

RUNNING HEAD: DAILY METAPHOR USE AND INTERPERSONAL PROCESSES

On the Interpersonal Function of Metaphor Use:

Daily Metaphor Use Fluctuates with Empathy and Perspective Taking

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ABSTRACT

Empathy and perspective taking play important roles in interpersonal functioning. As prior research has linked metaphor use to emotional understanding, it is likely that metaphor use is also involved in empathy and perspective taking. In two daily diary studies ($N = 225$; Obs. = 1,849), we predicted that on days in which empathy and perspective taking were high, participants would also report higher metaphor use. In Study 1, we found support for our hypotheses, such that daily metaphor use was positively associated with daily empathy and perspective taking. In Study 2, we replicated these results. We place this work within the current literature and discuss the promise of an interpersonal function of metaphor use.

KEYWORDS: Metaphor Use; Interpersonal Processes; Empathy; Perspective Taking; Daily Diary

Interpersonal relationships are undeniably important to human functioning (Baumeister & Leary, 1995). For this reason, people are motivated to identify warm and caring others (Abele & Brack, 2013) and to maintain close relationships (Knee et al., 2013). Empathy and perspective taking are particularly important for these purposes (Goldstein et al., 2014). Therefore, investigating the signals and features of empathy and perspective taking is important for understanding interpersonal relationships. One particular signal or feature of interest is metaphor use. Indeed, when people attempt to understand abstract concepts like emotion, they often use metaphors (Fainsilber & Ortony, 1987). Further, metaphor use appears to play a role in empathy and perspective taking (Drew & Holt, 1988; Horton, 2007). However, little work has directly assessed this link. The goal of the current investigation was to not only test for an association between metaphor use and empathy and perspective taking, but to test whether these associations are operative in everyday life. We did so in two daily diary studies.

Empathy & Perspective Taking

The terms “empathy” and “perspective taking” are often used interchangeably in casual conversation, even by researchers. This is likely due to the amount of overlap between these two constructs. However, an ample literature has separated empathy and perspective taking into “emotional” and “cognitive” empathy, respectively (Davis, 1983, 1994). Specifically, “empathy” often involves vicarious emotional experiences and/or sympathy. Perspective taking, on the other hand, involves cognitively seeing (i.e., imagining) things from someone else’s point of view. Importantly, both are important to finding and maintaining close relationships (Davis & Oathout, 1987), fundamental drives of all humans (Baumeiser & Leary, 1995).

Research on empathy and perspective taking have linked these constructs to numerous positive relationship outcomes in platonic and romantic relationships. For example, they are

positively associated with feelings of being supported in friendships (Ciarrochi et al., 2017), accommodating behaviors in romantic relationships (Arriaga & Rusbult, 1998; Murray et al., 2015), secure attachment (Mikulincer et al., 2001; Péloquin et al., 2011), responsiveness to relationship partners' needs (Schutte et al., 2001; Zaki et al., 2008), and a host of other positive relationship outcomes. Therefore, it is important to look for signals of empathy and perspective taking in others.

Researchers have investigated signals of empathy and perspective taking for the goal of understanding these processes further. For example, some have suggested that people wear these and similar traits on their faces (e.g., Oosterhof & Todorov, 2008). Others have looked to verbal behavior and language. For instance, people perceive others who use more negative emotion words as “complainers,” violators of social convention, or as being self-focused (Berry et al., 1997). Another potential language-based indicator of empathy and perspective taking is metaphor use.

Metaphor Use as a Signal of Empathy & Perspective Taking

Metaphors serve more important functions than beautifying language or literature (Ortony, 1975). They are tools that people use to understand concepts that are intangible or relatively abstract (Gentner et al., 2001; Glucksberg & Keysar, 1990; Holyoak & Stamenković, 2018; Lakoff & Johnson, 1980; Landau, 2017; Ortony et al., 1978). In that sense, they are a type of trace evidence of thought processes related to comprehending complex and abstract concepts (Kövecses, 2010). Therefore, if someone attempts to understand how a person is feeling, they draw parallels between physical or concrete concepts and that person's feelings (e.g., Jane is “in a dark place”). This understanding function is evident when considering the structure of metaphors. Most agree that metaphors have at least two parts: a source and target (Holyoak &

Stamenković, 2018; Ortony et al., 1978). The “target” is the thing one is trying to understand (e.g., “depression”), while the “source” is the concrete referent they use to concretize the target (e.g., “a dark place”). The function of the metaphor, then, is to provide meaning to the target.

There has been relatively little work looking into the specific functions of metaphor use, as it relates to social psychological outcomes. However, recent investigations are making inroads in this area. For example, Keefer et al. (2011) found that people tend to rely on metaphors in states of high uncertainty. Baldwin et al. (2018) found that applying a journey metaphor (vs. not) to one’s life led to higher feelings of meaning in life, suggesting an existential function of metaphor use. Perhaps of most relevance to the current investigation is the work on metaphor use and emotional understanding. Fetterman et al. (2016) created an individual differences measure of metaphor use and found that scores on this measure correlated positively with two tests of emotional understanding. Further, they found that participants who wrote about their emotions everyday using only metaphors (vs. literal statements) had significantly lower negative affect after a week. These findings suggest an emotional function of metaphor use, in that people use metaphors to understand their emotions, if only subjectively.

Fetterman et al. (2016) joins prior work in linguistics and cognitive science connecting metaphor use to emotion (Kövecses, 2003; Ortony et al., 1990). For example, Fainsibler and Ortony (1987) found that people use more metaphors when describing their emotions compared to other topics. Together, this work suggests that people draw upon metaphors in the process of emotional understanding. In other words, the presence of metaphor use hints toward an attempt at understanding emotion. However, it is also likely that people use metaphors to understand other people’s emotions, whether it be through empathy or perspective taking. If so, this would suggest an interpersonal function of metaphor use, in addition to the emotional function.

We are not first to propose a role for metaphor use in empathy and perspective taking (e.g., Cohen, 2008; Holyoak & Stamenković, 2018). In fact, there is already some indirect evidence for the association between metaphor use and these constructs. For example, Drew and Holt (1988) found that people use metaphors more often when trying to evoke empathic concern in others. In another case, Horton (2007) found that participants rated interaction partners who used more metaphors as interpersonally closer than those who used fewer metaphors. Further, to measure emotional understanding Fetterman et al. (2016), in the studies mentioned above, used the Situational Test of Emotional Understanding (MacCann & Roberts, 2008) and the North Dakota Emotional Abilities Test (Krishnakumar et al., 2016). For both tests, participants are tasked with imagining and deciding which emotions and emotion processes are involved in scenarios involving themselves and others, the latter requiring empathy and perspective taking. Therefore, the significant positive correlation between individual differences in metaphor use and scores on these emotional understanding tests provide initial evidence for a link between metaphor use and empathy and perspective taking. However, we wanted to test this association directly, in addition to testing whether this association was operative in daily life.

CURRENT INVESTIGATION

We adopted a daily diary approach given that such designs are high-powered and ecologically valid (Conner et al., 2009). In two studies, we tested for day-to-day relationships between metaphor use and empathy and perspective taking. In both studies, participants reported on their daily metaphor use for 14 days in a row. In this case, we used simple self-report items. An argument could be made that people cannot track their daily metaphor use and certainly do not do so without prompting. However, given the daily diary design, we argue that participants do start paying attention to, or at least become somewhat cognizant of, their behaviors (whatever

they are) after reporting them a couple times. Others have made similar arguments (Shrout et al., 2018). Furthermore, we argue that when people think back on their thoughts and behaviors, those who can more readily recall instances of metaphor use (or whatever construct) likely used them more. As such, with both of these considerations in mind, the self-report method seems, at least, a good approximation of daily metaphor use (BLINDED FOR REVIEW).

In both studies, participants also reported on their daily empathy and perspective taking using face-valid items inspired by the Interpersonal Reactivity Index (IRI; Davis, 1980) and the Toronto Empathy Questionnaire (TEQ; Spreng et al., 2009). We make the same approximation arguments regarding the daily measurement of these variables. We hypothesized that daily metaphor use scores would be higher on days that participants reported higher empathy and perspective taking.

Transparency Statement

We have a number of disclosures to make in the interest of open reporting and transparency. First, as with any time and resource intensive protocols (Finkel et al., 2015), we included a variety of items meant to test numerous hypotheses from various labs that pooled resources. We only report the items directly related to our hypotheses, though this includes *all* items directly related to our hypotheses. In addition, we have listed all items collected by our lab, along with the relevant data and analysis code for these studies, on the Open Science Framework (https://osf.io/yurpc/?view_only=c0d7a03957f841dcac5fbba7a0437e87). While some of the other items are indirectly related to the current investigation, our aim, here, was clearly on the daily co-occurrence of metaphor use with empathy and perspective taking.

Second, there have been two unrelated publications with data (though, not with the current variables) from Study 1 (BLINDED FOR REVIEW and BLINDED FOR REVIEW).

There are currently no publications associated with the Study 2 data. Third, we had originally planned to analyze the daily relations between emotional understanding and metaphor use, as well. In order to present a cohesive line of research focused on interpersonal processes, we only report these analyses in the Electronic Supplementary Material (ESM). Fourth, our original plan was to report the models at the item level for empathy and perspective taking given the complexity of empathy's components. However, we felt it more appropriate to create empathy and perspective taking composite scores similar to Davis (1983), and report item level analyses in the ESM.

Finally, even though we included the current items in the daily protocol to test the current hypotheses, none of our hypotheses nor our analysis plans were preregistered. Readers should consider our findings in light of this fact, combined with the aforementioned disclosures.

STUDY 1

METHOD

Participants and Procedure

Participants were undergraduate students from a large university in the Southwestern United States, who signed up for a daily diary study for course or extra credit. Our sampling strategy was to recruit as many participants as we could in one week to complete an online initial assessment, but at least 100. We based this decision on prior research that have used similar designs (e.g., Fetterman et al., 2018; Lenton et al., 2016). Of the 145 participants recruited, 127 (84 female) participants completed at least one daily report. The data consisted of 1127 observations (i.e., daily reports) allowing for ample statistical power behind the multilevel analyses.

Participants signed up for a two-week daily diary study via SONA and completed the online initial assessment. In the initial assessment, participants partook in a variety of tasks (mostly questionnaires) on Qualtrics, provided their email address, gave consent, and received instructions for the daily protocol. They received 1 point for completing the initial assessment. The daily assessment began the Monday immediately following the one-week initial assessment period. We sent participants an email at 5 PM for 14 consecutive days, containing participant numbers and survey links (administered via Qualtrics). Participants had until 3 AM the next morning to complete each survey. Participants were awarded .5 credit for each survey completed. To further motivate compliance, participants no longer received surveys if they missed six surveys (BLINDED FOR REVIEW), meaning they could no longer earn credits. Participants completed an average of 67% of their surveys.

Daily Diary Measures

Throughout the daily surveys, participants responded to items related to their daily thoughts, emotions, behaviors, and events. We sectioned the items by these categories and Qualtrics presented the items within the sections in random order for each participant, each day. To measure daily metaphor use, we used two items and participants responded on a four-point scale (1 = “never”; 4 = “very often”). Since most people do not have much scientific knowledge of metaphors, we designed the items to be more explanatory than directly asking whether they had been “metaphoric” that day. As a metaphor is the comparison of an abstract concept to a concrete domain (Lakoff & Johnson, 1980) we created the item, “Today, I compared my abstract thoughts to other things to make more sense of them.” This item is explanatory, in that it describes the process of metaphoric thought in simple language. The second item was equally explanatory: “Today, I preferred figurative language to more literal language.” Here, participants

likely understand what “figurative” means, especially in the context of comparing it to literal language. We averaged the items to create an acceptably reliable metaphor use score ($M = 2.09$, $SD = 0.77$, $\alpha = .63$)¹.

We created three face-valid items to measure a variety of components of empathy and participants responded to them on a five-point scale (1 = “very inaccurate”; 5 = “very accurate”). These items were inspired by the IRI (Davis, 1980) and the TEQ (Spreng et al., 2009). These two measures are trait-focused and, as such, the items have a specificity to them. Therefore, we modified the items to be more broadly relevant to daily life. One item addressed empathic concern, “Today, I felt sorry for other people’s misfortunes,” the second addressed empathic prediction (or forecasting), “Today, I was good at predicting how others felt,” and the third addressed empathic influence, “Today, people had a strong influence on my mood.” We averaged across these items to create daily empathy score ($M = 3.18$, $SD = .77$, $\alpha = .46$), though we note the poor internal reliability. Finally, we created two items to measure daily perspective taking. Both were inspired by the IRI (Davis, 1980). Participants responded to them on the same five-point scale. One item addressed argumentative perspective taking, “Today, I considered other people’s arguments,” and the other addressed imaginative perspective taking “Today, I tried to understand people better by imagining things from their perspective.” We averaged across these items to create daily perspective taking score ($M = 2.51$, $SD = .80$, $\alpha = .71$).

RESULTS

To test our within-person relations hypotheses, we used a multilevel modeling approach (Raudenbush & Bryk, 2002). First, to test the proportion of variability of metaphor use that was

¹ We included the original metaphor usage measure (MUM; Fetterman et al., 2016) in the initial session for other purposes. The MUM and the daily metaphor use measures differ largely in design and scoring. Even so, the MUM did positively predict daily metaphor use in a multilevel model, $b = 0.63$, $t(118) = 2.15$, $p = .034$, suggesting some, albeit imperfect, construct validity for the daily measure.

due to participant differences, we computed intra-class correlations (ICC) for the null model (i.e., not including empathy or perspective taking as predictor variables). The ICC was .59, which provided support for analyzing the data using multilevel modeling. To do so, we person-centered the daily empathy and perspective taking variables as level 1 daily predictors. Doing so distinguishes within-person from between-person sources of variance (Enders & Tofighi, 2007). Person-centering also removes data with no variability across days, which cannot be modeled, leading to lower and varying degrees of freedom in the models. We also followed the guidelines for standard error specification (Barr et al., 2013) by including corresponding random effects for the daily empathy and perspective taking variables for each model respectively. Finally, we conducted our analyses using the `lme` function in the `nlme` package (Pinheiro et al., 2020) in R, with an autoregressive covariance structure. We report fixed within-subjects effects below, as these directly test the current hypotheses.

In regards to empathy, as we hypothesized, on days that people reported higher empathy, they also reported more metaphor use, $b = 0.07$, $t(1069) = 4.33$, $p < .001$, 95% CI [.041,.108]. For perspective taking, our hypothesis was also supported. On days that people reported higher perspective taking, they also reported more metaphor use, $b = 0.14$, $t(1054) = 8.49$, $p < .001$, 95% CI [.107,.172]. See Figures 1 and 2 for visual representations of the data.

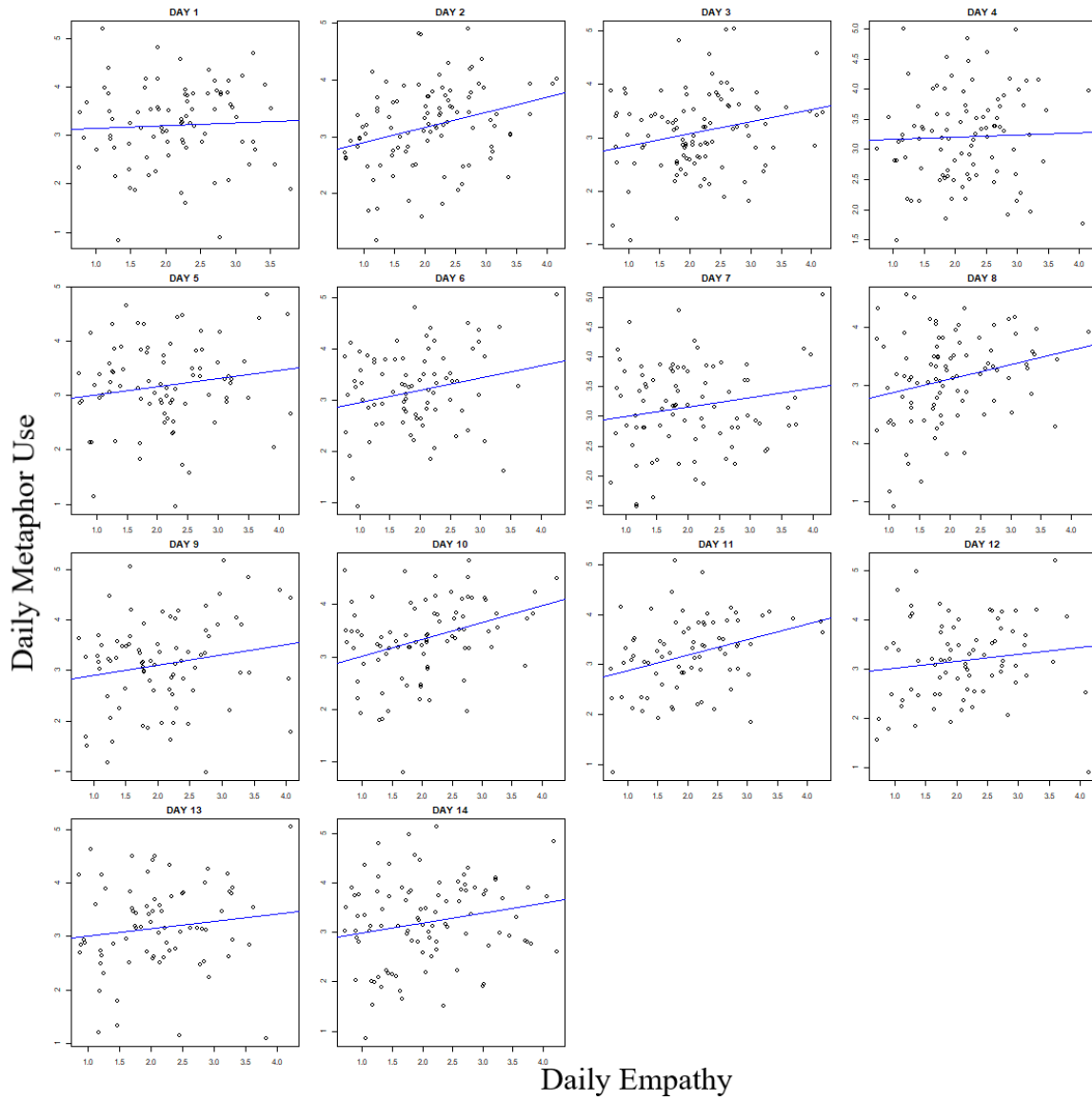


Figure 1: Scatterplots Representing the Association between Daily Empathy and Daily Metaphor Use by Day, Study 1

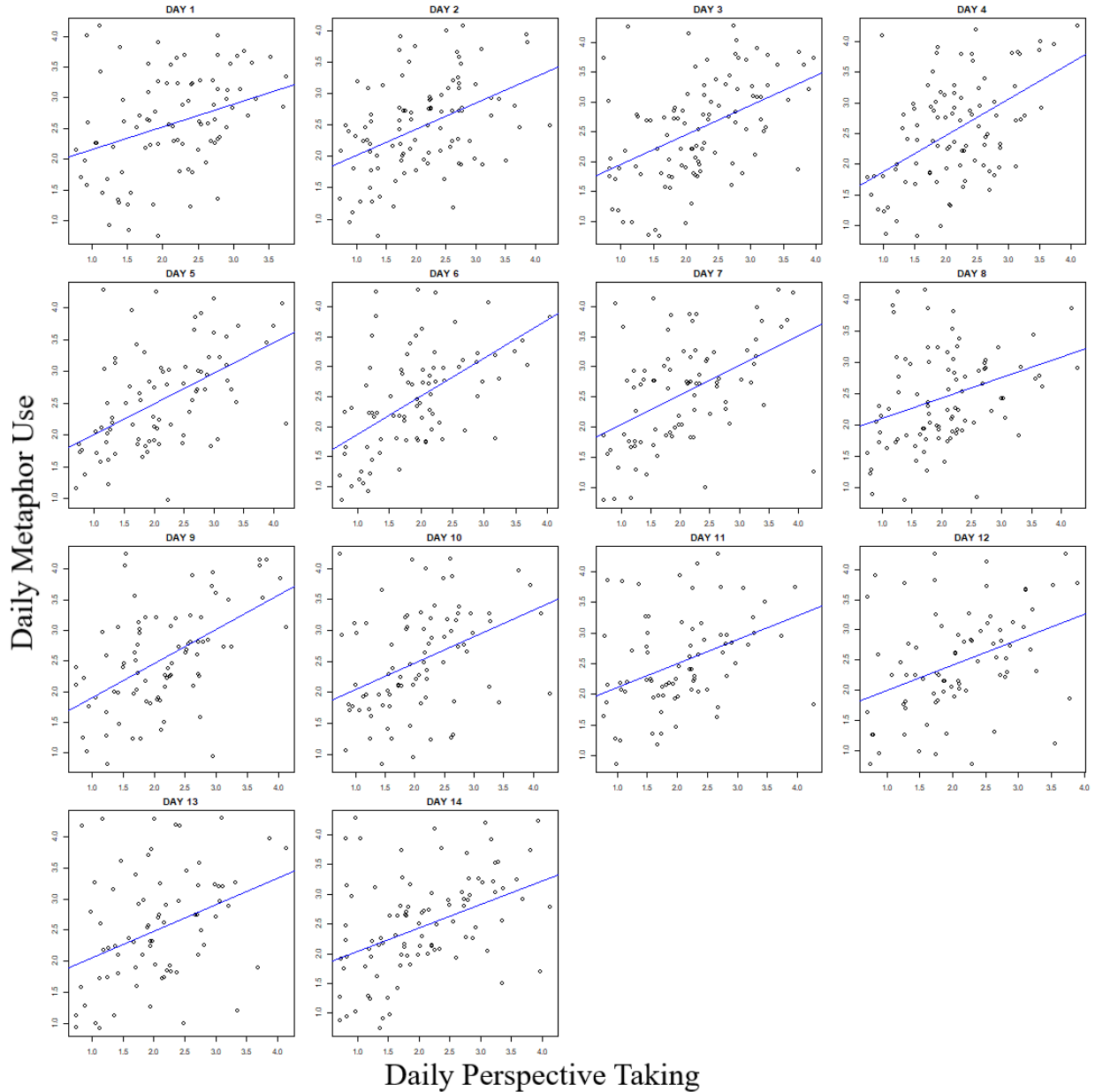


Figure 2: Scatterplots Representing the Association between Daily Perspective Taking and Daily Metaphor Use by Day, Study 1

DISCUSSION AND STUDY 2

People use metaphors to help them understand the abstract qualia of emotional experiences (Crawford 2009; Fainsilber & Ortony, 1987; Fetterman et al., 2016; Meier & Robinson, 2005). As a result, one could reason, changes in the frequency of metaphor use

correspond with fluctuating empathy and perspective taking. Study 1 provided support for this idea and did so in the context of daily life. Specifically, people reported using more metaphors on days in which they reported higher daily empathy and perspective taking.

The results of Study 1 provided support for our hypothesis regarding the link between metaphor use and empathy and perspective taking. In Study 2, we attempted to replicate these findings to add confidence to our conclusions. Further, we hoped to improve on our measures of daily metaphor use and empathy. For the former, we wanted to provide the participants with further guidance on what metaphors are and add an item that explicitly mentions metaphor use. For the latter, the empathic influence item may not have been a good empathy item after all. One can feel angry because of another person's action, which is an "influence" on mood, but not empathy. We removed this item in Study 2.

METHODS

Participants and Procedure

Participants were undergraduate students from a large university in the Southwestern United States, who signed up for a daily diary study for course or extra credit. Our sampling strategy was the same as Study 1. However, we did not meet our planned goal of 100 participants in one week. Therefore, we extended the initial assessment by one week. As such, the daily assessment began the Monday immediately following the two-week initial assessment period. This led to higher than usual drop-outs. Indeed, of the 146 participants recruited, 98 (82 female) participants completed at least one daily report. Even so, the data consisted of 722 observations (i.e., daily reports) allowing for ample statistical power behind the multilevel analyses.

Participants completed an average of 54% of their surveys.

Daily Diary Measures

As with Study 1, participants responded to items related to their daily thoughts, behaviors, emotions, and events. We sectioned the items and Qualtrics presented the items within the sections in random order. To measure daily metaphor use, we used three items to which participants indicated their agreement on a four-point scale (1 = “strongly disagree”; 4 = “strongly agree”). Further, we wanted to improve the items from Study 1 to increase the likelihood that participants were reporting on the metaphoric processes we were interested in and to increase the specificity of our measure. To do so, we provided a description of metaphor use and instructions with the following:

A “metaphor” is when you take an abstract concept (e.g., emotion) and describe it in terms of something concrete that we can directly perceive (e.g., color). A metaphor is figurative language. This differs from literal language, which uses words exactly with accordance to their definitions. So, when thinking about the difficulty of a test, we might say “this test is hard” (metaphor), as opposed to “this test is difficult” (literal). The test isn’t literally or physically “hard”, but we use the physical properties of “hardness” to describe the test.

Based on the above description of a metaphor, how much would you agree with the following statements:

The items were the same two items as presented in Study 1, with the additional following item:

“Today, I was metaphoric in my language and thoughts.” We averaged the items to create a daily metaphor use score, which had higher internal reliability ($M = 2.32$, $SD = 0.89$, $\alpha = .86$)².

² Since included the MUM (Fetterman et al., 2016) for other purpose (in both studies) we had used an exploratory revised version in Study 2. This revised version did not work out as planned. While it was a positive predictor of daily metaphor use, it was not significantly so ($p = .11$). Overall, the daily measure used in Study 2 has formed the basis of an improved revised trait measure of metaphor usage, which is currently undergoing validation.

For the empathy and perspective taking items, participants responded on a four-point scale (1 = “not at all true today”; 4 = “very much true today”). For empathy, they responded to the same empathic concern and empathic prediction items as Study 1. We averaged the items to create a daily empathy score, but removing the one item did not improve the internal reliability ($M = 2.09$, $SD = 0.77$, $\alpha = .44$). Finally, we included the same perspective taking items as in Study 1 and averaged across them to create a daily perspective taking score ($M = 2.27$, $SD = 0.91$, $\alpha = .79$).

RESULTS

We used the same multilevel modeling procedures that we used in Study 1. We first computed ICCs for each null model to test the proportion of variability of metaphor use that was due to participant differences. The ICC was .57, supporting our decision to analyze the data using a multilevel modeling approach. We report the fixed effects testing the main hypotheses.

The results replicated those of Study 1. As hypothesized, on days that people reported higher empathy, they also reported more metaphor use, $b = 0.08$, $t(630) = 3.24$, $p = .001$, 95% CI [.033,.136]. For perspective taking, our hypothesis was also supported. On days that people reported higher perspective taking, they also reported more metaphor use, $b = 0.12$, $t(634) = 5.01$, $p < .001$, 95% CI [.073,.167]. See Figures 3 and 4 for visual representations of the data.

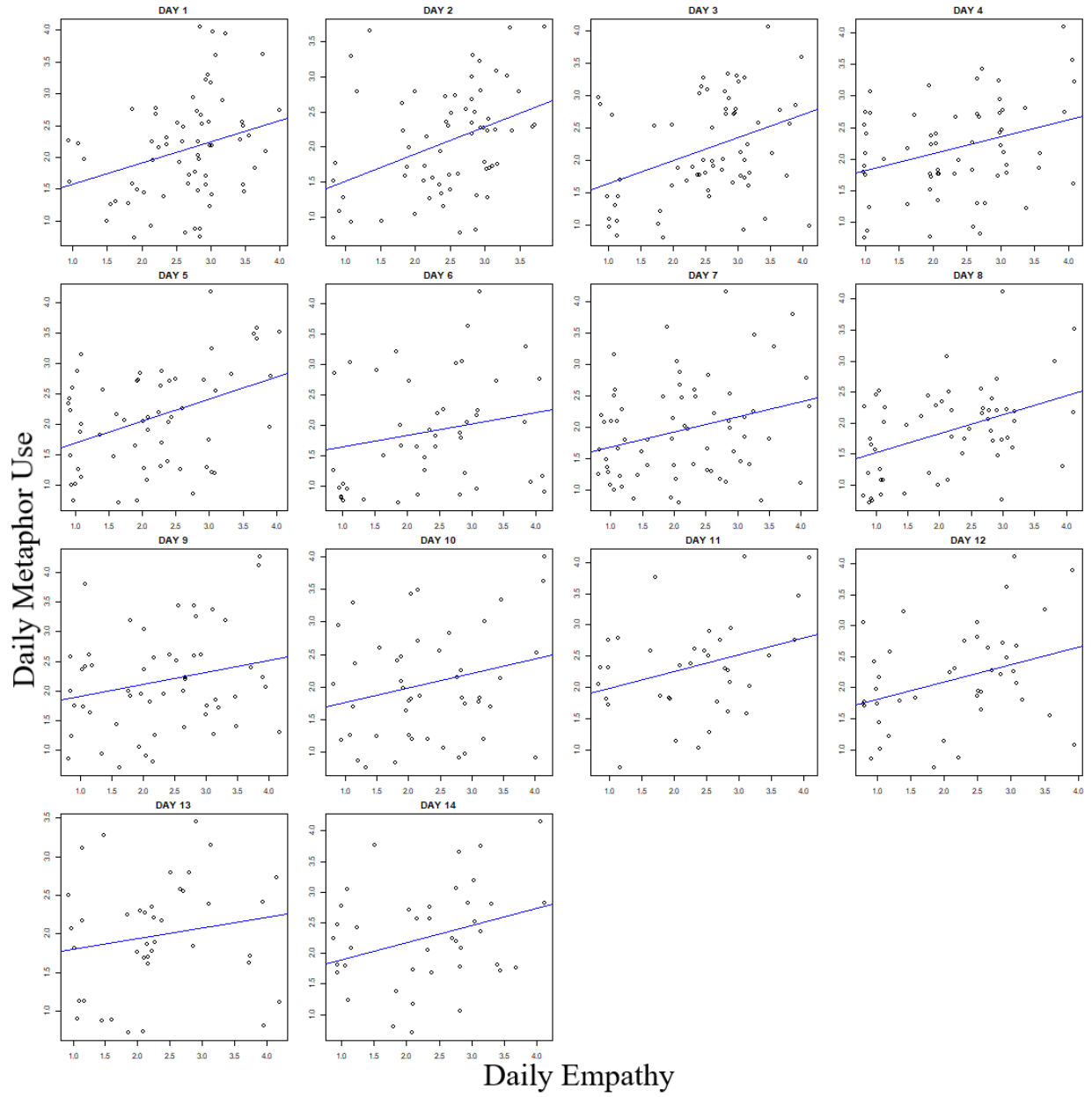


Figure 3: Scatterplots Representing the Association between Daily Empathy and Daily Metaphor Use by Day, Study 2

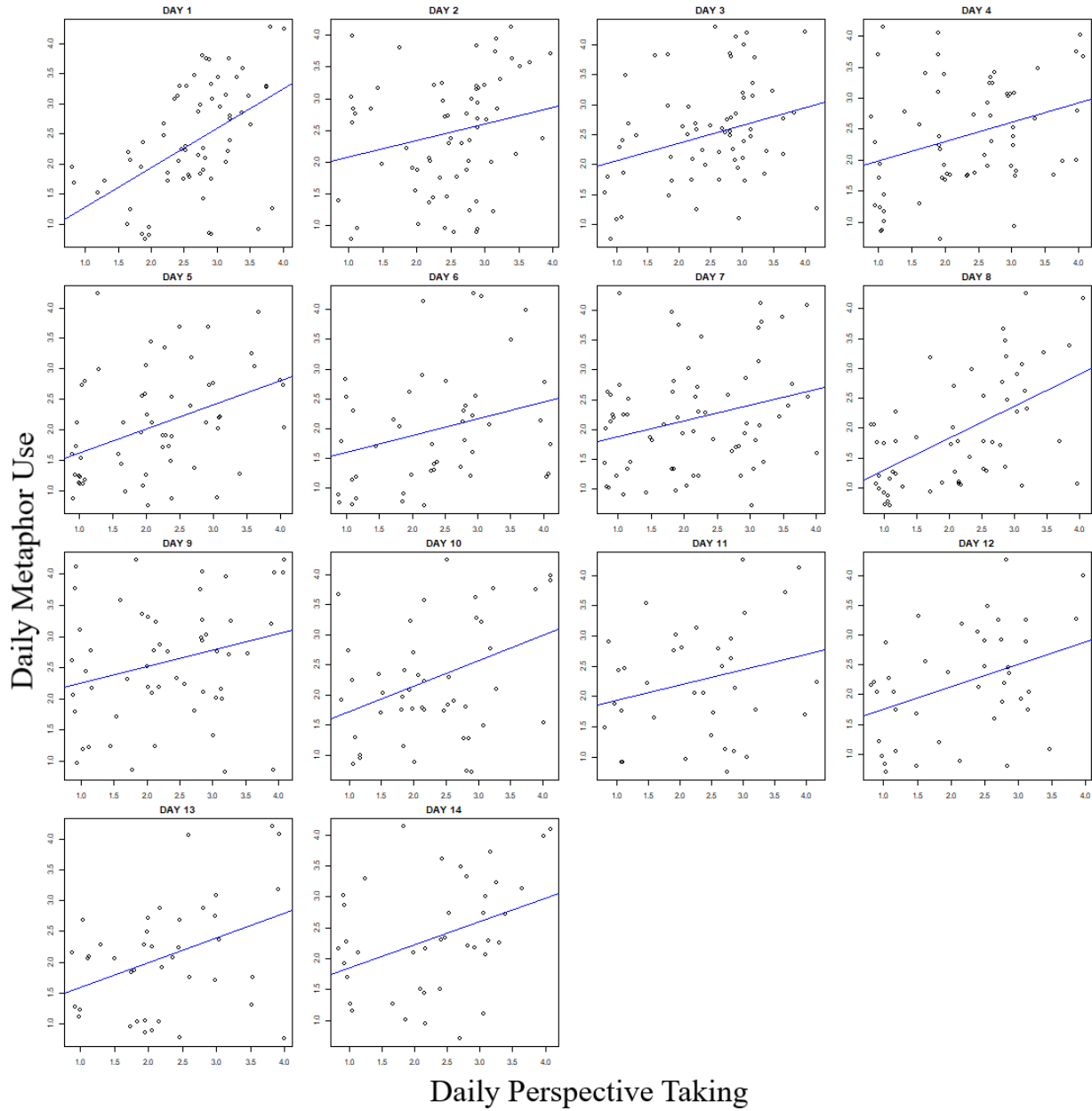


Figure 4: Scatterplots Representing the Association between Daily Perspective Taking and Daily Metaphor Use by Day, Study 2

DISCUSSION

Study 2 replicated the findings of Study 1, providing more confidence in our conclusion that there is a robust association between metaphor use and empathy and perspective taking.

GENERAL DISCUSSION

Interpersonal relationships are important to human functioning (Baumeister & Leary, 1995). Empathy and perspective taking contribute to being a good platonic or romantic relationship partner (Davis & Oathut, 1987; Goldstein et al., 2014). Since people use metaphors to understand emotion (Crawford 2009; Fainsilber & Ortony, 1987; Fetterman et al., 2016; Meier & Robinson, 2005), they likely use them to understand the emotions and perspectives of other people, as well. Therefore, we hypothesized a positive association between these variables. In two daily diary studies, we found support for our hypotheses. On days that participants reported higher empathy and perspective taking, they also reported using more metaphors. The effects ranged from small-to-medium in size, which are typical for social and personality psychology (Richard et al., 2003). These findings suggest that the association between these variables is operative in daily life.

Implications and Theoretical Considerations

Past research on metaphor has focused on the various means by which we conceptualize abstract concepts (Johnson, 1994; Kövecses, 2003). Recent years have seen a surge in studies that assess metaphorically transferable effects that arise from cognitive and physical manipulations of source concepts (Landau et al., 2010). These literatures show that metaphors structure our processing of abstract concepts and are an influential component of our conceptual system. More recently, research has begun to focus on the psychological outcomes and correlates of metaphor use. These studies provide information for when metaphors are used and for what purpose.

Keefer et al. (2011) were amongst the first to test the epistemological functions of metaphoric thought. They found that when people feel uncertain, they show stronger metaphoric transfer effects. In other words, when people lack understanding, they turn to metaphoric

processes for answers. Fetterman et al. (2016) further established that metaphor use serves an emotional function. They found that people who were more prone to metaphor use were set up to process their world metaphorically. Consequently, they found metaphor users were more likely to score high in emotional understanding.

The current work adds to this trajectory of elucidating the functions of metaphor use in three ways. First, we showed that not only can a person be more or less inclined to process their world metaphorically (Fetterman et al., 2016), but that reliance on metaphors can fluctuate day-to-day. This suggests that metaphors are drawn upon for specific purposes and become less frequent when they are not needed. Of course, we did not measure metaphor use for the specific purpose of empathy or perspective taking. We only measured the relative frequency of metaphor use and corresponding empathy and perspective taking. However, we showed that on days in which it would be theoretically likely that metaphor use would occur (i.e., high empathy and perspective taking days), people did in fact report using more metaphors. This further supports the idea that the presence of metaphors represents a sort of “trace-evidence” of our thought processes (Kövecses, 2010).

Second, we found that metaphor use is associated with the feeling of others’ emotions (i.e., empathy) and the tendency to try to understand things from other people’s point of view (i.e., perspective taking). Prior work has shown that people use metaphors when describing their emotions (Fainsibler & Ortony, 1987) and that people who use metaphors more often tend to score higher in emotional understanding (Fetterman et al., 2016). Our results suggest that people also use metaphors when trying to understand other people’s emotions and perspectives. This interpersonal function of metaphor use may be particularly useful in relationship maintenance and satisfaction. There is already some evidence for the beneficial use of metaphors in

therapeutic settings (e.g., Bucci, 1997) and, specifically, in couples therapy (Papp, 1982). The current findings may speak to empathy and perspective taking as potential mechanisms for metaphor's role in therapy. Furthermore, when patients perceive their therapists as being empathetic, they tend to have positive therapy outcomes (Elliott et al., 2011). Therefore, if metaphor use signals empathy, then metaphor use might be an important tool for therapists.

Third, we found that these associations are operative in daily life. That is, these processes naturally co-occurred. This suggests that metaphor use is an everyday feature of empathy and perspective taking that may signal empathy, perspective taking, and interpersonal warmth in everyday social interactions. Metaphor use could lead to such social perceptions because people use metaphors to understand their own emotions (Fainsilber & Ortony, 1987; Fetterman et al., 2016). Therefore, when people hear an interaction partner using metaphors, it might signal that the partner is at least attempting to be empathetic or engaging in perspective taking. Horton's (2007) results hint towards this possibility.

Additional Considerations and Future directions

While we highlight the ecological validity of our daily diary protocols, we cannot discern causal direction in the effects (Bolger et al., 2003). We modeled daily empathy and perspective taking as a predictor of daily metaphor use based on prior work showing that metaphor use seemed to be the result of similar interpersonal and emotional processes (Drew & Holt, 1988; Fainsilber & Ortony, 1987; Horton, 2007). Even so, it could be that metaphor use leads to greater empathic concern and perspective taking. Indeed, prior work found that metaphor use led to greater emotional understanding (Fetterman et al., 2016) and that a greater dependence on metaphors resulted from a lack of understanding to serve their function (Keefer et al., 2011; Baldwin et al., 2018). In fact, we confidently predict that the association flows in both directions.

Future research should systematically manipulate all three variables to test if this is the case. Either way, we encourage due caution in deriving directional conclusions from our results and call for further investigations to test for causal associations.

The goal of the current investigation was to expand upon previous findings that hint towards a link between metaphor use in empathy and perspective taking (Drew & Holt, 1988; Horton, 2007). Indeed, we found robust evidence that these processes co-occur in daily life. However, this is the first step and many questions remain. One question is in regards to mechanism. There are a number of potential mechanisms, but we suggest two promising routes for future work. First, metaphoric processing triggers mental imagery for simulation purposes (Gibbs & Bogdonovich, 1999; Gibbs et al., 2006). Such imaginal simulation is also involved in feelings of empathy and perspective taking (Decety & Jackson, 2004). Therefore, it is likely that mental imagery and simulation play an important role in the connection between metaphor use and interpersonal processes. In fact, there are similar mechanistic arguments regarding imaginal simulation for the effect of reading fiction on empathy (Dodell-Feder & Tamir, 2018; Johnson et al., 2013), which is likely related to metaphoric processes.

The second potential mechanism involves psychological distance (Trope & Liberman, 2010) and self-distancing (Kross & Ayduk, 2011). Metaphor use essentially helps the user to understand something from a different perspective (Ortony et al., 1978). By doing so, the metaphor user gains an “outside” or broader view of whatever it is they are processing, which may allow them to more easily take someone else’s perspective by removing their egocentric anchor. There is some evidence that psychological distance is associated with metaphoric processes (Jia & Smith, 2013), though this work has focused on the strength of metaphoric associations at different levels of construal. Therefore, the role of psychological distancing in

metaphoric processes needs further investigation. Overall, we deem it likely that mental imagery, self-distancing, and a combination of both, are involved in the effects we investigated here.

Measuring metaphor use precisely is a difficult task no matter which method is adopted (BLINDED FOR REVIEW). Here, we chose the self-report method, which introduces its own limitations. Primarily, among these limitations is the uncertainty that participants were accurately reporting their metaphor use or understood what metaphor use is. Even so, the fact that our daily measures predicted theoretically relevant daily outcomes suggests that we were likely getting at our desired construct, albeit imperfectly. Further, it is likely that while participants do not consciously track their daily metaphor use, they probably started doing so to some extent after reporting on it repeatedly. However, future research should also employ daily measurements of metaphor use in natural language through Electronic Activated Recorders (Mehl et al., 2001) or daily writing samples. While these methods create separate limitations, converging evidence will increase our confidence in measurement.

We created our empathy and perspective taking items for our specific daily measurement purposes. While the items were inspired by the IRI (Davis, 1980) and TEQ (Spreng et al., 2009), they were significantly modified to fit our daily methods. Further, we wanted the items to cover a broad range of empathic processes (i.e., concern and prediction or forecasting). Even though these items are face valid, the combination of modifying the items and the broad approach may have resulted in the poor internal reliability we observed with our empathy measure. In fact, in the case of the latter, others have noted that people often overestimate how well they can predict other people's feelings (Pollmann & Finkenauer, 2009) and that trait empathic concern is not always positively associated with empathic prediction or forecasting abilities (Davis & Kraus, 1997). In our studies, the empathic concern and prediction were significantly correlated ($r_s > .25$,

$ps < .001$), though they were self-reported. Further, both empathic concern and empathic prediction were consistently associated with daily metaphor use, individually considered (see ESM). However, future work should use more internally consistent measures of daily empathy and test the association between metaphor use and empathic accuracy in a non-self-report manner.

Finally, we focused only on general metaphor use, as opposed to metaphors specific to the goal of empathy and perspective taking. This was by design, as we based our predictions on the idea that if people use metaphors to help them understand other people's emotions or perspectives, then we should see evidence for daily co-occurrences of these processes. However, investigating the context of metaphor use will be important as researchers develop the literature on the specific functions of metaphor use.

Conclusion

Forming and maintaining interpersonal relationships are essential parts of human nature (Baumeister & Leary, 1995). Empathy and perspective taking play an important role in achieving both goals. Previous work suggests that metaphor use may be a feature of empathy and perspective taking, which led to the hypothesis that these processes co-occur. In two daily diary studies, we found support for this hypothesis. Daily metaphor use was consistently, positively associated with daily empathy and perspective taking. Metaphor use appears to be a sort of trace evidence for such interpersonal processes. In sum, these findings represent a "step forward" in understanding the interpersonal function of metaphor use.

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