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The Scope and Consequences of Metaphoric Thinking:

Using Individual Differences in Metaphor Usage to Understand How Metaphor Functions

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Abstract

People often think, feel, and behave metaphorically according to conceptual metaphor theory. There are normative sources of support for this theory, but individual differences have received scant attention. This is surprising because people are likely to differ in the frequency with which they use metaphors and therefore the frequency with which they experience the costs and benefits of metaphoric thinking. To investigate these ideas, a five study program of research (total $N = 532$) was conducted. Study 1 developed and validated a metaphor usage measure, finding that people were fairly consistent in their tendencies toward literal thought and language on the one hand versus metaphoric thought and language on the other. These differences were, in turn, consequential. Although metaphor usage predicted susceptibility to metaphor transfer effects (Studies 2-3), it was also linked to higher levels of emotional understanding (Studies 4-5). The findings provide support for several key premises of conceptual metaphor theory in the context of a new measure that can be used to track the consequences of metaphoric thinking.

Keywords: Conceptual Metaphor, Metaphor Use, Individual Differences, Metaphor Transfer, Emotional Understanding

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“All of these concrete metaphors increase enormously our powers of perception of the world about us and our understanding of it...Indeed, language is an organ of perception, not simply a means of communication.” (Jaynes, 1976, p. 50)

Metaphors are often, strictly speaking, nonsensical. One cannot have a colorful personality, for example, because personalities do not have surfaces that reflect light. In other cases, metaphors would seem to create ambiguity. Is a strong person strong in the sense of being able to lift heavy weights or in the sense of persisting when problems occur? And consider a phrase like “things are looking up.” What things are involved here and why are they gazing upward? Issues and ambiguities of this type have led some scholars to conclude that metaphors distract at best and obfuscate at worst (Rorty, 1989; Searle, 1979).

There is presumably a reason, though, why we use metaphors with some degree of frequency. Along these lines, Jaynes (1976) contends that metaphor was (and likely is) crucial to the development of human consciousness. In particular, a metaphoric construction of the self greatly expands our capacities to reflect on and act purposely on the environment. Metaphor may also be an important conceptual tool. Lakoff and Johnson (1980; 1999) developed this position in philosophical terms. Often termed *conceptual metaphor theory* (CMT), the idea is that it can be very difficult to comprehend the meaning of intangible concepts without likening them to something more directly perceived (e.g., a color or a taste). Metaphoric thinking serves this purpose and can have functionality for this reason (Gibbs, 1994; Kövecses, 2010).

As described below, there has been experimental support for conceptual metaphor theory. However, individual differences in metaphoric thinking have received almost no attention. As a consequence, we do not know whether some people are more susceptible to metaphor-related inputs than others, and we do not know whether metaphoric thinking is functional, as proposed by CMT. We will offer an individual difference level of analysis – with an accompanying measure – to shed light on the potential costs and benefits of metaphoric thinking.

Conceptual Metaphor Theory: Knowns and Unknowns

The Cognitive Linguistics of Metaphor

If conceptual metaphor serves a useful representational purpose, then many if not most metaphors should be conventional in form and content. Metaphors do tend to have these properties (Bowdle & Gentner, 2005). For example, metaphors typically occur in the context of everyday people talking about everyday events and experiences (Gibbs, 1994). Moreover, they often draw from perceptual experiences that are very basic, such as being in a lighter or darker environment or in a higher or lower vertical position (Tolaas, 1991). Even novel and creative uses of metaphor typically borrow from associations that are well-established (Gibbs, 1994).

Important progress has also been made on the nature of conceptual metaphors (Lakoff & Johnson, 1980; 1999). They involve mappings between two disparate domains, one a target (the domain to be understood) and the other a source (the domain borrowed from). Target domains are less tangible (e.g., a person's personality) and source domains are typically perceived in a more direct way (e.g., a taste or a texture). Source domains are borrowed from when they highlight some aspect of the target in a way that is useful and intuitive (Kövecses, 2010; Ortony, 1975). For example, we may say that a person "is ready to explode" because he or she is irate to the point of engaging in unpredictable, destructive behavior.

An analysis of linguistic metaphors has provided other insights as well (Lakoff & Johnson, 1999). Rather than thinking of metaphors as particular phrases, it is more useful to think of them as underlying mappings (e.g., MORAL IS UP, LOVE IS A JOURNEY) that motivate particular phrases (e.g., “an upstanding person”, “take the high road”). In addition, metaphors are typically asymmetric in that targets are characterized in terms of source domains (e.g., a bright person is a smart person) but not vice versa (e.g., a light source is not smart). The use of metaphors appears to be culturally universal (Heine, Claudi, & Hünemeyer, 1991; Kövecses; 2005) and metaphoric phrases are processed with relative ease (Gibbs, 1994).

Conceptual metaphor theory further contends, though, that people understand their worlds in metaphoric terms (Lakoff & Johnson, 1999). An analysis of linguistic phrases can point to, but not establish, this aspect of the theory (Crawford, 2009). Research in experimental social psychology has sought to fill this knowledge gap.

Experimental Support for Conceptual Metaphor

Approximately 10 years of research have supported the idea that conceptual metaphors influence processing and behavior (Landau, Meier, & Keefer, 2010). On the processing side, Meier, Robinson, and Clore (2004) found that positive (negative) stimuli were evaluated faster when paired with a light (dark) font color, consistent with a class of metaphors linking evaluative connotation to stimulus brightness (e.g., bright person, dark thoughts). Meier, Robinson, Crawford, and Ahlvers (2007) subsequently found that evaluations shifted perceptions in a brighter or darker direction. For example, after evaluating a negative prime word, participants perceived a subsequently presented square to be darker rather than lighter.

Between-subjects designs have also offered support for conceptual metaphor theory. Holding a warm (versus cold) cup leads people to perceive others as friendlier, consistent with

metaphors linking social and physical warmth (Williams & Bargh, 2008). Issues seem more important with cues to heavier (versus lighter) weight, consistent with metaphors linking weight to importance (Jostmann, Lakens, & Schubert, 2009). And people are less ethical when they perceive their environments as darker (versus brighter), consistent with metaphors linking immorality and darkness (Zhong, Bohns, & Gino, 2010). Other findings could be cited here, and replication is important, but it is apparent that CMT has a reasonable body of support for it (Landau, Robinson, & Meier, 2014).

What has received almost no attention, though, is whether there are individual differences in metaphoric thinking. This is an important question because the person is one half of the person-situation equation (Kenrick & Funder, 1988) and theories are considerably expanded if they can account for variations across people as well as within people (Kosslyn et al., 2002). Additionally, individual differences can be used to track the costs and benefits of a given way of thinking in a compelling way (Kozhevnikov, 2007) that can predict substantive life outcomes (Ozer & Benet-Martinez, 2006). Finally, there are several core assumptions of CMT, covered below, that would seem to lend themselves to an individual difference level of analysis.

Individual Differences in Metaphoric Thinking

Extant attempts to bridge the personality/CMT interface have typically assumed that all people think metaphorically. For example, just as processing is enhanced when dominant stimuli are up and submissive stimuli are down (Schubert, 2005), Robinson, Zabelina, Ode, and Moeller (2008) proposed and found that dominant people attend to higher regions of visual space than submissive people. These results presumably occurred because both dominant and submissive people share the same dominance is up metaphor (Lakoff & Johnson, 1999), both are equally influenced by it (Robinson & Fetterman, 2014), and therefore spatial attention diverges

depending on whether one typically entertains dominant or submissive thoughts (Robinson et al., 2008). The present work is very different because we begin with the premise that metaphoric thinking, as a whole, is more common among some people than others.

We can begin here with an observation. Text analysis suggests that people use metaphors once every 25 words or so (Graesser, Mio, & Millis, 1989). This figure is somewhat impressive when one considers that metaphors normally operate at the level of phrases rather than individual words (Gibb, 1994). Nonetheless, the same figure also means that much of speech or writing is *not* metaphoric (Glucksberg, Gildea, & Bookin, 1982). Indeed, there are reasons for avoiding metaphor in many circumstances. It can invite confusion, such as when it is not clear whether “right” is being used to refer to a direction, a state of veracity, or even a political orientation (Grice, 1975). And, even though apt metaphors can reveal, inapt metaphors can conceal (Paivio & Walsh, 1993). Thus, there are reasons for using literal language rather than metaphor when literal language is sufficient to capture the phenomenon (Bowdle & Gentner, 2005).

There are also style-related differences between people (Allport, 1961) and metaphor seems likely to be one of them. For example, Epstein (2003) suggests that some people are more likely than others to appreciate metaphors and to spontaneously use them to make sense of their experiences. Conversely, there are other people who are said not to appreciate metaphor or find it particularly compelling (Trick & Katz, 1986). Despite the suggestion of these individual differences, there is no instrument that we know of to measure them. Thus, a primary purpose of the investigation was to create a measure that can differentiate more literal thinkers from those whose representations tend toward the metaphoric.

A fundamental tenet of CMT is that metaphoric language reflects metaphoric thought (Lakoff & Johnson, 1980; 1999). One should therefore be able to track individual differences in

metaphoric thinking by tracking its linguistic outputs (Gibbs, 1994; Kövecses, 2005). This was the logic used in developing what we term the Metaphor Usage Measure. It involved pairing literal and metaphoric phrases and asking people which phrase is more characteristic of the way they typically think, speak, and write. If individual differences in metaphoric thinking are reliable, then people should score consistently across items irrespective of whether the items involve statements about the self, others, emotions, states of being, etc. These research efforts are reported in Study 1 along with evidence for convergent and divergent validity.

As reviewed above, experimental studies have shown that perceptual inputs (e.g., of warmth, of darkness) often result in metaphor-consistent cognitions or experiences (e.g., of friendliness, of negativity). Such results form a core source of evidence for CMT (Landau et al., 2010), yet it is not always certain that conceptual metaphors are involved (IJzerman & Koole, 2011). We suggest that an individual difference measure can be very helpful here: If a given effect is due to metaphor representation processes, then people who use metaphors more often should be more susceptible to the effect (Underwood, 1975). As a complementary way of thinking about such interactions, we might find that metaphor transfer effects (Landau et al., 2010) are somewhat particular to metaphoric thinkers. Experts in the field have desired moderation-related evidence of this exact type (Meier, Schnall, Schwarz, & Bargh, 2012a).

In this connection, we view metaphor transfer effects (Landau et al., 2010) as a cost of metaphoric thinking. These are cases in which people seem to be victims of their tendencies to think metaphorically, for example in the form of basing potentially important decisions about trust and distrust on whether there are fishy smells in the environment (Lee & Schwarz, 2012). Similarly, when one is told that font color is uninformative of valence, and it is in fact uninformative, it is almost puzzling that people still automatically infer that dark words refer to

more negative concepts than light words (Meier et al., 2004). If erroneous influences of this type are a cost of thinking metaphorically (Landau et al., 2010), then people who use metaphors more often should be more vulnerable to these costs. Study 2 examines this idea in a word evaluation task and Study 3 examines it in an experience-sampling study.

Yet, there is a reason that people use metaphors, according to CMT (Lakoff & Johnson, 1999). Through analogy and resemblance (Kövecses, 2010), metaphors provide grounding for non-tangible (typically abstract) concepts (Pecher, Boot, & Van Dantzig, 2011) and for experiences that are difficult to conceptualize using literal language (Berlin, Olson, Cano, & Engel, 1991; Ortony, 1975). For example, morality is an abstract concept that people often think about by likening it to high positions, sturdiness, purity, and cleanliness (Douglas, 1988; Schnall, 2014). Each of these metaphors provides useful insights into what morality is like, such as imperturbability in the case of sturdiness or lack of contamination in the case of cleanliness (Lakoff & Johnson, 1999). Using metaphors can therefore help people think about, or scaffold, meaning when literal language is not sufficient (Gibbs, 1994; Williams, Huang, & Bargh, 2009).

Literal language does not appear sufficient in representing emotional feelings (Epstein, 2003; Gibbs, 1994). One cannot see, hear, smell, or touch an emotional feeling and much of the relevant circuitry is subcortical or pre-linguistic (Davidson, 1999; McClelland, 1987). As a consequence, people often encounter considerable difficulties in representing their feelings, both for self-understanding purposes and when they wish to communicate these feelings to others (Barrett, Mesquita, Ochsner, & Gross, 2007). Such difficulties have been documented among both children (Izard et al., 2011) and adults (Wranik, Barrett, & Salovey, 2007) and are the target of many if not most psychotherapy practices (Cummings, Hayes, Saint, & Park, 2014; Gratz &

Tull, 2010). Simply put, thinking about feelings is a substantial epistemic challenge (Barrett, 2012; Bucci, 1997; Epstein, 2003).

Metaphors appear important in this context (Crawford, 2009). Kövecses (2000), for example, was able to show that metaphors pervade our language about feelings. Anger has fire-like aspects to it, sadness is dark and down, and the LOVE IS A JOURNEY metaphor is somewhat ubiquitous, etc. These metaphors do not create emotions, but they highlight critical aspects of them, such as the desire to move forward and head toward a destination in the case of a love relationship (Lakoff, 1986). Kövecses (2000) makes the case that it would be very difficult to conceptualize our feelings without using metaphors, owing to their intangible, nonverbal nature. The universality of emotion metaphors speaks in favor of this idea (Kövecses, 2005), as does the apparent link between emotional processing deficits and difficulties understanding metaphor (Langdon & Coltheart, 2004; Rundblad & Annaz, 2010).

According to Ortony (1975), people use metaphors to understand their emotions because metaphors are compact, vivid, and particularly suited to “express the inexpressible” about emotion, a position that has support (Fainsilber & Ortony, 1987). Moreover, there is a fairly substantial body of evidence for the idea that conceptual metaphors are recruited even in simple affective processing tasks, attesting to the apparent usefulness of metaphorically thinking about affect (Crawford, 2009). Finally, there is intriguing work suggesting that metaphors are therapeutically useful as people try to make sense of problematic negative feelings (Berlin et al., 1991; Levitt, Korman, & Angus, 2000). Along these lines, Shinebourne and Smith (2010) showed that people spontaneously speak about holes, darkness, fights, demons, and animals when they try to come to terms with their addiction experiences.

We do not claim that metaphors are absolutely necessary in thinking about emotion, but they appear to be helpful (Crawford, 2009; Fainsilber & Ortony, 1987; Kövecses, 2000). If so, there should be a positive relationship between metaphor usage and emotional understanding, a hypothesis examined in Study 4. Study 5 then used an experimental design to examine whether encouraging people to use metaphors to think about their emotions, relative to literal language, could augment the therapeutic effects of expressive writing (Pennebaker & Ferrell, 2013). Following CMT (Lakoff & Johnson, 1999) and the analysis of Berlin et al. (1991), we predicted that metaphoric expressive writing would reduce negative affect over time (Pennebaker & Ferrell, 2013) more than literal writing. Studies 4 and 5, that is, both sought to show that metaphors are useful in thinking about feelings.

In sum, the investigation had at least three goals. First, we sought to determine whether people are consistent in their tendencies toward metaphoric thought and language. This led to the creation of the Metaphor Usage Measure (Study 1). Second, we sought to provide support for the idea that metaphoric thinkers, in particular if not exclusively, are more prone to metaphor transfer effects, both in an experimental task (Study 2) and in daily life (Study 3). Third, however, we sought to show that metaphors are useful in thinking about emotional experience, both using correlational (Study 4) and experimental (Study 5) designs. Altogether, the studies were designed to highlight both the costs and benefits of metaphoric thinking.

Study 1

Despite the potential importance of metaphor usage (Lakoff & Johnson, 1999), and the value of individual differences in theory testing (Kosslyn et al., 2002; Underwood, 1975), no measure of metaphor usage existed and so we developed one. Rather than asking general questions (e.g., “do you often use metaphors?”), the desire was to model more online tendencies

and a forced-choice (literal phrase versus metaphoric phrase) format seemed particularly direct in doing so (see below for further details). Metaphor-related phrases were common rather than especially poetic in order to capture everyday tendencies (Gibbs, 1994).

It is an open question whether people have consistent metaphoric tendencies across diverse phrases and content areas. This is a question of internal consistency and internal consistency was the key property that we focused on. In addition, though, Study 1 attended to a number of validity questions. Predictive validity would be established if people scoring higher in metaphor usage spontaneously generate a greater frequency of metaphoric phrases when writing. Due to the unstructured nature of the writing task, we expected moderate, but significant, correlations here.

Metaphors are often compelling when they evoke vivid imagery (Ortony, 1975). To say that a person is “happy as a clam” works, for example, because it evokes an image of an animal that remains stationary but has its needs met. Alternatively, to say that a person “hit the ceiling” works because it suggests the image of an explosion, one that has the capacity to harm people (Gibbs, 1994). Given that metaphors often include imagery (Ortony, 1975), it was predicted that metaphor users would have a greater preference for using imagery when thinking. This prediction was tested by the inclusion of a style of processing questionnaire.

Study 1 also attended to discriminant questions. The metaphor usage measure targeted common, everyday metaphors rather than especially poetic ones. For this reason, there seemed no basis for expecting a relationship between metaphor usage and intellectual ability. In addition, metaphor usage should be thought of as an aspect of mental style rather than in terms of personality trait characteristics. For this reason, we expected low, potentially non-significant relationships between metaphor usage and the personality traits of the Big 5.

Method

Participants and Procedures

Participants were 132 undergraduates (45 male) from North Dakota State University (NDSU) who received course credit for their psychology classes. They registered using a SONA system and completed the laboratory study in groups of 6 or fewer. After general orienting instructions, measures were completed on personal computers equipped with MediaLab software. An implicit to explicit measurement order (Robinson, 2007) was used. Operationally, this meant that a writing assessment occurred first, the metaphor usage measure was next, and the most explicit measures were administered toward the end of the session.

Individual Differences in Metaphor Usage

We sought to assess individual differences in the frequency with which metaphors are used in thought and language. For purposes of reliability and control, a structured rather than unstructured test seemed desirable. On the other hand, using the word “metaphor” might confuse people or lead them in their answers and the goal was to assess metaphor usage rather than aspects of the self-concept. Accordingly, test items consisted of phrase pairs. One of each pair was literal (e.g., “She makes rational decisions”) and the other contained a metaphor (e.g., “She uses her head”). Literal people would choose literal phrases more often and metaphoric people would choose metaphoric phrases more often. For each pair, participants were asked which alternative phrase they would be “more inclined to say, think, or write in everyday life.” Choices were made by clicking on one of two screen buttons.

As the focus was on everyday metaphor usage, the phrases were relatively common. As the focus was on what the participant might say or think, many of the phrases, but not all, were

written from the first-person perspective. Sixty items were administered with the goal of selecting the better ones. Literal choices were scored 1 and metaphoric choices were scored 2.

Predictive and Convergent Validity

For many new measures (e.g., a new measure of negative affect), convergent validity is straightforward. This will be less true concerning metaphor usage. Nonetheless, metaphor usage should predict the spontaneous occurrence of metaphors in written language and it might reasonably be expected to correlate with a preference for mental imagery.

Metaphors in Writing. There was no desire to replace the structured measure described above with an unstructured measure. Even so, there should be a positive correlation between the structured measure and metaphor frequencies in written language. To examine this prediction, we asked participants to write for 8 minutes about themselves and their lives. The topic was intentionally general but was fleshed out with several more specific suggestions (e.g., “write about your time at NDSU”). Participants were asked to write freely for the entire 8 minutes without worrying too much about content or structure. Given the metaphor frequency estimate of Graesser et al. (1989), a 250 word sample was desired and participants averaged approximately this number of words ($M = 270.55$; $SD = 86.71$).

Metaphors operate at the level of phrases rather than individual words (Gibbs, 1994). The first author therefore subdivided each essay into discrete phrases. Subsequently, the first author and a separate lab member independently read each phrase and gave it a point if it was metaphoric (versus 0 if not), following which a summed total score was calculated for each essay. An intraclass correlation (ICC) analysis (Shrout & Fleiss, 1979) on these summed scores revealed moderate-to-high coder agreement, $r = .66$, $p < .01$, and so we averaged the two coder sums. The average essay had 7.45 metaphors ($SD = 4.16$), which translates into 1 metaphor per

36 words, a number similar to Graesser et al. (1989). It is important to correct for essay length, though. This was done according to Winter's (1994) correction formula, which divides a sum by word count and then multiplies by 1000 ($M = 27.13$; $SD = 12.56$). In addition to this count-based measure, each essay was assigned an overall rating of metaphor use along a 1 (not metaphoric at all) to 7 (very metaphoric) Likert scale. The two coders agreed with each other ($ICC r = .60$, $p < .01$) and these ratings were therefore averaged ($M = 3.19$; $SD = 1.42$). Coders were blind to other information about the participants.

Preference for Imagery. Metaphor often contains imagery (Gibbs, 1994; Ortony, 1975). We might therefore expect a positive correlation between metaphor usage and preferences for imagery. To examine this prediction, we administered the Style of Processing scale (SOP: Childers, Houston, & Heckler, 1985). The SOP consists of 11 items (e.g., "I generally prefer to use a diagram rather than a written set of instructions") that are rated in terms of extent of agreement (1 = always false; 4 = always true). An average score was computed ($M = 3.15$; $SD = 0.40$; $\alpha = .78$). The SOP has been shown to be reliable and valid in assessing preferences for visual imagery (Childers et al., 1985; Jiang & Wyer, 2009; Ong & Milech, 2001).

Discriminant Validity

Metaphor usage should be considered an aspect of mental style rather than a personality trait or intellectual ability. To support this point, standard measures of personality and intellectual performance were assessed.

Big 5 Personality Traits. There is considerable agreement that five personality factors – or the Big 5 – capture and integrate many major ways in which people differ from each other in terms of their personality traits (McCrae & Costa, 1999). We focused on this level of analysis by administering Goldberg's (1999) 50 item IPIP Big 5 inventory. Assessments of the Big 5 by the

IPIP scales converge strongly with alternative Big 5 assessments (John & Srivastava, 1999) and there is extensive validity evidence for these scales (Goldberg et al., 2006). In specific terms, participants were asked to indicate whether statements indicative of extraversion (e.g., “am the life of the party”; $M = 3.45$; $SD = 0.79$; $\alpha = .88$), agreeableness (e.g., “make people feel at ease”; $M = 4.01$; $SD = 0.56$; $\alpha = .85$), conscientiousness (e.g., “am exacting in my work”; $M = 3.51$; $SD = 0.62$; $\alpha = .82$), neuroticism (e.g., “get stressed out easily”; $M = 2.72$; $SD = 0.84$; $\alpha = .89$), and openness to experience (e.g., “spend time reflecting on things”; $M = 3.42$; $SD = 0.59$; $\alpha = .80$) generally characterize the self (1 = very inaccurate; 5 = very accurate). Some items were reverse-scored and there were 10 items per scale.

Intellectual Performance. The metaphor usage scale was populated with common metaphors rather than complicated ones. For this reason, no relationship between metaphor usage and intellectual performance was expected. As real-world manifestations of cognitive ability, participants indicated their ACT scores ($M = 23.32$; $SD = 3.41$) and their high school and college GPAs. We averaged the two GPA figures ($M = 3.16$; $SD = 0.56$).

Results

A 30 Item Metaphor Usage Measure

Study 1 participants had been presented with 60 phrase pairs. The goal was to retain approximately 30 of these pairs for the final metaphor usage measure. Selection was done by item-total correlations. That is, scores for each item (1 = literal; 2 = metaphoric) were correlated with a total score averaged across the 60 items (with higher scores reflecting a higher frequency of metaphoric choices). Item-total correlations .25 or above are better items (Everitt, 2002) and we were able to use this criterion in selecting the top 30 items. In fact, the .25 criterion was relatively effective in differentiating the well-performing from lesser-performing items.

The 30 item Metaphor Usage Measure (MUM) was then further evaluated. The content of the items seemed appropriate in capturing everyday metaphor usage. A mean around 1.5 (instead of, for example, 1.2) might be particularly effective in differentiating people who tend to use metaphors versus those who do not. The mean (across the 30 items) was 1.51 ($SD = 0.19$). There seems no reason to posit a non-normal distribution of scores and normality is a desirable property for many inferential tests. Skew was $-.24$ and kurtosis was $-.74$, both consistent with underlying normality (Tabachnick & Fidell, 2007). The internal consistency of the 30 item measure was also acceptable ($\alpha = .84$). Appendix A presents the 30 item measure.

A principle components factor analysis was then run to examine whether a single-factor solution might be preferred (Tabachnick & Fidell, 2007). A scree plot, presented as Figure 1, revealed a clear drop-off between the first factor, which had an eigenvalue of 5.32, and the remaining factors, none of which had an eigenvalue greater than 2. Furthermore, all of the 30 items loaded onto the first factor at $.25$ or higher and there was a relatively flat slope characterizing the remaining factors, none of which seemed particularly interpretable. Metaphor usage was therefore scored by averaging across all of the items.

Convergent and Discriminant Validity

The unstructured nature of the writing protocol was a strength as well as a source of consternation. In any case, it would be desirable to show that higher scores on the metaphor usage measure translate into the occurrence of metaphors in writing. This was the case for both the frequency-based writing measure, $r = .22$, $p = .01$, and the overall metaphoric rating, $r = .25$, $p < .01$. Metaphors often involve mental images that are combined in creative ways (Reed, 2010). We might therefore expect some relationship between metaphor usage and preferences for

mental imagery. This correlation was also significant, $r = .31, p < .01$. Together, these significant correlations establish convergent validity for the metaphor usage scale.

The metaphoric phrases chosen were common rather than abstruse or hard to understand. For this reason, substantial correlations with intellectual performance seemed unlikely. In fact, metaphor usage did not predict ACT or GPA scores, $|rs| < .05, ps > .65$. There also seemed no reason to expect substantial correlations with personality trait measures. This aspect of discriminant validity was supported by non-significant correlations with the Big 5 assessments, $|rs| < .20, ps > .05$. Finally, there was no sex difference in metaphor usage, $p = .32$. Overall, metaphor usage represents a new sort of individual difference variable, one that can contribute new insights concerning the role of metaphoric processes in cognition, emotion, and behavior.

Discussion

Study 1 established metaphor usage as a reliable individual difference variable. People inclined to use one sort of metaphor were inclined to use other metaphors as well. By contrast, others tended to avoid metaphoric phrases in favor of more literal statements of fact or description. That metaphor usage did not correlate with intellectual abilities or with personality traits suggests that metaphor usage cannot be viewed in terms of these other sorts of variables. To appreciate metaphor, though, one may need to appreciate image-based thinking (Pinker, 2007). Support for this idea was found in the positive relationship between metaphor usage and preferences for mental imagery (Childers et al., 1985). We sought to further examine imagery/metaphor relations in Study 2. Of more importance, though, we sought show that metaphor users are more prone to metaphor transfer effects.

Study 2

The MUM assesses preferences, not abilities. In support of this point, metaphor usage did not correlate with intellectual performance in Study 1. To further this point, Study 2 assessed the ability to invoke vivid mental images when instructed to do so. Although metaphor usage correlated with preferences for visual imagery in Study 1, preferences for visual imagery should be sharply distinguished from imagery abilities (Childers et al., 1985). The latter is a type of intelligence (Childers et al., 1985; McKelvie, 2007) and we did not expect it to correlate with metaphor usage tendencies. Findings of this type would further support the discriminant validity of the MUM scale.

We created the MUM scale because we believe that there are important individual differences in conceptual metaphor. Metaphor users, accustomed to thinking in terms of metaphor, should be more prone to conceptual metaphor effects, or metaphoric transfer (Landau et al., 2010), than people who tend to think in more literal terms. To provide potential evidence for this point, we administered a word evaluation test building on the metaphoric tendency to infer greater negativity with perceptual darkness (Crawford, 2009; Meier et al., 2004). This metaphor transfer effect would be evident in a stimulus color (black versus white) effect on word evaluations that we hypothesized would be stronger at higher levels of metaphor usage. Results of this type would provide compelling initial evidence for the idea that conceptual metaphor effects may be expected for some people (metaphor users) more so than for others.

Method

Participants and Procedures

The sample consisted of 132 (64 male) undergraduates from North Dakota State University who received psychology course credit. They signed up for a generally described personality study and arrived to the laboratory in groups of 6 or fewer. The word evaluation test

(see below) was completed prior to the individual difference assessment. We describe the latter first, however, for purposes of conceptual clarity.

Individual Difference Measures

Metaphor Usage. The 30 item version of the Metaphor Usage Measure (Appendix A) was administered. This allowed us to examine the properties of the scale independent of an item selection process. These properties were remarkably stable across the two samples, attesting to the reliability of the MUM ($M = 1.53$; $SD = 0.18$; skew = $-.12$; kurtosis = $-.45$; alpha = $.80$).

Vividness of Visual Imagery Questionnaire. The VVIQ was created to assess visual imagery abilities (Marks, 1973). It asks people to form 16 mental images (e.g., of the sky, a tree, a friend, or a relative) and then rate each in terms of its vividness and clarity (1 = no image at all; 5 = perfectly clear and as vivid as normal vision). A total score is created by averaging across items ($M = 3.80$; $SD = 0.70$; alpha = $.92$). The VVIQ has been shown to correlate with other ability-based tests of imagery and is the most commonly-used measure in this literature (Richardson, 1994). Imagery abilities and preferences should be distinguished, however, in that the VVIQ does not correlate with the SOP scale of Study 1 (Childers et al., 1985).

Word Evaluation Test

Metaphors frequently link dark to negative (e.g., “black heart”, “dark thoughts”) and light to positive (e.g., “bright idea”, “see the light”). This class of metaphors can be examined conceptually by randomly assigning stimuli to lighter or darker stimulus colors (Crawford, 2009). Even when irrelevant to the task and independent of semantic factors, people sometimes automatically infer that darker stimuli possess a more negative evaluative meaning (Meier & Robinson, 2005; Meier et al., 2004). Study 2 examined influences of this type in a judgment-related word evaluation task.

Because neutral words are likely to possess greater evaluative ambiguity than strongly positive or negative words (Meier, Robinson, & Caven, 2008), we used neutral words in the task. More specifically, we selected 20 words (e.g., “clock”, “journal”, & “seat”) from the normed database of Bradley and Lang (1999) such that the selected words had a mean valence of 4.97 (along their 1-9 unpleasant-pleasant scale), with a mean arousal rating of 3.79. In an E-prime program, participants were asked to evaluate the words using a 1 (unpleasant) to 6 (pleasant) scale. As a presumably irrelevant feature of the task, the words differed in appearance. By random assignment, 10 of the words appeared in a black font color and 10 appeared in a white font color, both against a constant mid-gray background. Which words were assigned to which colors was randomized across participants and the order of the stimuli was also randomized.

Word evaluations were made using the 1-6 keys at the top of the keyboard. For hypothesis-testing purposes, we computed the mean evaluation given to words appearing in black versus the mean evaluation given to words appearing in white. If we are correct, this difference should vary as a function of tendencies toward metaphor usage.

Results

The metaphor-related effect of stimulus color should be stronger among, if not particular to, metaphor users relative to their more literal peers. In other words, there should be a font color by metaphor usage interaction. To investigate this possibility, we performed a General Linear Model (GLM) analysis of evaluations in which there were two predictors. The first was the within-subject manipulation of font color and the second consisted of between-subject differences in metaphor usage, z-scored prior to the analysis (Robinson, 2007). The GLM platform is akin to the ANOVA platform, except that it can handle continuous as well as discrete predictors, thereby nicely lending itself to personality-processing questions (Robinson, 2007).

In this GLM analysis, there was no main effect for Font Color, $F(1, 130) = 2.63, p = .11$. This was slightly surprising, but does suggest that metaphoric effects on judgment may be more subtle than metaphoric effects on choice reaction time. There was also no main effect for Metaphor Usage, $F(1, 130) = 1.93, p = .17$, nor was one expected. Instead, and as hypothesized, there was a Font Color by Metaphor Usage interaction, $F(1, 130) = 5.99, p = .02$, Partial Eta Squared (PES) = .04. That is, the manipulation's effects varied by metaphor usage.

To determine the nature of the interaction, we calculated estimated means for each font color at a low (-1 *SD*) versus high (+1 *SD*) level of the metaphor usage continuum (Aiken & West, 1991). As shown in Figure 2, it appeared that the manipulation had an effect at the high level of metaphor usage, but not at the low level. To verify this interpretation of the pattern, we turned the within-subject manipulation into a difference score (white word evaluation minus black word evaluation) and then examined whether it, as an intercept, excluded 0 in two simple regressions (Robinson, 2007; Wilkowski & Robinson, 2007). At the high (+1 *SD*) level of metaphor usage, the intercept was significant, $t = 2.88, p < .01$, meaning that the manipulation had an effect among people who use metaphors frequently. At the low (-1 *SD*) level of metaphor usage, on the other hand, the intercept was not significant, $t = -0.59, p = .56$, meaning that font color did not matter among prototypically literal people. These results provide dramatic support for the idea that conceptual metaphors may operate primarily (or at least to a greater extent) among people who use metaphors with some degree of regularity.

Using metaphors in everyday discourse and recalling images vividly seemed to us to be very different constructs. In support of this point, there was no correlation between the MUM and the VVIQ, $r = -.04, p = .69$. Also, there was no main effect, $F < 1$, or interaction with font color, $F(1, 130) = 1.02, p = .31$, of VVIQ scores in predicting word evaluations. Finally, we

performed a multiple regression with the white minus black difference score as the dependent measure. In this multiple regression, MUM scores, $t = 2.49$, $p = .01$, Beta = .21, but not VVIQ scores, $t = 1.12$, $p = .27$, Beta = .10, predicted the magnitude of the font color manipulation effect. These results converge on the metaphoric nature of the MUM.

Discussion

Font color was irrelevant to the semantic nature of the words in Study 2. Perhaps because this was true, a large number of people were uninfluenced by font color when making their evaluations. For people who think metaphorically, however, representations of valence and of perceptual darkness should be more intertwined (Landau et al., 2014), such that even irrelevant perceptual inputs are more likely to trigger corresponding evaluative associations (Crawford, 2009). Consistent with these ideas, we found that metaphor users, but not those low in metaphor usage, rated words more negatively when they were presented in a black font color. These results provide nice support for the idea that there are individual differences in thinking metaphorically and that they extend to the metaphor transfer effects that can be examined in experimental tasks (Landau et al., 2010).

Indeed, two more points are worth making here. Without the inclusion of the MUM, the results may have been considered disappointing in that there was no normative effect for font color. This lack of a normative effect, however, masked considerable heterogeneity. The manipulation did in fact have an effect but that effect was limited to people who tend to think metaphorically, exactly as might be expected. From a different angle, the observed interaction supports the metaphoric nature of the manipulation. Specifically, if a manipulation has a metaphoric basis to it, then one might expect it to interact with individual differences in

metaphor usage. The metaphor usage scale, that is, can be used to discover or confirm the “metaphoricity” of an experimental effect and is a useful tool along these lines.

There is a long line of research on individual differences in mental imagery and their effects (Richardson, 1994). Much of this research traces back to Paivio’s (1971) suggestion that imagery-related codes can facilitate memory recall. The Metaphor Usage Measure is not about memory recall and it is not about imagery-related codes. Accordingly, we did not expect or observe a relationship between metaphor usage and mental imagery abilities. Although metaphor users like to use imagery somewhat more than non-users (as shown in the SOP correlation in Study 1), they are not better at forming mental images. Of equal importance, the MUM, but not the VVIQ, interacted with the font color manipulation of Study 2. Accordingly, there is evidence that the Metaphor Usage Measure captures something new about people and that something new relates to conceptual metaphor. We will continue this line of thinking in Study 3.

As a final note, the most meaningful comparisons in personality-processing designs involve the effects of a within-subject manipulation at a given level of personality (Robinson, 2007). In this comparison, like the within-subject design more generally, a person serves as his or her own control, thus eliminating unwanted sources of between-person noise (Robinson, 2007). Following these guidelines, what we emphasize in Study 2 is that the font color manipulation had an effect at the high (+1 *SD*) level of metaphor usage, but not the low (-1 *SD*) level. By contrast, we would caution against examining the relationship between personality and evaluations for just one of the two font colors as this would confound the within-subject manipulation effects with between-person noise (Keppel, 1991). Or, stated in other terms, further research would be necessary to conclude that the black negativity effect is stronger among metaphor users than the white positivity effect.

Study 3

The Study 2 results provide initial evidence for the idea that metaphor users are more susceptible to metaphor-related inputs. Additional evidence along these lines would be useful, however. This is partly true because the phenomenon examined in Study 2 – font color effects on word evaluations – has uncertain real-world significance. To extend Study 2, then, Study 3 focuses on what can be termed metaphoric daily living. The feelings and behaviors of metaphor users, we suggest, are more likely to vary in accordance with prominent conceptual metaphors. To make this case, we built on a body of work showing that prosociality is metaphorically sweet (Chan, Tong, Tan, & Koh, 2013; Fetterman, Meier, & Robinson, 2015; Meier, Moeller, Riemer-Peltz, & Robinson, 2012b). For example, Meier et al. (2012b) found that agreeable people liked sweet foods more than disagreeable people and sweet food consumption led other participants to view themselves as more agreeable. If such findings have a real-world counterpart, then we might expect people to act more prosocially on days on which more sweet food is consumed (Fetterman et al., 2015). If we are correct, however, such within-person, cross-day relationships should be particularly strong among people high in metaphor usage and potentially absent at low levels of metaphor usage.

Method

Participants and Overview

Participants signed up for a “daily study” using SONA software. They were told not to sign up unless they planned to complete both the laboratory session and two weeks of subsequent daily reports. Metaphor usage was assessed in the laboratory and the daily portion of the protocol began thereafter. In total, 136 (73 female) participants provided usable data.

Metaphor Usage

The 30 item Metaphor Usage Measure (Appendix A) was administered during the laboratory session along with unrelated measures (e.g., the Big 5). The properties of the MUM continued to be favorable ($M = 1.52$; $SD = 0.17$; $\alpha = .78$; skew = .02; kurtosis = -.31). Participant numbers were used to link MUM scores to the daily outcomes.

Daily Protocol and Measures

The laboratory portion of the study finished on a Friday and the daily portion of the study started the next Monday. Daily emails were sent with participant numbers and a website link, the latter linking to a day-specific questionnaire programmed with SurveyMonkey. Participants had to complete each survey after 5 p.m. and before 3 a.m. the next morning, a time window ensuring that reports pertained to the day in question. There were 9 non-compliers who were dropped for failing to complete at least 9 of the 14 daily reports, an a priori criterion. Among the remaining 136 participants, the response rate was 88%.

The metaphor transfer strategy is a primary tool for establishing metaphoric social cognition (Landau et al., 2014). If people are guided by conceptual metaphors, then perceptual experiences (e.g., of physically close distances) should influence social cognitions and behaviors (e.g., of social intimacy) in a metaphor-consistent direction (Landau et al., 2010). If metaphor users are more metaphoric creatures, however, transfer effects of this type should be more pronounced as metaphor usage increases. Such novel and theoretically important predictions were examined in the context of metaphor transfer effects involving sweet taste experiences and prosocial functioning (Chan et al., 2013; Meier et al., 2012b).

The translation of sweet taste metaphors to the daily protocol was straightforward. Participants were asked: “How much sweet food did you eat today?” (1 = none; 4 = a lot). Consumption of sweet food was moderate on average, yet varied from day to day ($M = 2.15$; SD

= 0.47, with day as the unit of analysis). Prosocial functioning was assessed in two ways. First, participants characterized their daily levels of agreeableness (“Today I was agreeable”), following the data of Meier et al. (2012b), using a 5-point scale (1 = very inaccurate; 5 = very accurate; $M = 3.61$; $SD = 0.61$). Second, they indicated the frequency (0 = never; 4 = very often) with which they had engaged in 3 prosocial behaviors on each day (“did a favor for someone”, “expressed gratitude to someone”, & “helped someone”). The prosocial behaviors were averaged to form a scale ($M = 1.37$; $SD = 0.50$; $\alpha = .80$, with day as the unit of analysis). As a procedural note, the sweet food item was completed subsequent to the outcomes so that answers to it would not guide outcome reporting.

Results

Multilevel modeling (MLM) procedures were used to analyze the daily diary data (Nezlek, 2001). In both models, metaphor usage was a z-scored level 2 (between-persons) predictor (Aiken & West, 1991) and sweet food consumption was a person-centered (Enders & Tofighi, 2007) level 1 (day-varying) predictor. Analyses were conducted using SAS PROC MIXED (Singer, 1998) and simple slope tests followed Bauer, Preacher, and Gil (2006). The metaphoric influence of sweet food consumption was hypothesized to be stronger at higher levels of metaphor usage, resulting in cross-level (Singer, 1998) interactions. We report fixed effect statistics for the two MLMs.

In the MLM involving the daily agreeableness outcome, there was a main effect for sweet food consumption, $b = .04$, $t = 1.98$, $p = .05$, such that agreeableness levels increased as sweet food consumption increased. This is a fascinating extension of Meier et al. (2012b), who found that eating sweet food in the laboratory led people to report higher levels of agreeableness (also see Fetterman et al., 2015). There was also a main effect for metaphor usage, $b = .10$, $t = 2.19$, p

= .03, such that metaphor users tended toward greater daily agreeableness. Of greater theoretical relevance, the cross-level interaction was significant, $b = .08$, $t = 4.20$, $p < .01$. That is, the sweet food/agreeableness relationship varied by metaphor usage.

To investigate the nature of the first interaction, we calculated estimated means for it at +1 *SD* and -1 *SD* levels of the predictor dimensions (Aiken & West, 1991). These estimated means, displayed in the top panel of Figure 3, suggest that within-person relations between sweet food consumption and daily agreeableness were somewhat particular to higher levels of metaphor usage. Simple slope tests (Bauer et al., 2006) confirmed this interpretation of the findings. Specifically, daily agreeableness increased with sweet food consumption for the prototypical metaphor user (+1 *SD*), $b = .12$, $t = 4.36$, $p < .01$, but not for the prototypical literal person (-1 *SD*), $b = -.04$, $t = -1.61$, $p = .11$.

We next sought replication with the more behavioral measure of prosociality. In this analysis, the main effect for sweet food consumption was significant, $b = .04$, $t = 2.76$, $p = .01$, indicating a daily life metaphor transfer effect. There was no main effect for metaphor usage, $b = .00$, $t = 0.01$, $p = .99$, but the hypothesized sweet food consumption by metaphor usage interaction was significant, $b = .04$, $t = 2.67$, $p = .01$. Estimated means for the interaction are reported in the bottom panel of Figure 3, which indicates the expected pattern: Metaphoric transfer was observed at the high (+1 *SD*) level of metaphor usage, $b = .08$, $t = 3.81$, $p < .01$, but not the low (-1 *SD*) level, $b = .00$, $t = 0.03$, $p = .97$.

Discussion

The findings of Study 3 are among the first to show that one can use common conceptual metaphors to make predictions concerning everyday social cognition and behavior. The Study 3 findings, that is, provide substance to the phrase “metaphors we live by” (Lakoff & Johnson,

1980). On the other hand, they also suggest that this phrase appears more applicable to metaphor users than to their literal counterparts. Indeed, in a pattern paralleling Study 2, metaphor-related transfer effects were not observed at low levels of metaphor usage. We suggest that these findings provide good support for the idea that there are individual differences in metaphoric thinking and that they can be studied using the MUM. We encourage further research of this type, but in the meantime turn our attention to another claim concerning metaphoric thinking – namely, that it is *helpful* in understanding experiences (Gibbs, 1994; Keefer, Landau, Sullivan, & Rothschild, 2011; Lakoff & Johnson, 1980).

Study 4

Emotional feelings cannot be directly seen, touched, smelled, or tasted (Epstein, 2003). They are also nonverbal in their essence (Panksepp, 1998). To understand emotions, thus, constitutes a representational challenge (Barrett, 2012; Bucci, 1997). Emotion words are useful in this context (Barrett, 2012), but so are conceptual metaphors (Crawford, 2009). Indeed, people use metaphors very often when they describe their emotions as well as those of other people (Kövecses, 2000). This is because metaphors can capture “what it is like” to have an emotion in a way that literal language cannot (Fainsilber & Ortony, 1987; Kövecses, 2010). On the basis of these ideas, it is intuitive to suggest that metaphor users should score at least somewhat higher in emotional understanding than people who tend to restrict themselves to literal language (Ortony, 1975). Study 4 sought to determine whether this is the case.

Asking people whether they understand their emotions is not sufficient because there is no objective standard for determining if they do (Mayer, Salovey, & Caruso, 2008a). Instead, researchers in this area present people with emotion-related materials, ask them to make inferences, and score the accuracy of these inferences (Mayer et al., 2008a). The tests somewhat

necessarily involve inferring the emotions of others (MacCann, Matthews, Zeidner, & Roberts, 2003), but possess numerous implications for the self (Mayer, Roberts, & Barsade, 2008b; Wranik et al., 2007). For example, the measures administered in Study 4 predict emotional well-being (MacCann & Roberts, 2008) and teamwork effectiveness (Krishnakumar, Hopkins, Szmerekovsky, & Robinson, in press). Accordingly, finding a positive relationship between metaphor usage and emotional understanding would implicate these other benefits as well.

Method

Participants

Participants were 82 (55 female) psychology undergraduates who received course credit. Enrollment was completed using SONA software and the study was completed on laboratory personal computers in groups of 6 or less. Measures were administered using MediaLab.

Metaphor Usage

The properties of the MUM were very stable. The mean was 1.51 – i.e., centered almost exactly on an even proportion of literal versus metaphoric choices. The standard deviation was again 0.19, meaning that metaphor usage should be conceptualized in dimensional rather than all-or-none terms. Skew (.10) and kurtosis (-.37) were minimal. Alpha was .83.

Emotional Understanding

Two objective tests of emotional understanding were administered. One adopts a discrete emotions perspective and scores answers as correct or incorrect (MacCann & Roberts, 2008). The other focuses on more complex combinations of experience and uses the work employment context as one in which multiple goals are typically present (Krishnakumar et al., in press).

Situational Test of Emotional Understanding (STEU). The STEU was developed as an objective assessment of emotional intelligence or EI (MacCann & Roberts, 2008). It uses

appraisal theory (Roseman, 2001) and the consensus of emotion experts (Mayer et al., 2008a) as the basis for probing participant abilities to make correct emotional inferences. In more particular terms, participants are presented with 42 situation descriptions (e.g., “Something unpleasant is happening. Neither the person involved, nor anyone else, can stop it.”), then asked to determine which emotion is most likely in the situation (in the example, options are “guilty”, “distressed”, “sad”, “scared”, and “angry”, with distressed as the correct answer). MacCann and Roberts (2008; also Libbrecht & Lievens, 2012) report evidence on the reliability and validity of this measure. Participants received a score of 0 for incorrect answers and 1 for correct answers, following which an average score was computed ($M = .55$; $SD = .13$).

Work-Related Emotional Understanding (WEU). Emotional understanding is often viewed in terms of relatively sophisticated emotion knowledge (Salovey & Mayer, 1989) and assessed with respect to inferences about emotion co-occurrences and transitions (Rivers, Brackett, Salovey, & Mayer, 2007). Krishnakumar et al. (in press) developed a reliable and valid measure of this type for the workplace context but the measure works somewhat equally well for workers and non-workers. Participants are presented with 10 scenarios (e.g., “Jim had a co-worker take credit for what he had accomplished.”). They then rate the likelihood (1 = not likely; 5 = very likely) that the protagonist would experience two emotions concurrently (e.g., “disgust and sadness”) or in succession (e.g., “irritation, then sadness”) in the described situation. Participants make 4 ratings per scenario for a total of 40 ratings.

Ratings are scored in terms of agreement with consensus rather than as right or wrong (Rivers et al., 2007), in the present case using the recommended procedures of Legree, Psotka, Tremble, and Bourne (2005). Specifically, we correlated a person’s 4 ratings for a given scenario with norms (which agree highly with expert opinion: Mayer, Salovey, Caruso, & Sitarenios,

2003) for the same 4 scenario items (Legree et al., 2005). For example, if a person made likelihood ratings of 2, 3, 1, and 5 for consecutive items of a scenario and average ratings for these same items were 3.83, 2.05, 1.97, and 4.12, the correlation between these two arrays is $r = .59$ and the person would receive a .59 score for that scenario (Legree et al., 2005). A total WEU score was computed by averaging across scenarios ($M = .59$; $SD = .17$).

Results and Discussion

Metaphors have been hypothesized to aid emotional understanding (Kövecses, 2000), in part by providing expression to the “ineffable” (Ortony, 1975). In support of this idea, there was a positive correlation between metaphor usage and STEU performance, $r = .28$, $p = .01$, and there was a positive correlation between metaphor usage and WEU performance, $r = .23$, $p = .04$. The correlation among the two emotional understanding measures was $r = .37$, $p < .01$. These results are consistent with the hypothesized benefits of metaphoric thinking in the emotion realm (Gibbs, 1994). To further explore these benefits, we conducted one last experiment.

Study 5

When people are uncertain, when they ruminate, and when they cannot fully understand what they are experiencing, negative emotions can persist despite benign circumstances (Barlow, 1991; Nolen-Hoeksema, 2011). These free-floating forms of negative affect will naturally subside to some extent when they are seen for what they are – unnecessary and counterproductive (Segal, Williams, & Teasdale, 2013). Psychotherapy is one way to gain this type of understanding, but expressive writing (akin to journaling) is another. When people write about negative events and experiences, they sometimes gain insight into forms of negative affect that no longer serve a purpose and should be relinquished (Pennebaker, 1997). Although the exact mechanisms responsible for expressive writing effects are not fully known, the fact is that

manipulations of this type are often effective in reducing negative affect, in part due to increases in emotional understanding (Baddeley & Pennebaker, 2008; Pennebaker & Ferrell, 2013).

In the expressive writing paradigm, people are randomly assigned to write about a control topic versus negative events and experiences from their lives (Baddeley & Pennebaker, 2008). In Study 5, we instituted a different set of conditions suited to our interest in the functionality of metaphor. If metaphors help people understand their emotions (Fainsilber & Ortony, 1987; Gibbs, 1994), then people who are instructed to use metaphors when describing their experiences should benefit from expressive writing to a greater extent than a control group instructed to write about their emotions in more literal terms. Following the expressive writing literature, this benefit should be evident in reductions in negative affect over time (Pennebaker & Ferrell, 2013) that, we hypothesized, would be somewhat particular to the metaphoric writing condition. Essentially, we sought to provide experimental support for the idea that thinking metaphorically can promote therapeutically useful forms of emotional understanding (Berlin et al., 1991).

Method

Participants and Recruitment

Study 5 was conducted in Tübingen, Germany, with a different type of participant pool. The Knowledge Media Research Center has compiled a list of people from the area (students or non-students) who are in principle willing to volunteer their time for psychology and communication research. We emailed this group and received 88 (59 female, M age = 26.76, primarily Caucasian) tentative commitments prior to the start of the study. This group was informed that the study would involve writing about emotions and that 1 of 10 completers of the study would receive a 10 Euro amazon.de voucher. The somewhat involved nature of the protocol combined with the modest nature of the compensation made it likely that a sizable

minority of study starters would not finish. We handled this likelihood by adding a pre/post (within-subject) element for the key dependent measures, thus boosting power.

Metaphoric Writing Manipulation

The study was conducted online, using Questback software. In an initial survey, potential participants reported on their baseline levels of negative affect and depressive symptoms. For 7 subsequent days, they were asked to log onto the website and write about their negative emotions on that day. The procedures were generally modeled after the expressive writing literature, which has shown that brief but repeated writing efforts of this type can reduce negative affect across time (Pennebaker, 1997). Writing commenced at 5 p.m. or later and each writing session lasted for 5 minutes, a length of time that was deemed both sufficient and efficient in pilot testing.

Participants, though, were randomly assigned to one of two writing conditions. In the control condition, they were to write about their negative emotions using literal rather than metaphoric language (e.g., “I felt anxious or confused”). They were further told that literal language tends to be precise and matter of fact. In the experimental condition, by contrast, participants were to describe their negative emotions using metaphors rather than literal language (e.g., “I felt like a leaf in the wind”, which is a common anxiety metaphor in Germany). These participants were further told that metaphors often liken the abstract to the concrete. A person’s writing condition – control or metaphoric – stayed constant across consecutive days.

The expressive writing literature considers it important that a topic be revisited for at least several days (Baddeley & Pennebaker, 2008; Pennebaker & Ferrell, 2013). Accordingly, when a potential participant missed a day of writing, he or she was encouraged to be more compliant on the next day. If 5 days were missed, the potential participant was immediately dropped from the study. Fifty participants completed at least 3 ($M = 5.08$; $SD = 1.34$) of the 7

daily writing assignments, thus meeting the a priori inclusion criterion. These participants also followed writing prompt instructions (e.g., metaphors were common in the metaphor condition), as determined by the third author. All writing was in German.

Measures

As in the expressive writing literature, our interest was in whether writing would be therapeutic in reducing levels of negative affect. We assessed participant levels of negative affect in two ways. First, we used the German translation (Krohne, Egloff, Kohlmann, & Tausch, 1996) of the well-validated PANAS negative affect (NA) scale (Watson, Clark, & Tellegen, 1988). Participants were asked to indicate the extent (1 = very slightly or not at all; 5 = extremely) to which they had felt 10 markers of NA (e.g., in English, “distressed”, “upset”) over the past couple of weeks. The time frame chosen was comparable to the duration of the study.

In addition, participants completed the German version (Kühner, Bürger, Keller, & Hautzinger, 2007) of the revised Beck Depression Inventory (BDI: Beck, Steer, & Garbin, 1988). The BDI presents participants with 21 sets of 4 statements and asks them which statement best captures their experiences over the past two weeks. Statements are graded such that one can receive a 0 (e.g., “I do not feel sad”), 1, 2, or 3 (e.g., “I am so sad or unhappy that I can’t stand it”) for each of the 21 items. Scores are summed.

The expressive writing literature focuses on changes in negative affect as a result of writing topic and so did we. This within-subject element also boosted power for the study. Whereas time 1 measures were collected days prior to the first writing prompt, time 2 measures were collected the day after the last writing prompt. The dependent measures were therefore reductions (time 1 minus time 2) in NA from time 1 ($M = 1.81$; $SD = 0.69$; $\alpha = .88$) to time 2

($M = 1.68$; $SD = 0.61$; $\alpha = .88$) as well as decreases in depression levels from time 1 ($M = 9.37$; $SD = 10.13$; $\alpha = .95$) to time 2 ($M = 8.17$; $SD = 9.93$; $\alpha = .95$).

Metaphor use, we think, is more preference or habit than ability. As a consequence, using metaphors to describe personal experiences for a week, relative to a control condition, should reasonably shift a person toward greater metaphor use outside of the writing context. To examine this possibility, we translated the MUM into German and gave the German MUM at time 2. As might be expected, the English-selected metaphors did not always translate to German perfectly, resulting in a lower average score ($M = 1.36$; $SD = 0.18$), but the German MUM was reliable ($\alpha = .82$). The German MUM was not given at time 1, which means that results involving this measure should be considered complementary rather than primary (e.g., we could not relate changes in metaphor use to changes in negative affect).

Results

Asking people to think about their personal experiences using metaphors appears to have increased their preferences for metaphor in that time 2 MUM scores were higher following the experimental ($M = 1.42$) than control ($M = 1.31$) writing assignments. This difference was significant, as determined by a one-way ANOVA, $F(1, 48) = 5.90$, $p = .02$, $PES = .11$. Metaphor use, these results suggest, can be trained or changed.

The primary interest, though, was whether metaphoric thinking would prove effective in alleviating distress over time (Baddeley & Pennbaker, 2008). This proved to be the case in that the reduction in NA observed in the experimental condition ($M_{change} = 0.22$) was greater than the reduction of NA observed in the control condition ($M_{change} = 0.03$), as determined by a one-way ANOVA, $F(1, 48) = 4.48$, $p = .04$, $PES = .09$. Equally important, one can consider these results from a second perspective. Among participants in the metaphor condition, there was a significant

decrease in NA over time, as the 95% confidence interval excluded 0, CI = .05 to .39. Among participants in the control (literal writing) condition, there was no change in NA, 95% CI = -.05 to .12. Thus, metaphoric expressive writing was uniquely therapeutic.

We next sought to determine whether similar benefits occurred with respect to depressive symptoms. In the metaphor writing condition, depressive symptoms abated over time, as indicated by the 95% CI, which excluded 0, CI = .34 to 4.30. In the control condition, there was no reduction in depressive symptoms over time, 95% CI = -.63 to 1.41. Viewed another way, an ANOVA revealed that changes in depression were larger in the experimental condition ($M_{change} = 2.32$) than in the control condition ($M_{change} = 0.39$), a comparison that nearly reached conventional levels of significance, $F(1, 48) = 3.62, p = .06, PES = .07$. We conclude that there is some evidence for the idea that metaphoric thinking can be helpful in alleviating distress.

Discussion

Study 4 established a positive relationship between metaphor use and emotional understanding. Study 5 sought to build on these results in two ways. Metaphors are culturally shared (Kövecses, 2005) and their use does not require high levels of intellect (Study 1) or mental imagery ability (Study 2). For these reasons, it should be possible to train people to think metaphorically by simply asking them to do so. Study 5 supports this idea in that participants assigned to a metaphoric writing condition subsequently scored higher on a German translation of the MUM. Thus, thinking metaphorically is, at least in part, a matter of practice.

If metaphor use can be trained, then its benefits should be amenable to training as well. Study 5 supported this idea in that the reduction in negative affect that often follows from expressive writing (Pennebaker, 1997) was stronger among people using metaphors to understand their emotions than among people not using metaphors. The results were a bit more

ambiguous for depressive symptoms than general negative affect, but both outcomes followed a similar pattern. These results comport with Study 4 because emotional understanding is thought to transmit some of the benefits of expressive writing (Pennebaker, 1997; Pennebaker & Graybeal, 2001). The results of Study 5 can be viewed as evidence in favor of this idea.

We should add that our primary focus has been on individual differences and thus the experimental approach taken in Study 5 deserves further attention. Greater compensation might be useful in lessening attrition and larger sample sizes could be used. The use of a neutral topic control group would be helpful in determining whether metaphoric thinking benefits emotional understanding, literal thinking inhibits it, or both. It would also be interesting to determine whether metaphoric expressive writing has some of the other health-related benefits that have been identified in this literature (Baddeley & Pennebaker, 2008). Regardless, Studies 4 and 5 together make a case for the functionality of using metaphors when thinking about emotion.

General Discussion

There are fascinating ideas concerning the role that conceptual metaphors play in human thought (e.g., Geary, 2012; Pinker, 2007) that will remain relatively speculative without a tool for comparing metaphoric and non-metaphoric forms of representation (Landau et al., 2010). The Metaphor Usage Measure (MUM) constitutes such a tool in that it distinguishes people prone toward conceptual metaphors from those who think and speak in more literal terms. The costs, benefits, or otherwise of conceptual metaphor can be studied by investigating relations between MUM scores and variations in the domain (e.g., emotional understanding) of interest. Before elaborating on this point, we review and discuss findings from the five studies.

Discussion of Findings

Study 1 established that there were robust individual differences in metaphor usage that could not be viewed in terms of intellectual performance or personality. The latter discriminant relations are important in that they will permit inferences about conceptual metaphor that are independent of these alternative ways of characterizing the individual. Metaphor use instead varied by preferences for imagery, but the correlation was modest, and metaphor use was independent of imagery abilities in Study 2. Thus, metaphor users like imagery more than literal people but they are not better at creating mental simulations of a perceptual type. Overall, metaphor use seems more accurately characterized as a preference than ability, results consistent with everyday perspectives on metaphoric thinking (Gibbs, 1994; Lakoff, 1986).

People who use metaphors more often should be more susceptible to what might be called “metaphoric illusions” but are more commonly called “metaphor transfer effects” (Landau et al., 2010). These are cases in which people’s conceptual representations, and potentially even their behavior, can be hijacked by irrelevant perceptual inputs that are associated with prominent metaphors. In Study 2, simply presenting words in a dark font led to more negative evaluations, but only at high levels of metaphor usage. Literal thinkers, by contrast, were spared from this metaphoric illusion. Study 3 was important not just because it replicated this pattern, but also because it focused on daily life implications. The prosociality of metaphor users, but not literal thinkers, was contingent on whether and how much sweet food they had consumed on a given day, consistent with the sweet/prosocial conceptual metaphor (Meier et al., 2012b). These findings confirm a role for metaphor in metaphor transfer effects (Landau, Keefer, & Meier, 2011) while suggesting that such effects may typically be absent among some (i.e., low MUM) people. The Metaphor Usage Measure will have value in further analyses of this type.

Due to their nonverbal experiential nature, emotions constitute a representational challenge (Bucci, 1997) and conceptual metaphors may help us meet this challenge (Kövecses, 2000). Consistent with these theoretical proposals, Study 4 established positive relationships between metaphor usage and performance on two objective tests of emotional understanding. Although metaphor usage seems unlikely to help with more perceptual forms of EI (Mayer et al., 2003), emotional understanding is considered more important to intelligent emotion regulation (Izard et al., 2011; Wranik et al., 2007). We would therefore expect metaphor users to regulate their emotions better, a suggestion consistent with the results of Study 5. It is also worth pointing to parallels between low MUM scores and alexithymia, which is marked by literal thinking and difficulties conceptualizing emotion (Nemiah, Freyberger, & Sifneos, 1976). Given these parallels, MUM scores should correlate positively with emotional expressivity according to the analysis of Nemiah et al. (1976). Altogether, the collective findings of Studies 2-5 demonstrate both costs (Studies 2-3) and benefits (Studies 4-5) to metaphoric thinking.

The Nature of the Measure

It seemed desirable not to ask vague questions about how metaphorical participants think they are. Such questions would arguably tap features of the self-concept rather than what we sought to assess – namely, actual variations in metaphor use. Even so, the structured nature of the Metaphor Usage Measure is an advantage. By structuring the measure, we were able to avoid the reliability and subjective coding problems that can be endemic to unstructured tests (though the MUM did predict the frequency of spontaneous written metaphors in Study 1).

We sought to focus on relatively ordinary manifestations of conceptual metaphor. For this reason, the items of the MUM consist of common, everyday expressions rather than rarified poetic language (Gibbs, 1994). Perhaps as a result, the MUM averages hovered around the

midpoint, thus nicely distinguishing more literal people (< 1.5) from more metaphoric people (> 1.5). Perhaps as a result, also, correlations with intellectual performance were non-significant. One should therefore view MUM scores in terms of style-based (Riding & Rayner, 1998) rather than ability-based differences between people.

Implications for Conceptual Metaphor Theory

On their surface, metaphors appear to be diverse, unrelated figures of speech. A contribution of conceptual metaphor theory was to suggest a deeper organization – namely, a way of thinking that gives rise to these diverse figures of speech (Gibbs, 1994; Lakoff & Johnson, 1980). Data from the MUM support conceptual metaphor theory in that people predisposed toward one metaphoric phrase (e.g., “he is deep”) were predisposed to diverse other metaphoric phrases (e.g., “time is dragging”) as well. Further, such tendencies systematically predicted metaphor transfer effects, results consistent with a deep rather than surface view of how metaphor operates (Landau et al., 2010).

Conceptual metaphor theory, though, might be interpreted to suggest that all people are prone to think metaphorically. At least as manifest in responses to the MUM, this does not appear to be the case. Although some people consistently endorsed the metaphor-related option of each phrase pair, others consistently endorsed the literal option of each phrase pair. Metaphor usage, that is, has dispositional features, features that have not received a great deal of attention in the literature (Meier et al., 2012a; Robinson & Fetterman, 2014).

Studies 2 and 3 demonstrate the utility of this sort of dispositional analysis. Conceptual metaphor theory is supported when perceptual inputs lead to metaphor-consistent thoughts, feelings, or behaviors (Landau et al., 2010). The literature has produced a number of supportive findings, but we lack knowledge concerning important who and why questions (Meier et al.,

2012a). In addition, it would be useful to have firmer evidence that metaphor representation processes are involved (Keefer et al., 2011; Landau et al., 2014). Our findings contribute to the literature in these multiple desired manners. Specifically, they suggest that metaphor users are more likely to exhibit metaphoric transfer and they are more likely to do so precisely because they think in metaphoric terms. The MUM can therefore be used as a tool for determining the “metaphoricity” of a phenomenon: If metaphor representation processes are involved, then the phenomenon should be stronger as levels of metaphor usage increase.

Conceptual metaphors are thought to be functional in thinking about nonverbal entities such as emotion (Kövecses, 2000; Ortony, 1975). Studies 4 and 5 of the present investigation provide some of the first available evidence for this idea. People inclined to think metaphorically, for example, scored higher in emotional understanding (Study 4). These relationships were not large, but they were theory-consistent. The MUM, a measure not confounded with intellectual performance or personality traits, can therefore facilitate rapid progress on the proposed benefits (Lakoff & Johnson, 1999) of metaphoric thinking.

Future Directions on Benefits and Costs

Conceptual metaphor is thought to facilitate the understanding of abstract concepts or mental events that lack clear perceptual referents (Lakoff & Johnson, 1999). If so, we might expect metaphor users to be better abstract thinkers. Metaphors involve making links between disparate domains on the basis of similarity or analogy (Bowdle & Gentner, 2005). The associative scope of metaphor users should therefore be broader than that of their more literal counterparts. Due to the role of broadly associative thinking in creativity (Mednick, 1962), furthermore, we would expect metaphor usage to positively correlate with at least some forms of creativity. Finally, conceptual metaphors relate thoughts and feelings to concrete experiences

(Landau et al., 2014). As concreteness and relatedness contribute to memory performance (Paivio, Walsh, & Bons, 1994), metaphor users may have some advantages in memory tasks.

In addition to these relatively cognitive benefits, people often use metaphors to translate their nonverbal feelings into words (Gibbs, 1994; Kövecses, 2010). Conceptual metaphors should therefore play some role in what is termed “referential competence”: insightful symbolic access to one’s nonverbal experiences (Bucci, 1984; 1997). We reported evidence in support of these ideas in the form of positive relations between metaphor usage and emotional understanding. Future research could expand along these lines. For example, Schultheiss and Strasser (2012) review evidence in favor of the idea that people higher in referential competence have conscious views of their motives that are more in line with their implicit motives. This sort of congruence seems more likely to characterize metaphor users than literal thinkers. As another example, Bucci (1997) has linked referential competence to progress in psychotherapy, which itself requires some ability to gain insight into nonverbal feelings and experiences. Similar benefits may occur as a function of metaphoric thinking, as suggested by Study 5.

We hasten to add that conceptual metaphors for affect are primarily about representation, not experience (Crawford, 2009). What this means, in part, is that metaphoric thinking is not likely to alter initial, biologically-based (Lang, Bradley, & Cuthbert, 1997) reactions to emotional stimuli. Further, the emotional lives of literal and metaphoric people should be largely the same. In support of this point, correlations with the emotion-related traits of extraversion and neuroticism were non-significant in Study 1. What metaphors do to emotion should therefore be considered more subtle. They highlight shades of emotional meaning that literal thinking cannot (Fainsilber & Ortony, 1987) and therefore facilitate emotional understanding (Kövecses, 2000). This understanding can mitigate prolonged experiences of negative affect (Pennebaker, 1997), as

shown in Study 5, but would not be expected to alter how emotions initially arise (Barrett, 2012). These suggestions would benefit from additional research.

Although we have emphasized the benefits of metaphoric thinking, there are likely to be costs as well, even beyond those established in Studies 2 and 3. It should be recognized that conceptual metaphors depart from factual truth and we might therefore expect additional downsides to metaphoric thinking like confabulation or irrational beliefs. The availability of the MUM will facilitate such directions of research.

Metaphor, Embodiment, and Simulation

In the traditional view of the mind, representations consist of semantic knowledge or disembodied symbols (Barsalou, 2008). In one way or another, the terms embodiment, metaphor, and simulation challenge this traditional view, instead positing a prominent role for perceptions and the body in how knowledge is structured as well as how it guides behavior (Pecher et al., 2011). The terms – and the processes they represent – presumably overlap in systematic ways, such that studying these interactions represents a valuable direction for research (Barsalou, 2010; Gibbs, 2006). What follows is one take on these relationships.

Embodiment means that the body has an influence, such as when smiling causes people to read pleasant sentences faster than unpleasant sentences (Niedenthal, 2007). We view embodiment as part of the scaffolding of many conceptual metaphors (Gibbs, 2006). For example, the metaphor INTIMACY IS CLOSENESS seems likely to follow from the fact that our bodies tend to be closer to others when we are having intimate experiences (Lakoff & Johnson, 1999). What happens with conceptual metaphors, though, is that they gain considerable independence from their potentially embodied roots (Gibbs, 2011). As just one example, we can liken an angry person to a wild animal despite having little experience with wild animals

(Kövecses, 2010). We also emphasize that embodied effects are typically those involving current bodily states (e.g., one's current smiling), whereas conceptual metaphor effects need not involve such online feedback from the body (Landau et al., 2014). Or, stated in other terms, conceptual metaphor should be distinguished from concurrent bodily influences.

Another framework worth discussing is Perceptual Symbol Systems (PSS: Barsalou, 1999; 2008) theory, which contends that the brain recruits perceptual and motoric circuits for conceptual processing tasks. This often occurs through a simulation process whereby past experiences with an object or activity (e.g., holding and manipulating tools) are drawn upon to represent that object or activity (e.g., thinking about tool use), for example while reading sentences on a computer screen (Barsalou, Simmons, Barbey, & Wilson, 2003). As suggested by Gibbs (2006) and Crawford (2009), simulation is probably involved in conceptual metaphor. That is, for example, past experiences of darkness are likely simulated when we think of our future as dark, even though the future does not have reflective surfaces (Gibbs, 2006). If so, what is remarkable about conceptual metaphors is just how creative, or even impossible, these associations can be (Landau et al., 2014). The fact is that traditional versions of PSS would have to be modified to handle conceptual metaphors (Pecher et al., 2011) and, in some cases, both PSS and CMT are necessary to explain an effect (Slepian & Ambady, 2014). In addition to such points, we simply add that our individual difference measure targets conceptual metaphors, not more routine simulation activity, and the findings of Studies 2 and 3 follow from prominent conceptual metaphors rather than from PSS-derived predictions (Landau et al., 2010).

It may be of some final value to compare and contrast our results with other recent findings. IJzerman, Karremans, Thomsen, and Schubert (2013) found that physical warmth led to prosocial behavior only among securely attached children and Fay and Maner (2014) found that

rejection experiences combined with heat to cause aggression particularly among people high in fear of negative evaluations. These studies highlight motivation-related moderators of embodiment and they also focus on the specific consequences of heat. Metaphor usage, by contrast, is not primarily a motivational factor and its moderating effects should extend beyond heat to encompass other perceptual inputs as well, specifically those reflected in prominent metaphors (Lakoff & Johnson, 1999).

Häfner (2013), like us, proposes a general sort of moderator. He suggests that people with greater interoceptive access to their bodies – for example, in the form of more accurate heartbeat detections – should be more susceptible to embodiment effects. It seems unlikely to us that there would be a systematic relationship between metaphor usage and interoceptive access, but this could be examined empirically. Even so, interoceptive accuracy presumably works on the internal states of the body (Häfner, 2013), whereas metaphor usage may typically operate on external inputs (e.g., the font colors of Study 2). Slepian (2015) showed that hard versus soft inputs affected judgments of political conservatism, but only for people thinking that the metaphor of “hard Republicans” makes sense. Metaphor usage might also moderate effects of the Slepian (2015) type, but it reflects a more general disposition. Metaphor usage, that is, operates at the level of people rather than individual metaphors.

Limitations and Conclusions

The investigation sought to establish a new construct and each study had its own set of goals. As a consequence, though, more extensive evidence for particular points (e.g., that metaphor use benefits emotional understanding) would be valuable. Our interest was in whether people differ in metaphor usage. We consider this to be an individual difference question, but

manipulations of the Study 5 type may be considered a complementary strategy for future research. We do think that metaphoric thinking is trainable.

Conceptual metaphor theory (Lakoff & Johnson, 1999) makes potentially profound points about the human mind and has generated a great deal of interest in social psychology (Landau et al., 2014). The theory has been relatively silent on individual differences, however, despite likely differences in metaphoric cognition across people (Messick, 1976). We developed the Metaphor Usage Measure both to examine the proposed functionality of conceptual metaphor and because individual differences in metaphoric thinking are likely to be consequential in other ways as well. Conceptual metaphor theory was supported in the consistency with which people endorsed literal versus metaphoric phrases as more typical of their thoughts, speech, and writing. In addition, metaphor users displayed greater emotional understanding, but in the context of greater susceptibility to metaphor transfer effects. For better or for worse, it appears that some of us are living far more metaphor-infused lives than others.

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Figure 1

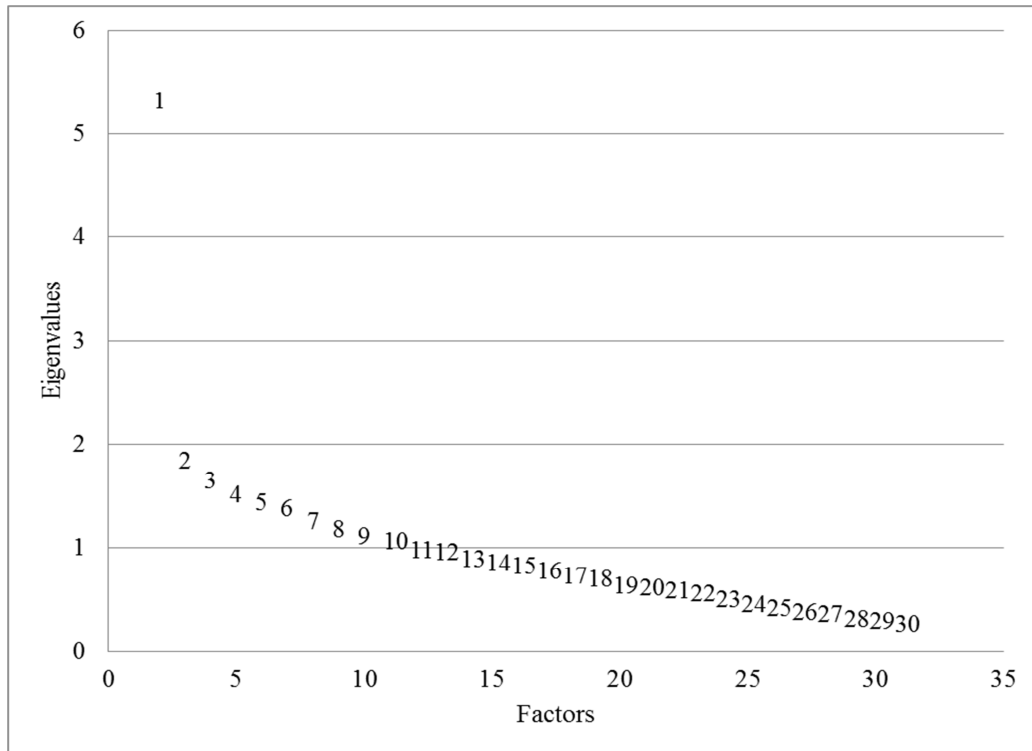
Principle Components Factor Analysis Scree Plot, Study 1

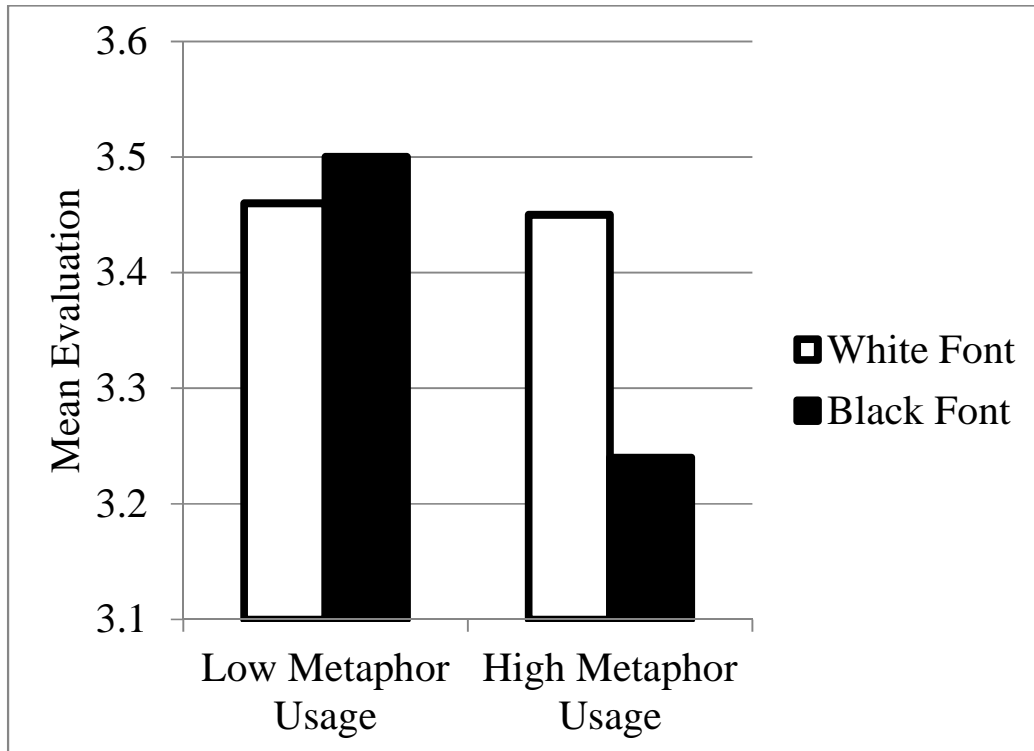
Figure 2

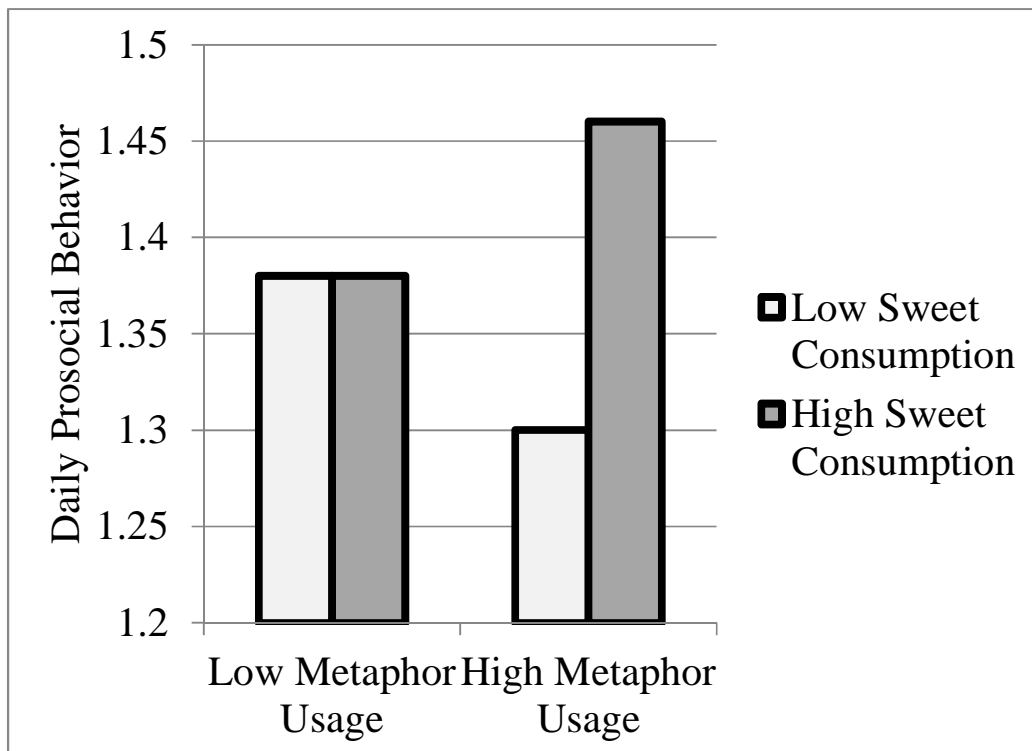
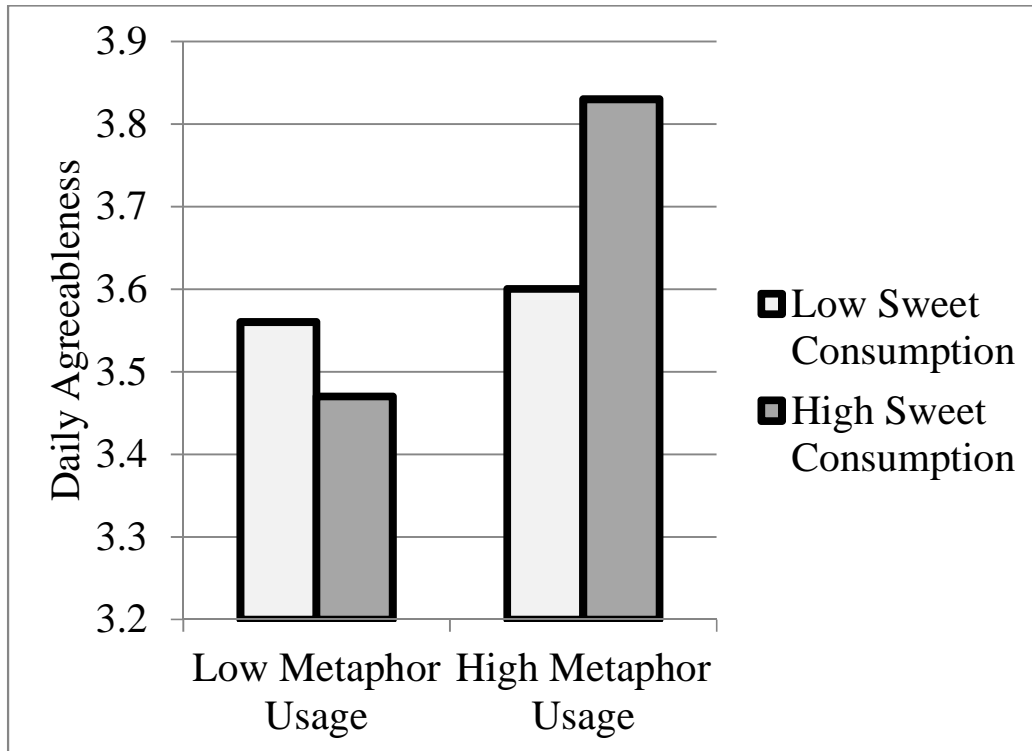
Stimulus Color Effects on Evaluations Vary by Metaphor Usage, Study 2

Figure 3

*Metaphor Usage by Sweet Food Consumption Interactions for Daily Agreeableness (Top Panel)
and Daily Prosocial Behavior (Bottom Panel), Study 3*







Appendix: Metaphor Usage Measure (MUM)

Instructions: Which phrase would YOU be more inclined to say, think, or write in everyday life?

- | | |
|--|--|
| 01) A. I feel very happy | B. I feel like jumping for joy* |
| 02) A. The test was difficult | B. The test sucked* |
| 03) A. I am fed up* | B. I am impatient |
| 04) A. I understand your point | B. I see what you mean* |
| 05) A. The sales have skyrocketed* | B. The sale have increased dramatically |
| 06) A. She uses her head* | B. She makes rational decisions |
| 07) A. He is very thoughtful | B. He is deep* |
| 08) A. I am burning up* | B. I am very hot |
| 09) A. She thinks outside the box* | B. She is very creative |
| 10) A. She is very nice | B. She is a saint* |
| 11) A. This is very important | B. This is a big deal* |
| 12) A. Time is dragging* | B. Time is moving slow |
| 13) A. I destroyed them* | B. I won the match |
| 14) A. I cannot get him to understand | B. I cannot get it across to him* |
| 15) A. We did something very wrong | B. We are in deep trouble* |
| 16) A. I am very happy | B. I am on top of the world* |
| 17) A. That makes me sick* | B. I hate it |
| 18) A. I feel like crap* | B. I am sick |
| 19) A. She got very angry | B. She blew up* |
| 20) A. I can't cram any more into my head* | B. I can't memorize any more information |

- | | |
|-------------------------------------|-----------------------------------|
| 21) A. I'm drained* | B. I'm tired |
| 22) A. I slept well | B. I slept like a rock* |
| 23) A. He is doing well | B. He's on the right track* |
| 24) A. He has a big heart* | B. He is caring |
| 25) A. He got very drunk | B. He got wasted* |
| 26) A. My heart was broken* | B. I was very sad |
| 27) A. She was crushed by the news* | B. She was very upset by the news |
| 28) A. I am very tired | B. I am dead tired* |
| 29) A. He ran very fast | B. He ran like the wind* |
| 30) A. Cheer up* | B. Be happy |

*Metaphor-related option