that moods affect geographical slant perceptions (Riener, Stefanucci, Proffitt, & Clore, 2011) and pain tolerance (Weisenberg & Tal Raz, 1998). Thus, we included positive and negative moods to Level 1. Even controlling for both positive and negative moods, participants in

the understanding condition put their hands in icy water for a marginally longer period of time than those in the misunderstanding condition, $\gamma_{01} = 29.14$ ($SE = 14.757$), $t(17) = 1.98$, $p = .06$. In contrast, the effect of felt understanding and misunderstanding manipulation on distance perception disappeared, once both positive and negative moods were statistically controlled for, $\gamma_{01} = -.28$ ($SE = 0.216$), $t(15) = -1.32$, $p = .21$. In some, the effect of felt understanding/misunderstanding manipulation on pain perception and distance perception was independent of the liking of the partner. The effect of felt understanding/misunderstanding on pain perception was also present above and beyond current moods.

In short, we found initial support for our predictions in two of the three outcome measures and the mean effect size across the three perception tasks was quite substantial (mean $d = 0.73$). We note four potential limitations to the current study. First, the sample size was modest due to the fact that this experiment was run in the end of the spring semester. Second, we did not separate male and female participants in the current experiment, and we had only female experimenters in this study. Although we did not find any differences between participants in the mixed sex pairs and the same sex pairs in any of the perception tasks, it is possible that such a factor might play a role. Third, the lack of the significant finding in the slant perception could be due to the fact that participants in the previous studies (Bhalla & Proffitt, 1999; Schnall et al., 2008) carried a heavy backpack when they estimated the slant, whereas our participants did not carry anything. Adding heavy backpack burdens participants, which affords the opportunity for psychosocial resources to alter perceptions. Fourth, we did not include any fitness measures in our study. Previous studies (Bhalla & Proffitt, 1999) suggest that one's fitness level affects pain tolerance and slant perceptions.

## Study 2

We conducted Study 2 to address the limitations of Study 1. First, to increase the power, we substantially increased our sample size from 49 to 202. Second, we had a male experimenter run male participants and a female experimenter run female participants. Also, male and female participants were run separately to reduce the potential influence of cross-gender dynamics. Third, participants in Study 2 carried a backpack roughly 20% of their weight while estimating the slant. Fourth, we measured participants' fitness, so as to control for individual differences in fitness.

## Method

Participants were 202 undergraduate students at the University of Virginia. The sample consisted of 90 men (44.6%) and 112 women (55.4%). Out of the 202 participants, 112 self-identified as European American, 55 self-identified as Asian or Asian American, 14 self-identified as African American, 7 self-identified as Hispanic, 12 as "other." Postexperiment probing indicated that 20 participants were suspicious that the feedback was fake and 4 additional participants had known the interaction partner very well prior to the experiment and suspected the feedback. Thus these participants were excluded from our analyses (resulting in 71 participants in the understanding condition; 67 participants in the misunderstanding condition, and 40 participants in the control condition).

The experiment was conducted from September to November 2010. The procedure was essentially identical to Study 1, with the changes described above. Five participants did not complete the slant task because of the heavy rain. Two participants did not complete the final, distance task because they ran out of time. Physical fitness was assessed by 5 items: "If you were asked right now to do as many pushups as possible, how many do you think you would be able to do?" "If you were asked right now to jog as far as possible without stopping, how many miles do you think you would be able to run?" "Considering a 7-day period, how many times on the average do you do strenuous exercise (heart beats rapidly) for more than 15 minutes?" "Considering a 7-day period, how many times on the average do you do moderate (no exhausting) exercise for more than 15 minutes?" and "Considering a 7-day period, how many times on the average do you do mild (minimal effort) exercise for more than 15 minutes?" We first standardized each response and combined them to create a measure of physical fitness (Cronbach's $\alpha = .59$). Manipulation check, moods, and liking of the partner items were identical to those used in Study 1: felt understood ($\alpha = .88$), felt misunderstood ($\alpha = .84$), positive affect ($\alpha = .84$), and negative affect ($\alpha = .61$). As the distribution of the distance estimation variables was again highly skewed, we used the same procedure as in Study 1 to compute the mean distance estimate ($M = .01$, $SD = .71$; $\alpha = .65$).

## Results and Discussion

First, the manipulation of felt understanding and misunderstanding was again successful, on ratings of accuracy, $t(135) = 13.00$, $p < .001$, $d = 2.24$, felt understanding, $t(135) = 8.35$, $p < .001$, $d = 1.42$, and misunderstanding, $t(135) = -7.66$, $p < .001$, $d = 1.32$. Second, as predicted, Study 2 participants perceived exactly the same hill to be roughly 5 degrees steeper than Study 1 participants because Study 2 participants carried the heavy backpacks (Proffitt, 2006), $M_{\text{study 2}} = 24.34$, $SD = 13.00$ vs. $M_{\text{study 1}} = 19.73$, $SD = 9.15$, $t(218) = 2.26$, $p = .02$, $d = 0.31$. Third, again replicating Study 1, male participants were able to put their hands in the ice water for a longer period of time than were female participants, $t(176) = 4.89$, $p < .001$, $d = 0.74$. Also, male participants perceived the same hill to be less steep than did female participants, $t(171) = -3.63$, $p < .001$, $d = 0.56$. As in Study 1, there were no gender differences in the perceived distance to the target locations, $t(174) = 1.26$, $p = .21$, $d = 0.19$. Thus, Study 2 perfectly replicated the findings from Study 1 on these manipulation checks and gender differences.

Unlike Study 1, Study 2 participants were diverse. Thus, we examined whether the ethnic background of participants made any difference on the three perception tasks. Our European

American participants were able to put their hands in ice water for a longer period of time than were non-European Americans, $t(176) = -3.25$, $p = .001$, $d = 0.49$ (no difference among African Americans, Asian Americans, or Hispanic Americans). They also perceived the target locations to be closer than non-European Americans, $t(174) = 2.56$, $p = .01$, $d = 0.39$. There were no differences in their slope estimations, however, $t(171) = -0.36$, $p = .72$, $d = 0.06$. Finally, as predicted, individuals who were more fit were able to tolerate pain for a longer period of time than those who were less fit, $r = .35$, $p < .001$, and perceived the distance to the target locations to be shorter than those who were less fit, $r = -.23$, $p = .002$. However, there was no association between one's fitness and slant perception, $r = -.09$, $p = .27$. The descriptive statistics and correlations among the three dependent variables are shown in Table 1.

### Hypothesis Testing

Because the preliminary analyses above revealed effects of gender, race, and fitness, we included these as Level 1 predictors. The model we ran was as follows:

Level 1 (within pair)

$$\text{Time in ice water} = \beta_0 + \text{gender} \times \beta_1 + \text{fitness} \times \beta_2 + \text{race} \times \beta_3 + e,$$

Level 2 (between pair)

$$\beta_0 = \gamma_{00} + \gamma_{01} \times \text{understanding} + u,$$

$$\beta_1 = \gamma_{10} + \gamma_{11} \times \text{understanding},$$

$$\beta_2 = \gamma_{20} + \gamma_{21} \times \text{understanding},$$

$$\beta_3 = \gamma_{30} + \gamma_{31} \times \text{understanding},$$

where gender and race were coded as follows: *Female* = 0; *Male* = 1; *non-European Americans* = 0; *European Americans* = 1, and Understanding (*misunderstanding* = −1; *control* = 0; *understanding* = +1). The fitness level was grand centered.

Our hypothesis was supported on all three outcome measures. As in Study 1, participants in the understanding condition were able to put their hands in icy water for a longer period of time than those in the misunderstanding condition, $\gamma_{01} = 22.32$ ($SE = 9.26$), $t(111) = 2.41$, $p = .02$. The adjusted mean difference in time in ice water between the understood and misunderstood conditions was 44.62 s. Like the cold pressor task, participants in the understood condition perceived the same hill to be less steep than those in the misunderstood condition, $\gamma_{01} = -5.31$ ($SE = 1.96$), $t(111) = -2.71$, $p = .01$ (see Figure 2). Finally, as predicted, participants in the felt understanding condition perceived the target locations to be closer than those in the felt misunderstanding condition, $\gamma_{01} = -0.23$ ($SE = 0.11$), $t(111) = -2.08$, $p = .04$ (see Figure 3). For instance, participants in the understanding condition estimated the distance to Monticello to be more than 4 miles shorter than those in the misunderstanding condition. Thus, as predicted, participants in the felt understanding condition perceived the icy water to be less painful, the same hill to be less steep, and the same distance to be shorter than those in the felt misunderstanding condition. Also, as predicted, those in the control condition were generally similar to those in the felt understanding condition.

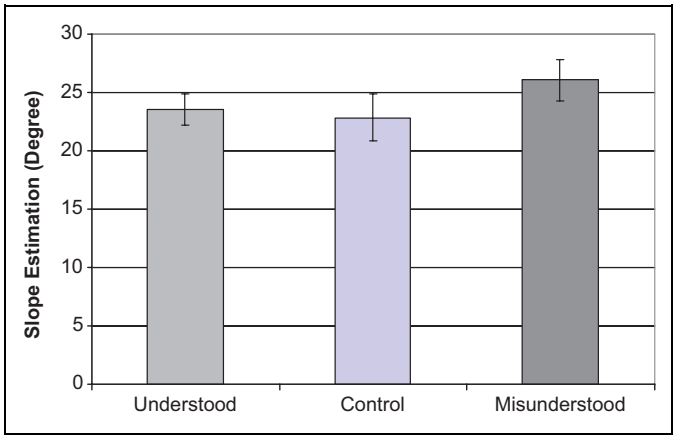


**Figure 2.** Slope estimation in Study 2. The hill was 5 degrees.

As in Study 1, we examined two alternative hypotheses. The effect of understanding/misunderstanding remained significant on pain perception, $\gamma_{01} = 20.97$ ($SE = 9.85$), $t(70) = 2.13$, $p = .04$, and on slope perception, $\gamma_{01} = -5.56$ ($SE = 2.03$), $t(68) = -2.74$, $p = .01$, and marginally significant on distance perception, $\gamma_{01} = -0.20$ ($SE = 0.12$), $t(70) = -1.69$, $p = .10$, controlling for liking of the partner, as well as gender, race, and fitness. The effect of understanding/misunderstanding manipulation remained also significant on pain perception, $\gamma_{01} = 22.84$ ($SE = 9.84$), $t(70) = 2.32$, $p = .02$, slope perception, $\gamma_{01} = -5.52$ ($SE = 1.98$), $t(68) = -2.78$, $p = .01$, and distance perception, $\gamma_{01} = -0.24$ ($SE = 0.12$), $t(70) = -2.07$, $p = .04$, controlling for positive and negative moods, as well as gender, race, and fitness. In sum, Study 2 provided strong support for our hypothesis for all three perception tasks. It was also noteworthy that our findings remained significant, controlling for the two alternative processes (liking of the partner as well as positive and negative moods).

## General Discussion

We conducted two studies in order to examine whether the psychological states of felt understanding and misunderstanding would affect our basic perceptions such as pain, geographical slant, and distance. Building on recent studies on embodied cognition and perception (e.g., Balcetis & Dunning, 2010; IJzerman & Semin, 2009; Proffitt, 2006; Schnall et al., 2008; Williams & Bargh, 2008; Zhong & Leonardelli, 2008), we

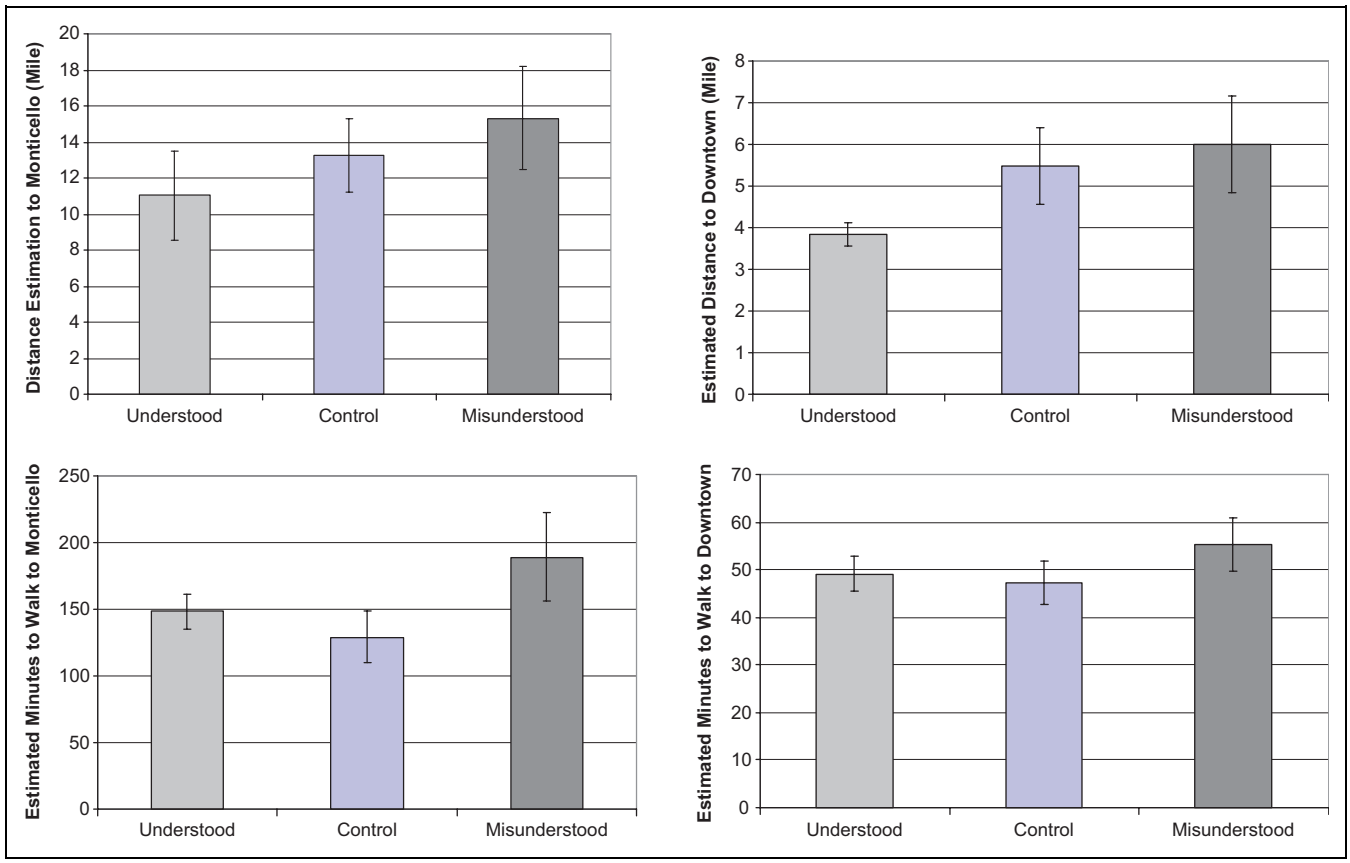


**Figure 3.** Distance estimations in Study 2. The actual distance to Monticello is 6.5 miles. The Google Map's estimated time to walk to Monticello is 125 min. The actual distance to Downtown is 2 miles, and the Google Map's estimated time to walk is 39 min.

found that an experimentally induced sense of felt understanding would increase pain tolerance and reduce the perceived distance to the target locations relative to an experimentally induced sense of felt misunderstanding in both studies. With the modified slant perception task in Study 2, we also found support for our hypothesis that participants in the understanding condition perceived the same hill to be less steep than those in the misunderstanding condition. We were also able to demonstrate that the effect of felt understanding and misunderstanding on these perception tasks went beyond the liking of the partner and positive and negative moods.

We speculate that the accurate perception provides a general feeling that the world is a safe place and that one can focus on the task at hand, whereas the inaccurate perception by others presents a general feeling of vigilance that one must be concerned (Swann et al., 2003). The interaction with a stranger could be like an interaction with a close other, if one knows that the other person understands him or her. The interaction with a stranger who misunderstood him or her could be like an interaction with a threatening person. To the extent that the state of vigilance requires energies (lots of calories; Segerstrom, 2007), and to the extent that caloric resources available affects one's perception (Schnall, Zadra, & Proffitt, 2010), felt misunderstanding could give rise to an exaggerated perception of the icy water, hill, and distance. It is also possible that felt understanding and misunderstanding change skin temperature, which then made the icy water more or less tolerable, as social exclusion has been shown to lower skin temperature (IJzerman, Gallucci, Pouw, Weissgerber, Van Doesum, & Williams, in press). These explanations (caloric and skin temperature) need to be tested in the future.

There are several important implications of the current findings. First, slant and distance estimations reflect people's action potentials—whether to walk up the hill and whether to walk to the destination or not (Proffitt, 2006). These action potentials in turn signal an individual's sense of efficacy toward the task at hand, climbing, walking, or enduring pain. In this sense, we have identified that felt understanding and misunderstanding have a causal influence on a subtle sense of efficacy by changing the visual and geographical world that we face every day. Combined with an earlier finding that people experience fewer physical symptoms when they feel understood by others (Lun, Kesebir, & Oishi, 2008), then felt understanding appears to nurture a sense of efficacy and make people physically stronger (in the sense that they can tolerate pain more and perceive the world as more approachable). In contrast, felt misunderstanding appears to generate a sense of ineptitude and make people physically weaker. As articulated by Berscheid (2003), aid from others is key to survival, and the greatest human strength might indeed be other humans.

Whereas previous studies were ambiguous regarding why the presence of close others helps reduce pain (Coan et al., 2006; Master et al., 2009) or makes people perceive hills as less steep (Schnall et al., 2008; see however Harber et al., 2011 for the explanation based on self-worth), our studies illuminate one specific psychological mechanism, namely felt understanding and misunderstanding as a potential key link between the presence of others and perceptions.

Second, it appears that the difference between felt understanding and misunderstanding is driven largely by the felt misunderstanding condition. That is, an experimentally induced feeling state of misunderstanding decreases pain tolerance and exaggerates the slope and the distance to the target locations. Thus, our findings could be interpreted as felt misunderstanding causing people to see the world more challenging. As is often the case, our findings then showed that negative is stronger than positive (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Cacioppo, Gardner, & Berntson, 1999; Oishi, Diener, Choi, Kim-Prieto, & Choi, 2007; Rozin & Royzman, 2001). Although this interpretation is highly plausible, it is also important to note that the similarities between the felt understanding and the control conditions could be driven by the general tendency that participants' default state of mind might be closer to the felt understanding condition than misunderstanding (Beckes & Coan, 2011). Just as people typically assume others to be similar to them (Byrne et al., 1986), people typically assume others would understand them. Like in the similarity-attraction literature (Rosenbaum, 1986), due to the default state of the mind being similar to the felt understanding condition, it might be more challenging to demonstrate the power of felt understanding, and that our experiments might be underestimating the positive effect of felt understanding on perceptions. It is critical to test the assumption that people expect others to understand them in the future.

Third, it is also important to test the generalizability of the current findings, to see whether the effect of felt understanding and misunderstanding might vary across developmental stages and cultures. For instance, it is possible that felt misunderstanding is particularly aversive to young adults, or cultural groups that emphasize interpersonal harmony (cf. Lun, Oishi, Coan, Akimoto, & Miao, 2010). Finally, it is important in the future to examine whether the previously reported link between felt understanding and physical health (Lun et al., 2008) is mediated by pain tolerance and slant and distance perceptions.

Despite some limitations, we did find key instances of support for our overall hypothesis: With no other systematic differences, manipulation of felt understanding/misunderstanding alone was enough to affect perception of distances and slants and to enable people to endure pain for longer. Not only do these findings further bolster the literature touting the importance of others in daily life (Berscheid, 2003), they contribute to explaining a specific psychological component that might be critical in the link between social relationships and well-being found in previous research (Diener & Seligman, 2002; House, Landis, & Umberson, 1988). Social interactions with a stranger that are validating and nonjudgmental create a sense of felt understanding, which can make the world look more benevolent, whereas new interactions that create a sense of felt misunderstanding can cause individuals to feel that the physical world is challenging.

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## Note

1. Another negative mood item, "tired" was included in the questionnaire. However, Cronbach's α was less than .50 when "tired" was included. Thus, we excluded this item in Study 1. The relation between negative mood and three perception tasks is not different, depending on the inclusion or exclusion of this item.

## References

Balcetis, E., & Dunning, D. (2010). Wishful seeing: Desired objects are seen as closer. *Psychological Science*, *21*, 147–152.

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, *4*, 323–370.

Beckes, L., & Coan, J. A. (2011). Social baseline theory: The role of social proximity in emotion and economy of action. *Social and Personality Psychology Compass*, *5*, 976–988.

Berscheid, E. (2003). The human's greatest strength: Other humans. In *A psychology of human strengths: Fundamental questions and future directions for a positive psychology* (pp. 37–47). Washington, DC: American Psychological Association.

Bhalla, M., & Proffitt, D. R. (1999). Visual–motor recalibration in geographical slant perception. *Journal of Experimental Psychology: Human Perception and Performance*, *25*, 1076–1096.

Brown, J. L., Sheffield, D., Leary, M. R., & Robinson, M. E. (2003). Social support and experimental pain. *Psychosomatic Medicine*, *65*, 276–283.

Byrne, D., Clore, G. L., & Smeaton, G. (1986). The attraction hypothesis: Do similar attitudes affect anything? *Journal of Personality and Social Psychology*, *51*, 1167–1170.

Cacioppo, J. T., Gardner, W., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology*, *76*, 839–855.

Coan, J. A., Schaefer, H. S., & Davidson, R. J. (2006). Lending a hand: Social regulation of the neural response to threat. *Psychological Science*, *17*, 1032–1039.

Diener, E., & Seligman, M. E. P. (2002). Very happy people. *Psychological Science*, *13*, 81–84.

Goldstein, E. B. (2007). *Sensation and perception*. Belmont, CA: Wadsworth.

Harber, K. D., Einev-Cohen, M., & Lang, F. (2008). They heard a cry: Psychosocial resources moderate perception of others' distress. *European Journal of Social Psychology*, *38*, 296–314.

Harber, K. D., Yeung, D., & Iacovelli, A. (2011). Psychosocial resources, threat, and the perception of distance and height: Support for the Resources and Perception Model. *Emotion*, *11*, 1080–1090.

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, *241*, 540–545.

IJzerman, H., Gallucci, M., Pouw, W. T. J. L., Weissgerber, S. C., Van Doesum, N. J., & Williams, K. D. (in press). Cold-blooded loneliness: Social exclusion leads to lower finger temperatures. *Acta Psychologica*.

IJzerman, H., & Semin, G. R. (2009). The thermometer of social relations: Mapping social proximity on temperature. *Psychological Science*, *10*, 1214–1220.

Lun, J., Kesebir, S., & Oishi, S. (2008). On feeling understood and feeling well: The role of interdependence. *Journal of Research in Personality*, *42*, 1623–1628.

Lun, J., Oishi, S., Coan, J. A., Akimoto, S., & Miao, F. F. (2010). Cultural variations in motivational responses to felt misunderstanding. *Personality and Social Psychology Bulletin*, *36*, 986–996.

Master, S. L., Eisenberger, N. I., Taylor, S. E., Naliboff, B. D., Shirinyan, D., & Lieberman, M. D. (2009). A picture's worth: Partner photographs reduce experimentally induced pain. *Psychological Science*, *20*, 1316–1318.

Murray, S. L., Holmes, J. G., Bellavia, G., Griffin, D. W., & Dolderman, D. (2002). Kindred spirits? The benefits of egocentrism in close relationships. *Journal of Personality and Social Psychology*, *82*, 563–581.

Oishi, S., Diener, E., Choi, D.W., Kim-Prieto, C., & Choi, I. (2007). The Dynamics of daily events and well-being across cultures: When less is more. *Journal of Personality and Social Psychology*, *93*, 685–698.

Oishi, S., Koo, M., & Akimoto, S. (2008). Culture, interpersonal perceptions, and happiness in social interactions. *Personality and Social Psychology Bulletin*, *34*, 307–320.

Oishi, S., Krochik, M., & Akimoto, S. (2010). Felt understanding as a bridge between close relationships and subjective well-being: Antecedents and consequences across individuals and cultures. *Social and Personality Psychology Compass*, *4*, 403–416.

Oishi, S., Lun, J., & Sherman, G. D. (2007). Residential mobility, self-concept, and positive affect in social interactions. *Journal of Personality and Social Psychology*, *93*, 131–141.

Proffitt, D. R. (2006). Embodied perception and the economy of action. *Perspectives on Psychological Science*, *1*, 110–122.

Reis, H. T., Clark, M. S., & Holmes, J. G. (2004). Perceived partner responsiveness as an organizing construct in the study of intimacy and closeness. In D. J. Mashek & A. P. Aron (Eds.), *Handbook of closeness and intimacy* (pp. 201–225). Mahwah, NJ: Lawrence Erlbaum Associates.

Riener, C., Stefanucci, J., Proffitt, D. R., & Clore, G. (2011). An effect of mood on the perception of geographical slant. *Cognition and Emotion*, *25*, 174–182.

Rosenbaum, M. E. (1986). The repulsion hypothesis: On the nondevelopment of relationships. *Journal of Personality and Social Psychology*, *51*, 1156–1166.

Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, *5*, 296–320.

Schnall, S., Harber, K. D., 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. R., & Proffitt, D. R. (2010). Direct evidence for the economy of action: Glucose and the perception of geographical slant. *Perception*, *39*, 464–482

Segerstrom, S. C. (2007). Stress, energy, and immunity: An ecological view. *Current Directions in Psychological Science*, *16*, 326–330.

Swann, W. B. Jr., Rentfrow, P. J., & Guinn, J. S. (2003). Self-verification: The search for coherence. In M. R. Leary & J. P. Tangney (Eds.), *Handbook of self* and identity (pp. 367–383). New York, NY: Guilford Press.

Weisenberg, M., & Tal Raz, T. H. (1998). The influence of film-induced mood on pain perception. *Pain*, *76*, 365–375.

Williams, L. E., & Bargh, J. A. (2008). Experiencing physical warmth promotes interpersonalwarmth. *Science*, *322*, 606–607.

Zhong, C. B., & Leonardelli, G. J. (2008). Cold and lonely: Does social exclusion literally feel cold? *Psychological Science*, *19*, 838–842.