

Measuring the ability to perceive emotional connotations of language
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ABSTRACT

Figurative language is often used to describe emotions (Fainsilber & Ortony, 1987): When we say someone is “down,” we imply they feel sad (Lakoff & Johnson, 1980). The Metaphors Test (Barchard et al., 2011) was created to measure the ability to perceive emotions in metaphors. It has good convergent validity with tests of emotion perception. However, the 48 metaphors in the initial item pool were not based upon previous research. Therefore, it was impossible to create a scoring key before data were collected. Instead, the scoring key was boot-strapped from the data itself. This type of scoring may be susceptible to cultural biases. Therefore, we designed a new test of the ability to perceive emotions in language, where items are based upon established theory and research. We derived a list of common metaphors for anger, sadness, fear, and happiness, and created the Measure of Emotional Connotations based upon that extant literature.

INTRODUCTION

Our social world is increasingly dependent on text-based media such as email, text messaging, and social networking sites such as Facebook. Individuals often misinterpret emails or text messages and may perceive them as more negative than they were intended (Byron, 2008). People need to perceive emotions accurately, even when they do not have access to traditional non-verbal cues, such as tone of voice, posture, and facial expressions. Therefore, we want to design a measure of the ability to perceive the emotional connotations of language.

Language contains both denotative and connotative information (Lyons, 1977). Denotative information is the type of information one would find in the dictionary, or information that is literally expressed by the words themselves. Connotative information is information that is implied, and may include emotional content. For example, when people say, “I feel blue,” they are using connotations to express the emotion of sadness. Several tests exist to measure the ability to decipher the emotional meanings of language. Some of these tests are influenced by both denotative and connotative information. For example, the Mayer-Salovey-Caruso Emotional Intelligence Test Changes task (Mayer, Salovey, & Caruso, 2002) and the Multifactor Emotional Intelligence Scale Stories task (Mayer, Caruso, & Salovey, 2000) both include explicit emotion words in the item stems.

Two existing tests focus only on the ability to decipher the emotional connotations of language. The first of these is the Metaphors Test (Barchard, Anderson, Hensley, & Walker, 2011). It includes 10 emotionally evocative metaphors. For each, participants rate the extent to which the speaker was feeling each of three associated emotions, using a five point scale, where 1 = not at all and 5 = extreme. The total test score is calculated as the sum of the item-level scores for each of the 30 items. Three studies (totaling 457 participants) were used in the development and psychometric evaluation of the Metaphors Test. These studies demonstrate that the Metaphors Test is reliable and has strong convergent validity.

The second test that measures the ability to decipher the emotional connotations of language was designed by Gregory and Waggoner (1996). It includes a total of 12 emotional metaphors, each of which is followed by a list of the four basic emotions: anger, fear, happiness, and sorrow. Respondents are asked to select the emotion that the metaphor is trying to communicate. These metaphors were created in a previous study (Waggoner & Palermo, 1991), and Gregory and Waggoner used the ones that had the most consistent interpretations. This test showed the expected differences between young and old participants, thus supporting its construct validity.

Both of these tests demonstrate the feasibility of measuring the ability to decode the emotional connotations of language. However, none of the test stimuli were based upon known relationships between the stimuli and emotional connotations. For example, Barchard et al. (2011) used the metaphor “Hard work is the father of fame,” but no previous research or theory has suggested that this metaphor would be strongly and consistently associated with one particular emotion. Therefore, there were not any pre-established correct answers to the items. Since there were no definite correct answers, they had to rely on proportion consensus scoring to determine how to score the items. In proportion consensus scoring, a person’s score on an item is equal to the proportion of the norm group who gave the same response. Proportion consensus scoring has several problems (Maul, 2011), but the most relevant issue is that it cannot identify the correct answers accurately when the items are difficult (Barchard, Hensley, & Anderson, 2011).

The purpose of the current study was to design a test of the ability to decipher the emotional connotations of language. Unlike the two existing tests, we used previous empirical research to inform the creation of the test stimuli so that a veridical scoring key could be created, and so that the items could potentially be translated into other languages and still be valid.

There are many ways we could find stimuli for which there is an established empirical record that would justify a particular veridical scoring key. One approach would be to use single words as our stimuli. Strauss and Allen (2008) identified many words that were closely associated with just one emotion. However, they found many words that were associated with happiness and very few words associated with anger, fear, or sadness that were not simply synonyms of those emotion words. Because we wanted to measure the ability to decode connotative information, this produced few associations. We therefore decided that we need to use stimuli that consist of more than one word, and we needed some other justification for the association between those stimuli and particular emotions. We noted that people often use figurative language to express emotions and thought that we could use this as the basis for our test stimuli.

Figurative language is well suited to express emotional experiences for two reasons. First, figurative language is used to communicate ideas that cannot be captured by literal language (Fainsilber & Ortony, 1987). For example, someone might say, “Love is a whirlwind of rose petals.” Second, figurative language can be used to capture the vividness of an experience that otherwise would be difficult or impossible to describe (Fainsilber & Ortony, 1987). An example of this can be found in times of intense stress: an individual might say, “I felt like the world was falling down around me.”

Thus, the first step was to find well-established conceptual metaphors for emotions. A conceptual metaphor is an idea that involves two concepts in which one concept displays a certain aspect about the concept of interest (Lakoff & Johnson, 1980). For example, “Happiness is up” is a conceptual metaphor in which the concept of “up” displays information about the concept of “happiness.” Conceptual metaphors are the foundation for many other metaphors and figurative phrases: For example: “We had to cheer him up,” “Lighten up” (Kovecses, 1986), “I’m feeling up,” and “That boosted my spirits” (Lakoff & Johnson, 1980).

We used two types of research to identify conceptual metaphors for emotions. First, we relied extensively upon the work of Kovecses (1986) and Lakoff and Johnson (1980). They used a lexical approach, which assumes that language reflects our conceptual system and thus uses ordinary language to discover the subtle internal structure of concepts (Kovecses, 1986). Second, we identified words that were associated with each emotion. Strauss and Allen (2008) asked participants to rate words according to how emotional they were: from “not very emotional” to “very emotional.” Participants also sorted these words into eight emotional categories: happiness, sadness, anger, anxiety, fear, disgust, surprise, and neutral. Some of their findings supported the conceptual metaphors that we had identified from the lexical analyses. For example, “sunny” and “rainbow” both received high scores for happiness, and we interpreted this to support the conceptual metaphor “Happiness is bright.” Similarly, Dor-shav and Dor-shav (1978) asked participants to indicate which of two opposing characteristics (e.g., hot-cold) matched each of four emotions: anger, fear, sadness, and pride. For example, they found anger was more associated with hot than cold, providing support for the conceptual metaphor “Anger is hot.”

Finally, we wanted to focus upon conceptual metaphors for emotion that are used in multiple cultures. This way, if our test is translated into other languages, the veridical scoring key is more likely to still be valid. Many metaphors for emotion are used across cultures worldwide. One reason for this is that our bodily experience structures our cognitive activity: Mental functioning is often explained in terms of bodily functioning, such as “that man is sick in the head” (Fesmire, 1994). In addition, different cultures have similar emotion metaphors because emotional experiences have typical physiological reactions (Kovecses, 2005). For example, when people are happy, they tend to be more active, and may either jump up and down or move around more than usual. In contrast, when people are sad, they tend to be inactive and have downwards posture. Given the large number of conceptual metaphors that do occur across cultures, we decided to limit test stimuli to ones that are congruent with conceptual metaphors that have been established across multiple cultures. Combining the results of our analyses, we found cross-cultural support for 16 conceptual metaphors, which are listed in Tables 1, 2, 3, and 4. Of these, we chose 11 as the basis for our item stems.

Table 1
Conceptual Metaphors for Happiness

Happiness is...	Culture	Examples	Main evidence	Supporting evidence
Up	American	"We had to cheer him up." "Lighten up."	Lakoff & Johnson (1980) Kovecses (1991) Ruben (1985) Yu (1995)	Strauss & Allen (2008) Waggoner & Palermo (1991)
	Chinese	"In high spirits." "Tails up." "Filled with spirits."	Chen (2010) Li (2008)	
	Hungarian	"This film gave me a high." "He is on cloud nine."	Kovecses (2005)	
Bright or Light	German	"Look on the bright side." "She lit up."	Barcelona (2000) Lakoff & Johnson (1980) Kovecses (1991)	Strauss & Allen (2008)
	American	"You are the sunshine in my life." "He smiled, which caused his face to beam." "They're in high spirits with a strong glow."	Yu (1995)	
Warmth	Chinese	"His face brightened up." "He has a sunny personality."	Kovecses (2005)	
	Hungarian	"What she said made me feel warm all over."	Kovecses (1991) Omori (2008)	Strauss & Allen (2008)
Off the ground	American	"I was flying high." "Nothing could bring him down."	Kovecses (1991)	Strauss & Allen (2008)

Table 2
Conceptual Metaphors for Sadness

Sadness is...	Culture	Examples	Main evidence	Supporting evidence
Down/ Falling	American	"I'm feeling down." "My spirits sank." "Her face fell."	Lakoff & Johnson (1980) Kovecses, Benczes, & Csábi (2009) Barcelona (2003)	Waggoner & Palermo (1991) Dor-Shav & Dor-Shav (1978) Shweder (1991)
	Mayan Indians		Barcelona (1997) Barcelona (2000)	Shweder (1991)
Blue	Nepalese			Dor-Shav & Dor-Shav (1978)
	Japanese			Dor-Shav & Dor-Shav (1978)
Empty	Israeli	"I feel blue."		Dor-Shav & Dor-Shav (1978)
	American	"My life is empty."		Shweder (1991)
	Mayan Indian			Shweder (1991)
	American			Shweder (1991)
	Mayan Indian			Shweder (1991)

Table 4
Conceptual Metaphors for Anger

Anger is...	Culture	Examples	Main evidence	Supporting evidence
Hot	American	"Don't get hot under the collar." "I'm boiling over."	Kovecses (1986) Kovecses (1990)	
	Nepalese			Dor-Shav & Dor-Shav (1978)
	Israeli			Dor-Shav & Dor-Shav (1978)
	Hungarian	"He was hot-headed." "They had a heated argument."	Kovecses (2003)	
	Japanese	"My head got hot." "You should cool down."	Kovecses (2003)	Dor-Shav & Dor-Shav (1978)
Red	Zulu	"That boy is red hot."	Kovecses (2003)	
	Wolof	"He heated my heart."	Kovecses (2003)	
	American	"He got red with anger." "She was scarlet with rage."	Kovecses (1986)	
	Chinese	"His face turned red." "His eyes emit fire."	Kovecses (2003) Yu (1995)	
	Hungarian	"His head turned red."	Kovecses (2003)	
	Japanese	"He turned red with anger."	Kovecses (2003)	
	Zulu	"That boy is red hot."	Kovecses (2003)	

Table 3
Conceptual Metaphors for Fear

Fear is...	Culture	Examples	Main evidence	Supporting evidence
Cold	American	"Make one's blood run cold." "Frozen in one's tracks." "Cold shivers running down one's spine."	Kovecses (1990) Omori (2008) Dobrovol'skij, Dobrovol'skij, & Piirainen (2005)	Dor-Shav & Dor-Shav (1978)
	Japanese			Dor-Shav & Dor-Shav (1978)
	Israeli			Dor-Shav & Dor-Shav (1978)
	Russian	"The blood freezes in the veins." "A chill went through the body."	Dobrovol'skij, Dobrovol'skij, & Piirainen (2005)	
	German	"To get cold feet." "A cold shiver went up someone's spine."	Dobrovol'skij, Dobrovol'skij, & Piirainen (2005)	
	Dutch	"To get goose pimples with fear." "With fear and trembling."	Dobrovol'skij, Dobrovol'skij, & Piirainen (2005)	
Inability to move/ function	American	"I was rooted to the spot." "She was frozen in her boots."	Kovecses (1990)	

The Measure of Emotional Connotations has 10-item scales for each of four emotions: anger, happiness, sadness, and fear. Items for the four scales are randomly intermixed. The stimuli were modeled after Gregory and Waggoner (1996): each item contains a two-word phrase. The respondent must then choose which of the four emotions is most closely associated with that phrase. Some example items are given in Figure 1. We anticipate that this will be a useful measure of the ability to decipher the emotional connotations of language and hope that it will be valid both in its current English form and when translated into other languages. Collaborative research with a colleague in Germany is currently being planned.

Figure 1
Metaphors of Emotional Connotations Example Test Item

Measure of Emotional Connotations

Select the emotion that is conveyed by each of the following phrases.

	Happiness	Sadness	Fear	Anger
Floating bubble	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hissing volcano	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sinking downhill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paralyzed puppet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beaming sun	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chilling insight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Echoing footprints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boiling blood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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