Online Measurement of Conceptual Distance via the Implicit Association Test

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Conceptual metaphor theory (Lakoff & Johnson 1980, Lakoff 1993, Kövecses 2002, Gibbs 2008) claims that figurative language grounds the understanding of abstract conceptual domains in terms of concrete, embodied experiences. For example, time is understood in terms of spatial distance, direction, and relative motion (Gentner, Imai & Boroditsky 2002; Boroditsky & Ramscar 2002). Studies arguing for the psychological reality of conceptual metaphors (e.g., Bowdle & Gentner 2005, Gibbs & Colston 2012) typically measure the effect of one figurative expression as a prime for comprehension of a subsequent expression.

While the measurement of linguistic priming effects is an important step in building the case for psycholinguistic models of metaphor processing, it leaves unanswered at least two types of counter-argument. First, such effects could be due to lexical priming alone rather than to semantic patterns (Burgess 1998, Sahlgren 2008). Second, linguistic priming effects can in some cases function as verbal interference, potentially obscuring variation in processing across different populations, as has been pointed out by Winawer et al. (2007). In this paper, I demonstrate how the Implicit Association Test ("IAT," Greenwald et al. 1998), a highly robust method used widely in social psychology and personality studies, could be adapted to address both of these concerns.

Relative motion in event structure metaphors can be conceptualized from two perspectives: either from an ego-centric ("Moving-Ego") perspective or from a passive, process-centric ("Stationary-Ego") perspective. Languages can vary in which of these perspectives is dominant for a given target domain. For example, corpus data indicate that English tends to favor the Moving-Ego perspective when describing emotion events (e.g., *find happiness*, *searching for happiness*), while Mandarin Chinese tends to favor the Stationary-Ego perspective (e.g., *gan-shou-dao xingfu* 'feel happiness,' lit. 'moved-accept-arrive happiness') (Polley 2012).

To examine whether such language-specific preferences for perspective taking in event structure metaphors are psychologically real, an experiment using the IAT protocol was conducted. Subjects categorized images depicting either a seeking event or a receiving event, while simultaneously categorizing images of faces depicting either happy expressions, which served as critical stimuli, or sad expressions, which served as filler stimuli. Given the differences for event structure metaphors for happiness in English versus Chinese, it was hypothesized that English speakers would be faster to simultaneously categorize images of happy faces and seek-type events with a single response key, while Chinese speakers would be faster when the same stimuli were mapped to the response key for receive-type events. The experiment results confirmed this hypothesis (ANOVA by subject $F[1,15] = 5.04$, $p = 0.04$, ANOVA by item $F[1,7] = 24.713$, $p = 0.002$).

This study suggests that the IAT method can test the psychological reality of cross-domain conceptual links reflected in metaphor, thus providing a complementary method to existing psycholinguistic priming studies. Because the IAT is readily adaptable to a variety of linguistic and non-linguistic stimuli, it offers a robust method for the quantification of general conceptual distance in online processing.