Perceptions of Body Posture and Emotion:
A Question of Methodology

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Abstract ~ The current study questions whether the emotions that people associate with body postures change depending on how they are asked to identify the stimulus. The Diagnostic Analysis of Nonverbal Accuracy Test of Posture (DANVA2-POS) is used as the standard by which to rate people's agreement levels. Thirty participants were randomly allocated to 3 response conditions: A forced-choice option where participants chose from 4 emotions (happy, sad, angry, fearful), a forced-choice option with a "none of the above" option, and an open-ended option. Comparisons of the results indicate that the "none of the above" option produces significantly less agreement than the other forced-choice option, while the open-ended response format elicits even lesser agreement.

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Introduction

To what extent do people agree on which emotions are associated with specific body postures? The literature suggests that people agree at above chance levels (Coulson, 2004; De Silva & Bianchi-Berthouze, 2004; Ekman, 1965; Ekman & Friesen, 1967; Pitterman & Nowicki, 2004; Schouwstra & Hoogstraten, 1995; Wallbott, 1998), based on studies that have asked participants to judge images of various body postures. The majority of the data gathered from these studies is based on the use of a forced-choice approach. That is, after being shown an image of a posture, participants are asked to choose from a list of emotions to describe particular postures. This paper suggests this approach overestimates people's agreement.

It is unclear which methodology would be best to test people's accuracy in recognizing the emotions associated with particular body postures. Part of the problem is that there is no definite agreement among researchers as to which emotions are associated with which body postures. Underlying this disagreement is the question of what the basic emotions are and whether they are universal (Ekman, 1992, 1994; Izard, 1994; Otony & Turner, 1990, 1992; Panskepp, 1992; Russell, 1994). Researchers have used emotions as a standard to test people's recognition of various non-verbal cues. Unfortunately, this standard seems to vary from study to study. Both the number of basic emotions and the terms used to describe them seem to differ depending on the author. Ekman's original basic emotions consisted of happiness, anger, fear, sadness, surprise, and disgust. Studies on body posture and emotion have used a range of four to seven basic emotions and have included emotions other than Ekman's original six, such as shame, pride, and confusion (see Coulson, 2004; De Silva & Bianchi-Berthouze, 2004; Keltner & Shiota, 2003; Pitterman & Nowicki, 2004; Schouwstra & Hoogstraten, 1995;

Wallbott, 1998). This causes difficulties in comparing results across studies.

Additional problems arise when one looks at how the stimulus is administered in these studies. There has been some debate about the reliability of fixed poses versus spontaneous poses (Russell, 1994; Wallbott, 1998; Wallbott & Scherer, 1986), as well as whether still photographs represent emotions as accurately as video (Ekman, 1967, Wallbott & Scherer, 1998). In the same vein, there is disagreement regarding whether actors should be used to portray emotions as opposed to behavioral observation, citing that an actor's representations as possibly being too simulated or stereotyped (Wallbott, 1998; Wallbott & Scherer, 1986). The participant's perspective on the particular body posture is also of some concern. Not surprisingly, viewpoint can play an important role in how a person recognizes a particular emotion from a posture. There is some evidence to suggest that some postures do not elicit the same response when viewed from different angles (Coulson, 2004; Daems & Verfaillie, 1999).

This study focuses on the question of how research participants are asked to identify body postures. In the few studies looking specifically at people's recognition of emotion in body posture (Coulson, 2004; De Silva & Bianchi-Berthouze, 2004; Kudoh & Matsumoto, 1985; Pitterman & Nowicki, 2004; Schouwstra & Hoogstraten, 1995), various versions of Ekman's basic emotions have been used as a forced-choice model of assessing people's agreement levels. This is surprising considering that the way a question is asked can drastically change a person's response (For reviews, see, e.g., Clark & Schober, 1991; Schwarz, 1999; Sudman & Bradburn, 1982). The literature suggests that there are vast differences between providing participants with forced-choice options, offering a "don't know" option, or utilizing an open-ended format (see Russell, 1994). Interestingly, in the first published experiment on emotion and posture judgment, James

(1932) used an open-ended methodology. Unfortunately, although there seemed to be some agreement, generalizability of the results was unclear due to a small sample size. Few posture and emotion studies have made use of this methodology since.

Research on facial expression and emotion has explored the issue of how the framing of a question affects the results of the studies. Differences have been found when using open versus closed formats (Russell, 1994). Specifically, when comparing responses to forced-choice versus open-ended, the open-ended format tends to yield less agreement and more use of non-emotion words. For example, labels including "disgust" and "bored" were often given for "contempt" expressions, while "frustration" was most often used to describe "anger" expressions (Russell, 1994). Yet there are those who assert that although differences exist, agreement levels using the open-ended option are still high enough to justify consideration (Haidt & Keltner, 1999; Izard, 1994; Rosenberg & Ekman, 1995). This matter has been largely ignored in studies looking at recognition of body postures and emotion. It is clear that the implications of these questions warrant exploration.

This study aims to examine whether the format of the question elicits different responses to images of body postures. To do this, the Diagnostic Analysis of Nonverbal Accuracy Test of Posture (DANVA2-POS) was used as a stimulus to measure judgment accuracy. The original test asks participants to categorize photographs of people in various postures by choosing from four options: happy, sad, angry, and fearful. The current study contrasts this forced-choice methodology with the option to select "none of the above" and an open-ended format. Participant's agreement was determined by comparing responses to the DANVA2-POS between the three different conditions.

Method

Participants
Thirty people participated in this study; 13 were male and 17 were female. All were 18 years of age or older. Ages ranged from 19 to 56, with a mean age of 29. Participants were recruited from the New York City metropolitan area by targeted emails, flyer postings, and via word-of-mouth.   There were 22 White/Caucasian, 3 Black/African-American, and 1 Asian/ Pacific Islander participants; 4 participants identified themselves belonging to an "Other" ethnic group. Five participants had high school diplomas, seventeen had college diplomas, and eight had graduate degrees.

Apparatus and Procedure
Each of the twenty-four photos of body postures, taken from the DANVA2-POS, was flashed for 2 seconds on a computer screen using Superlab. Participants were asked to view each photo and respond on a paper answer sheet. Participants received one of three possible answer sheets, each of which gave them the opportunity to address the emotion that they thought best corresponded with the appropriate posture.

Answer sheet A provided the Pitterman and Nowicki (2004) multiple-choice format where participants were asked to choose from four emotions: happy, sad, angry, or fearful. Answer sheet B was the same except a "none of the above" option was also available. Answer sheet C was completely open-ended. In this format, participants were asked to describe the emotion or feeling they associated with each posture. The different conditions were randomly assigned.

After the consent form was signed and demographic questions were answered, participants did a practice trial of the experiment

to become familiar with how to respond to the stimuli. Three nonsense pictures were used during the practice sequence so as not to bias the participants' later judgments. Each picture appeared for 2 seconds after the participant pressed the space bar. The next picture did not appear until the participant pressed the space bar again, leaving ample time to provide responses on the answer sheet. Once the participant appeared to be comfortable with the experimental process, the actual experiment was initiated. Participants were left to respond to the stimuli in a quiet room, but were told that the experimenter would be in the next room if they had any questions or concerns.

Results

Responses in all three conditions were compared to the standard set of correct answers provided in the DANVA2-POS manual. Open-ended responses were analyzed based on a coding system developed for the purposes of this study. Responses were coded based on whether they included: 1) the emotion standard or a derivation of the standard (e.g., sadness = sad), 2) a synonym of the standard (e.g., scared = fear), 3) any of Ekman's standard emotions (happy, sad, fear, angry, surprise, disgust), 4) anything classifiable as an emotion (e.g., upset, nervous, grumpy), 5) non-emotions (e.g., "It looks like he is anticipating something," "He is thinking about something.").

Results indicate that people's ratings of postures differ significantly in the three different conditions. People whose response options included "don't know" were reliably less likely to agree with the standard (55.0%) than people without a "none of the above" option (70.8%) (contrast $F(1,27) = 5.91$, $p= .023$). People whose response options were open-ended spontaneously generated the emotion words used as the standard (or derivations of those words) far less often (for 11.2% of the photos) than they agreed with the standard even with the none of the above option

(55.0%) (contrast $F(1,27) = 55.11$, $p< .0001$).   People sponta-
neously generated the emotion words used as the standard or syn-
onyms of those words far less often (for 20.9% of photos) than
they agreed with the standard even with the don't know option
(55.0%) (contrast $F(1,27)=30.25$, $p<.0001$) (see Figure 1).

Figure 1. Mean percentage of agreement for condition 1
(original), condition 2 ("none of the above" option), and
condition 3 (self-generated standard or synonym).
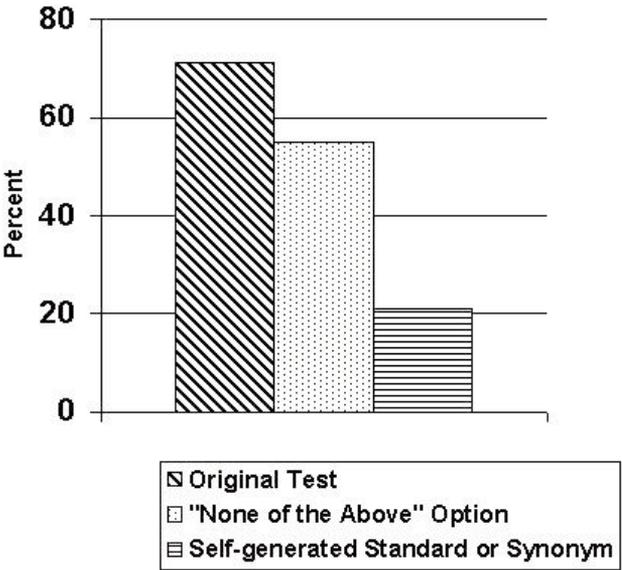
An alternate explanation of the self-report data is to exclude the
responses where people did not use any emotion words (which
was a surprisingly high percentage of the time (92%) which sug-
gests that the majority of people's spontaneous reactions to the
photographs do not fall within the categories of happiness, anger,
sadness, and fearfulness).   Based on the emotions that people
reported (when they reported any emotions), it was found that
they still agreed with the standard much less (44.7%) than with

the original version of the test (71.3%)(contrast $F(2,30)=9.488$, $p=.001$). They also agreed marginally less than with the "none of the above" option (55.0%, $p=.106$).

Discussion

Agreement levels have varied in the research on posture and emotion from 48.5% (Coulson, 2004) to 85% (Ekman, 1967); most seem to be in the 60-70% range. The differences in agreement can most likely be attributed to the lack of consistency across studies aiming to measure people's agreement levels on posture and emotion. Differences in choice of stimulus (photographs vs. computer generated figures), viewpoint differences, and forced-choice vs. open-ended response formats could all affect agreement levels as some have suggested (Coulson, 2004; Daems & Verfaillie, 1999 Russell, 1994).

Pitterman and Nowicki (2004) found 78% agreement using the DANVA2-POS. The current study revealed 71% agreement for the original condition using only the forced-choice method with the four emotion choices, which is in the same range of agreement found by Pitterman and Nowicki. Interestingly, there is a substantial drop in agreement rates once additional response options are introduced. The results clearly show that significant differences in level of agreement occur when subjects were given "none of the above" and open-ended options versus a forced-choice option. This implies that the emotions that people associate with body postures are not so clearly defined. This is not to imply that the DANVA2-POS is obsolete. It certainly measures people's agreement with the provided emotions, but based on these findings, there appears to be a much deeper level of processing occurring. People not only associate postures with other "incorrect" emotions, but with non-emotions as well. It might be more helpful to consider emotions as Haidt and Keltner (1999) did, as "falling along a gradient of recognition." These findings

suggest that measuring people's perceptions of body postures by restricting their responses to a list of specified emotions fails to provide an accurate measure of agreement. It would be prudent to consider these findings for future research in this domain of study.

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