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Emotional Implications of Metaphor: Consequences of Metaphor Framing for Mindset about Cancer

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ABSTRACT

When faced with hardship, how do we emotionally appraise the situation? Although many factors contribute to our reasoning about hardships, in this article we focus on the role of linguistic metaphor in shaping how we cope. In five experiments, we find that framing a person's cancer situation as a "battle" encourages people to believe that that person is more likely to feel guilty if they do not recover than framing the same situation as a "journey" does. Conversely, the "journey" frame is more likely to encourage the inference that the person can make peace with their situation than the "battle" frame. We rule out lexical priming as an explanation for this effect and examine the generalizability of these findings to individual differences across participants and to a different type of hardship—namely, an experience with depression. Finally, we examine the language participants produced after encountering one of these metaphors, and we find tendencies to repeat and extend the metaphors encountered. Together, these experiments shed light on the influential role of linguistic metaphor in the way we emotionally appraise hardship situations.

Introduction

Conventional wisdom tells us that hardship may be inescapable. But we can choose how to respond to our hardships. In unfortunate circumstances we can choose to "take the high road," to "make lemonade," or to "roll with it." Can the metaphors we use to describe our hardships shape the way we cope?

Metaphor and reasoning

An extensive body of work shows that the metaphors used to describe many complex concepts shape the way people think about them. For example, people who read about crime as either a virus or a beast offered solutions for dealing with the crime that were consistent with the metaphor they read (Thibodeau & Boroditsky, 2011, 2013). Specifically, people who read that crime was a beast suggested solutions like increasing law enforcement and punishments for criminals more than those who read that crime was a virus.

Other work has shown that metaphors that frame the country as a body encourage people to compare immigrants to pathogens, decreasing their opinions of this group (Jia & Smith, 2013; Landau, Sullivan, & Greenberg, 2009). Similarly, thinking about one's relationship as a "unity" can lead a person to feel more threatened by interpersonal conflicts than thinking about the relationship as a "journey," which is more likely to naturally have positive and negative experiences (Lee & Schwarz, 2014). These studies and many others (see Thibodeau, Hendricks, & Boroditsky, 2017 for review) suggest that for a wide range of topics, linguistic metaphors can guide thought.

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Can metaphors also influence the way we evaluate, or appraise, an emotionally distressing situation like an illness? Lipowski (1970) articulated a number of ways that people attribute meaning to illness, such as seeing illness as a challenge, enemy, punishment, relief, or a value. He suggested that the meaning we attribute to our disease influences our coping abilities, in turn affecting recovery.

One way of coping is by reconceptualizing our experiences. This process of reappraisal allows us to change the way we feel about something by changing the way we think about it. In other words, by consciously changing our cognitive evaluation of a situation, we can change our emotions. Even physical health can improve when concerns like stress are framed as potentially positive forces (Crum, Salovey, & Achor, 2013). Of course, there are many cases of physical illness in which a change in mindset will not lead to a better physical outcome, but may still contribute to a better quality of life.

Language about cancer

Metaphors pervade language about cancer. One survey found that oncologists used metaphors in roughly two thirds of their conversations with patients (Casarett et al., 2010). In this work, metaphors were defined as “figurative language in which one concept is described as being equivalent to another, often imbuing the first with qualities that are difficult to describe in other ways” (p. 256). Patients also rated physicians who used more metaphors (based on the previous definition) as better communicators and easier to understand than those who used fewer.

Metaphors comparing a cancer experience to a “battle” or “fight” have been widely described as dominant in English, particularly in the United States and the United Kingdom (Granger, 2014; Miller, 2010; Penson, Schapira, Daniels, Chabner, & Lynch, 2004; Reisfield & Wilson, 2004; Sontag, 1979). Quantitative evidence for this dominance has been provided in a UK-based study that used corpus linguistics methods (Semino, Demjén, Hardie, Payne, & Rayson, 2018). Metaphors to do with violence (including “battle,” “fight,” etc.) were found to be the most widely used type of metaphor in online writing by people with cancer, family carers, and healthcare professionals, and among the top two most used types of metaphors in interviews with patients, family carers, and healthcare professionals (Demmen et al., 2015; Semino et al., 2017, 2018). Additional research has revealed that battle metaphors also predominate in Spanish speakers’ discourse about cancer (Magaña & Matlock, 2018).

Using battle-related metaphors for adversity such as serious illness seems deeply ingrained in our culture. For example, in a review of other studies, Reisfield and Wilson (2004) noted the dominance of the “martial metaphor” for cancer not just among doctors and patients, but also in the advertising of chemotherapy drugs and the promotion of cancer support forums. Additionally, a “fighting spirit” is also one of the five categories in the Mental Adjustment to Cancer scale, which has been used to assess patients’ mentalities about their disease (Greer, Moorey, & Watson, 1989). The other four states included in the scale—helplessness/hopelessness, anxious preoccupation, fatalism, and denial—are all negative, suggesting that those who designed and use the scale assume that patients *should* think of cancer as a battle—in particular, one they can fight.

Our societal belief in the battle metaphor is also evident in interventions like the game *Re-Mission*, touted on its website (www.re-mission.net) as “the original cancer-fighting game.” In the game, players fire treatments at growing tumors, drop chemo bombs on cancer cells, and collect healthy cells to earn points. Cancer patients aged 13–29 who regularly played *Re-Mission* showed greater adherence to their treatments, self-efficacy, and knowledge about the disease than those who did not (Kato, Cole, Bradlyn, & Pollock, 2008).

Despite the prevalence of the battle metaphor, some researchers, patients, and physicians have suggested that a battle, inherently violent, masculine, and power-based, may not be a productive framing for cancer. It may suggest that someone “wins” (recovers) if they try hard enough, a message that disregards more social and emotional aspects of healing (Reisfield & Wilson, 2004). A battle

mindset may encourage someone to suppress negative feelings (Byrne, Ellershaw, Holcombe, & Salmon, 2002). The idea of a battle may imply the importance of treatment at all costs (Harrington, 2012) and is also potentially misleading because cancer does not involve enemy invaders; instead, one's own cells are the enemies (Reisfield & Wilson, 2004). Most crucially, the battle metaphor presents lack of recovery as defeat, and hence potentially as a personal failure (Granger, 2014). In the patient online forum discussed in Semino et al. (2017), for example, a contributor with advanced cancer comments: "I feel such a failure that I'm not *winning this battle*" (p. 63, emphasis added).

Despite intuitions and anecdotes that battle metaphors might be counterproductive, at least for some people, little work has empirically measured the effects of such metaphors on reasoning or emotional states. One study that did do so considered the role of battle metaphors in language about cancer prevention (Hauser & Schwarz, 2015). Some participants read about cancer metaphorically framed as an enemy, including phrases like "*fight against developing cancer.*" In a more neutral frame, people were asked what they would do to reduce their risk of developing cancer. Those who encountered the enemy frame indicated *less* intention to engage in self-limiting behaviors like reducing their consumption of red meat, alcohol, salty foods, and tobacco, than those who encountered the neutral frame. The authors suggest that enemy metaphors are likely ineffective for encouraging people to refrain from behaviors linked to cancer because we do not associate success in fighting with limiting or constraining certain behaviors. Cancer prevention involves many activities that are defensive in nature, while our mental model of fighting is more offensive.

On the whole, prior work does not reflect positively on "*battle*" metaphors for talking about cancer. The most frequently suggested alternative is to describe cancer as a journey. The corpus-based studies mentioned earlier indeed found that "*journey*" metaphors were the second most frequent type of metaphor (after "*violence*" metaphors) in the language used by patients, family carers, and healthcare professionals (Demmen et al., 2015; Semino et al., 2017, 2018). There is no winning or losing on a journey; the emphasis is instead on a larger process, since life itself is often compared to a journey (Lakoff & Johnson, 1980; Reisfield & Wilson, 2004). Someone's experience with cancer can therefore be just one part of a larger narrative (Harrington, 2012).

Importantly, different metaphors may have different advantages and disadvantages; there is likely no perfect metaphor for talking about cancer. Certain metaphors are likely to help some patients more than others, depending on a wide range of features of their experiences, as well as on their personal preferences (Penson et al., 2004; Reisfield & Wilson, 2004). In fact, Semino et al.'s (2017, 2018) corpus analysis of online writing by patients and health professionals demonstrated that the "*battle*" was not inherently bad, nor was the "*journey*" inherently good for everyone. Rather, different people used each of the metaphors in both empowering and disempowering ways. Nonetheless, there was no evidence in Semino et al.'s data that journey metaphors can have the potentially harmful effects that are sometimes associated with battle metaphors. Understanding the impacts of different metaphors may help us use them in ways that are most helpful to patients' particular situations and mindsets.

This article takes a first step in exploring the role of metaphor in appraisal of a hardship situation. We look at metaphors for overcoming adversity in the context of cancer. In five experiments, we compare the expectations that people have about the emotional landscape of an individual whose cancer experience is framed metaphorically. Do people appraise an illness situation differently when it is framed as a battle than as a journey? If so, we predict that the battle framing will encourage people to believe that if a person does not recover, they are more likely to feel that they could have fought harder, and to therefore feel guilty, than the journey framing. On the other hand, we predict that the journey framing will encourage greater belief in the possibility of making peace with the situation than the battle. We further explore the role of the patient's perceived gender on how metaphor influences appraisals of that patient's emotional landscape, and whether these metaphors lead to different inferences when used to describe a different illness—depression. Finally, we examine the language people produce after encountering one of the metaphors to better understand the mental models those metaphors give rise to.

Methods

In the five experiments reported here, participants read short vignettes about a person experiencing cancer (or depression, Experiment 5). The illness experience was framed using either battle or journey metaphors, but all other information in the passages was identical. After reading the vignette, participants answered questions about the protagonist of the story.

Participants

All experiments except Experiment 4 involved workers from Amazon Mechanical Turk. In Experiment 4, undergraduates at UC San Diego participated voluntarily as part of a class activity in an upper-level Cognitive Science course. In all experiments involving participants on Amazon Mechanical Turk, workers were paid \$10/hr. Payment for each study was calculated at this rate for the average expected completion time. Table 1 shows the participant details for each experiment.

Materials and procedure

All participants read one of the following two passages. No words were emphasized in the original materials.

Vignette with battle frame

Joe was just diagnosed with cancer. He knows that for the foreseeable future, every day will be a “battle against” the disease. The “battle” he has to “fight” will not always be an easy one. Many people have written about their experiences on the “battlefield,” and he can turn to those for consolation. His friends and family want him to know that he will not be alone in his “battle.” Even though sometimes he might not feel like talking, other times he may want to share stories of his “battle” with others, and they will be there for those moments.

Vignette with journey frame

Joe was just diagnosed with cancer. He knows that for the foreseeable future, every day will be a “journey with” the disease. The “road” he has to “travel” will not always be an easy one. Many people have written about their experiences on the “path,” and he can turn to those for consolation. His friends and family want him to know that he will not be alone on his “journey.” Even though sometimes he might not feel like talking, other times he may want to share stories of his “journey” with others, and they will be there for those moments.

Participants advanced to the next page when they were ready. They rated the extent to which two separate statements described Joe’s experience based on the information they had read. Options for agreement with each statement ranged from 1 (not at all) to 7 (very much). The following were presented in a random order:

- He will feel guilty that he hasn’t done enough if he does not recover.
- He can make peace with his experience.

After responding to the two statements, participants were asked to: “Please give any additional information about Joe’s experience that you can imagine based on the passage that you read

Table 1. Participant information.

Experiment	Number of participants	Participant source
1: Original	506	Mechanical Turk
2: Make Peace	272	Mechanical Turk
3: Firsthand Experiences	527	Mechanical Turk
4: Gender	113	UC San Diego undergraduates
5: Depression	211	Mechanical Turk

previously.” Participants also answered a subset of the following questions, all designed to encourage them to think through different aspects of Joe’s situation and produce language about it: (a) What do you imagine about Joe’s day-to-day experience? (b) Why does Joe have cancer? (c) How will this experience affect Joe’s relationships? (d) Please describe the mindset you imagine Joe has. (e) Biologically, what is going on in Joe’s body? (f) What are Joe’s prospects for recovery?

The experiment concluded by asking participants their gender, highest level of education, languages they speak, and whether they have personally been diagnosed with or are currently being treated for cancer (Experiments 3 and 4) or depression (Experiment 5).

Behavioral analyses

For each participant, we quantified an overall metaphor framing effect by calculating the difference between their belief that the vignette’s subject could make peace with the situation and their belief that the subject would feel guilty if they did not recover, referred to throughout as the peace–guilt difference score. A larger difference indicates greater belief that the patient can make peace with his situation relative to how likely he is to feel guilty, while a smaller difference indicates the opposite. We used these differences as the dependent variable for analyses.

Corpus analysis

Free-text responses for all experiments were collated into two text files, one for each metaphor condition. The “*battle*” responses amounted to 40,392 words, while the “*journey*” responses amounted to 39,510 words. These files were loaded into Wmatrix (Rayson, 2008), an online corpus analysis tool that, among other things, automatically annotates lexical items in text with tags corresponding to semantic fields such as: “Warfare, defence and the army; weapons,” “Location and Direction,” and “Emotional actions, states and processes” (see Rayson, 2008 and McEnery & Hardie, 2012 for more detail). The software therefore enables the comparison of two data sets, such as the free responses in the two metaphor conditions, not just at the word level, but also at the level of areas of meaning. The latter is particularly important for our current purposes, since metaphors operate beyond the level of specific lexical items. The semantic annotation tool in Wmatrix was used to identify which semantic fields were “overused” in responses by people who encountered the “*battle*” metaphors as compared with people who encountered the “*journey*” and vice versa. The tool ranks overused items both in terms of the statistical significance of the observed frequency in the two data sets (using the Log-likelihood measure of confidence; Dunning, 1993) and of the size of that difference (using Log Ratio as a measure of effect size). The log-likelihood cutoff we adopted was 3.84 ($p < .05$, 95% confidence of significance) and a Log Ratio cutoff of 0.5.

Experiment 1: Original

There were no modifications to the methods described above in Experiment 1.

Experiment 1 results

People who read the “*journey*” passage showed a greater difference between their responses for making peace and feeling guilty (more likely to make peace and less likely to feel guilty) than those who read the “*battle*” passage, reflected by a 2-way analysis of variance (ANOVA) (metaphor \times gender) on peace–guilt difference scores (make peace – feel guilty), $F(1,499) = 12.1$, $p = .0005$. This finding is consistent with predictions that the journey metaphor may have more peaceful entailments than the battle metaphor, and that the latter might suggest to people that fighting is a patient’s responsibility; hence, if someone is not getting better, they may feel guilty that they have not done enough.

In addition, there was a main effect of gender: peace–guilt difference scores were greater for females than for males, $F(1,499) = 7.5, p = .007$. In other words, females reported more belief that Joe can make peace than that he will feel guilty to a greater extent than males did. However, the size of metaphor framing effect did not differ by gender, since there was no interaction between metaphor and gender $F(1,499) = .23, p = .63$.

Experiment 1 played a foundational role by demonstrating a metaphor framing effect: when people encountered a battle metaphor to describe someone’s cancer experience they made systematically different appraisals of the emotional landscape than when they encountered a journey metaphor.

Experiment 2: Make peace

This experiment explored the possibility that the differences observed in Experiment 1, particularly in response to the phrase *make peace*, might be explained by lexical priming. If participants were lexically primed by the language in the question, we might predict that those who read about a battle might be less inclined to agree that Joe can make peace specifically because *battle* and *peace* are antonyms. The word *battle* might trigger thoughts that are strongly opposed to *peace*. On the other hand, making peace is often an eventual result of a battle, so people who read about the “*battle*” could actually be more inclined to indicate that Joe could make peace if they were lexically primed (although this outcome is not consistent with our actual findings in Experiment 1).

Half of the participants received the original phrasing of the statement “He can make peace with his situation,” and the other half received the phrasing “He can come to terms with his situation.” Otherwise, methods were identical to Experiment 1.

Experiment 2 results

If lexical priming could explain our results in the previous study, we would expect a greater framing effect in response to the phrase *make peace* than *come to terms*. However, we found no difference in peace–guilt difference scores for the two phrasings, $F(1,244) = .82, p = .37$. Further, the size of the metaphor framing effect did not differ for these two statements, as there was no difference between question instantiation (*make peace* or *come to terms*) and metaphor condition, $F(1,244) = .54, p = .46$. Thus, it does not seem that the phrase *make peace* primed participants to respond in a particular way specifically because it included battle-related words.

Experiment 3: Role of firsthand experience

Experiment 3 was designed to probe whether metaphors about a cancer situation affect people’s emotional appraisals differently depending on their prior experience with the disease. Past research does not make clear how much background knowledge is ideal for a metaphor to shape reasoning (Thibodeau et al., 2017). For instance, some work has suggested that when participants feel confident in their prior knowledge about the target domain (i.e., economics), metaphors may not be as influential as when participants do not feel confident, since metaphors are competing with entrenched prior mental models, especially when participants perceive themselves to be knowledgeable on a topic (Landau, Keefer, & Rothschild, 2014). Consistent with this interpretation, other work has shown that people who hold deep-seated beliefs about how to best deal with crime are less persuaded by metaphors about crime than those who do not (Thibodeau & Boroditsky, 2015). In other words, prior research suggests that participants’ views on a target must be somewhat malleable for a metaphor to influence them.

However, to the best of our knowledge no studies have investigated the role of firsthand experience with the target domain as a potential mediator of metaphor’s influence on reasoning. Thus, we designed this experiment to examine whether the metaphor framing effect differs for

people who do and do not have firsthand experience with cancer. Based on prior research that suggests that deep-seated beliefs about a topic make a person less amenable to persuasion by metaphor, we might find that the metaphor framing effect is smaller for people who have firsthand experience with cancer, and are therefore more likely to have entrenched mental models of the topic, than for people who do not have such vivid experience. We operationalized firsthand experience as having been or currently being treated for cancer, or having at least one close family member or friend who has been or is currently being treated. We asked participants whether they or someone close to them was being treated or had been treated for cancer at the end of the experiment, so that up until the question about firsthand experience, Experiment 3 was identical to Experiment 1.

Experiment 3 results

If current or prior firsthand experience with cancer reduced metaphor's influence, we would expect a smaller framing effect for people who reported experience with the disease than those who did not. However, there was no difference in the metaphor framing effect for people who did and did not have close personal experience with the disease, $F(1,504) = 0.005, p = .94$. There was also no main effect of having close experience on peace–guilt difference scores, $F(1,504) = 0.51, p = .48$.

Participants who accurately recalled the metaphor they had encountered showed a stronger metaphor framing effect than those who did not recall the metaphor, $F(1,498) = 4.82, p = .03$. This finding is inconsistent with prior work showing that people need not be aware of the metaphor they encountered for it to covertly influence thought (Thibodeau & Boroditsky, 2013). However, it is in line with research on using analogy to solve problems (Gick & Holyoak, 1983). In many cases, participants needed to be given a hint to think about a relevant analog in order to apply that case to the problem at hand. Further research is needed to better understand the role of conscious awareness and memory in metaphor framing effects.

Experiment 4: Gender neutrality

Since the prior experiments always described a male's experience, in Experiment 4 we used an ambiguously gendered name (Jamie) and neutral pronouns (they). The pronouns were changed accordingly in the passage (see below) as well as in the questions about Jamie's experience. No words were emphasized in the original materials.

Battle framing

Jamie was just diagnosed with cancer. **They** know that for the foreseeable future, every day will be a “*battle*” against the disease. The “*battle*” **they** have to **fight** will not always be an easy one. Many people have written about their experiences on the “*battlefield*,” and **they** can turn to those for consolation. **Their** friends and family want them to know that **they** will not be alone in **their** “*fight*.” Even though sometimes **they** might not feel like talking, other times **they** may want to share stories of their “*battle*” with others, and people will be there for those moments.

Journey framing

Jamie was just diagnosed with cancer. **They** know that for the foreseeable future, every day will be a “*journey*” with the disease. The “*road*” **they** have to “*travel*” will not always be an easy one. Many people have written about their experiences on the “*path*,” and **they** can turn to those for consolation. **Their** friends and family want them to know that **they** will not be alone in **their** “*journey*.” Even though sometimes **they** might not feel like talking, other times **they** may want to share stories of their “*journey*” with others, and people will be there for those moments.

In addition to the debriefing questions mentioned above, participants indicated whether they believed Jamie was male or female.

Experiment 4 results

If the metaphors shaped inferences to different extents depending on the protagonist's gender, we might see greater metaphor framing effects for participants who perceived Jamie to be a male than a female, or vice versa. In reality, there was no interaction between metaphor and perceived gender, $F(1,104) = 0.28, p = .60$. There was also no main effect of perceived gender, $F(1,96) = 0.34, p = .56$, suggesting that gender alone (or in conjunction with a metaphor) does not affect emotional appraisals as they were explored in this study.

We also replicated the metaphor framing effect from prior experiments: people who read about Jamie's "journey" reported higher peace–guilt difference scores than those who read about Jamie's "battle" did, $F(1, 104) = 7.38, p = .01$. In addition, consistent with Experiment 1, there was a main effect of gender, with females reporting greater difference scores than males, $F(1, 104) = 5.76, p = .02$.

Experiment 5: Depression

Is there something specific about reasoning about cancer that is particularly sensitive to metaphor frames? Or would thinking about an experience with a different illness, such as depression, also be influenced by metaphor? Experiment 5 used the same materials described previously, but substituted the word *depression* for *cancer* in the vignettes. Thus, the first sentence became "Joe was just diagnosed with depression." After this sentence, both the "battle" and "journey" passages were identical to the passages used in Experiment 1.

During the debriefing, participants reported whether they or a close friend or family member had been or was currently being treated for depression.

Experiment 5 results

If the metaphor framing effect was specific to thinking about cancer, we should not observe a framing effect for participants who read about depression. Only somewhat consistent with this prediction, people who read about Joe's *battle* with depression reported numerically, but not statistically significantly, smaller peace–guilt difference scores than those who read about his *journey*, $F(1, 192) = 2.46, p = .12$. As in prior experiments, peace–guilt difference scores were (marginally) larger for female participants than for male, $F(1, 192) = 3.58, p = .06$.

To investigate whether the size of the metaphor framing effects differed by domain (cancer vs. depression), we combined the Experiment 5 data with the data from Experiment 1. Again, if the metaphor framing effect were specific to thinking about cancer, we should find a smaller effect for people who read about depression than those who read about cancer. However, we found no difference in the size of the metaphor framing effect for cancer and depression ($F(1,695) = 0.24, p = .63$). Combining the data from Experiments 1 and 5, we found a robust effect of metaphor on peace–guilt difference scores, $F(1,695) = 14.0, p = .0002$.

The combined data from Experiments 1 and 5 revealed a main effect of illness, $F(1,695) = 6.80, p = .009$. Peace–guilt difference scores were greater in the context of cancer than depression. This difference was driven by stronger beliefs that Joe would feel guilty if he did not recover from depression than from cancer, $t(392) = 3.35, p = .0009$. This result confirms a likely intuition that people hold different mental models about the different illnesses. However, of note for the goals of this study, battle and journey metaphor frames did not shift people's beliefs about cancer and depression to different extents.

All experiments: Behavioral results

Because the five experiments described here were consistent at their core (participants read similar passages, containing either a "battle" or "journey" metaphor, and answered how likely the main character was to make peace with his situation and how likely he was to feel guilty if he did not

recover), we combined the data for a more robust test of the metaphor framing effect. A 4-way ANOVA (metaphor \times experiment \times gender \times close experience) on the peace–guilt difference score revealed the metaphor framing effect: people who read the “*journey*” passage reported greater difference scores than those who read the “*battle*” metaphor, $F(1,796) = 9.78, p = .002$. In other words, people in the “*journey*” group believed the character had a higher chance of making peace with his situation than feeling guilty to a greater extent than people in the “*battle*” group did. The effect of the metaphor on difference scores did not differ across the experiments, $F(2,796) = 1.68, p = .19$. Differences in responses by metaphor frame and experiment are shown in Figure 1 and Table 2.

There was also a main effect of gender on peace–guilt difference scores, as shown in Figure 2, $F(1,796) = 9.40, p = .002$. Differences in responses were greater for females than males. In other words, females reported a stronger belief that Joe can make peace with his situation relative to the belief that he will feel guilty if he does not recover than males did. However, the metaphors did not sway males and females to different extents, as demonstrated by a lack of interaction between metaphor and gender $F(1,796) = 1.05, p = .31$ (a finding that did not differ across the experiments, $F(2,796) = 1.16, p = .31$).

All experiments: Corpus results

The semantic domains that were used significantly more in free text responses by those who had encountered the “*battle*” metaphor than the “*journey*” were: “Warfare, defence and the army; weapons” (which includes the terms *battlefield*, *war*, and *military*), “Trying hard” (which includes *battle(s)*, *battling*, *struggle*, and *struggling*) and “Hindering” (which includes *fight(s)*, *fighting*, and *fought*). On the other hand, people who read the “*journey*” metaphor overused the semantic domain “Vehicles and transport on land” (which includes *road* and *path*).

Many of the words the participants overused in either condition had also been used in our passage, demonstrating that people repeated the metaphors they had encountered. However, participants also extended the metaphors, using semantically related words they had not read in the

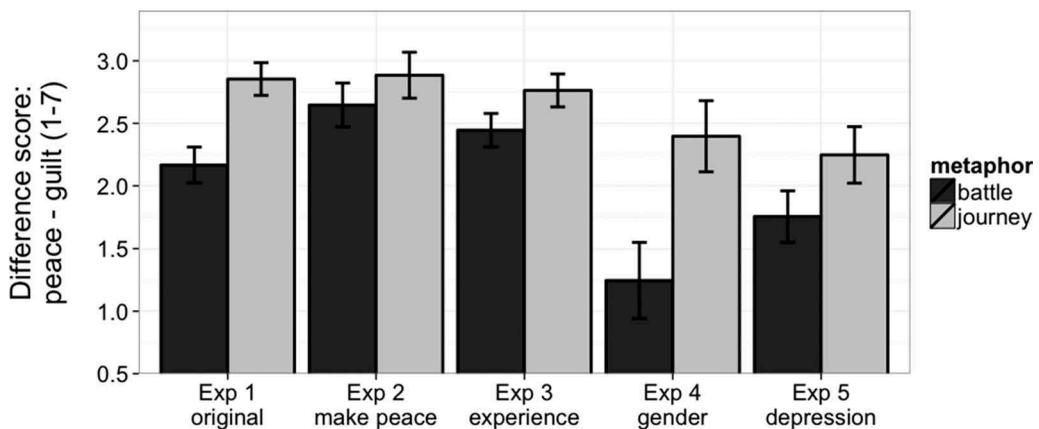


Figure 1. Difference scores (*he will make peace with his situation* minus *he will feel guilty if he does not recover*) by metaphor condition and experiment. Higher difference scores after reading the “*journey*” passage than the “*battle*” are consistent with the predicted metaphor framing effects.

Table 2. Peace–guilt difference scores (*he can make peace* minus *he will feel guilty*) by metaphor condition and experiment.

		Exp 1	Exp 2	Exp 3	Exp 4	Exp 5
Battle	Peace	5.05	4.23	5.30	5.00	5.12
	Guilt	2.88	2.98	2.65	3.25	2.66
Journey	Peace	5.35	5.34	5.57	5.26	5.34
	Guilt	2.50	2.95	2.68	3.01	2.58

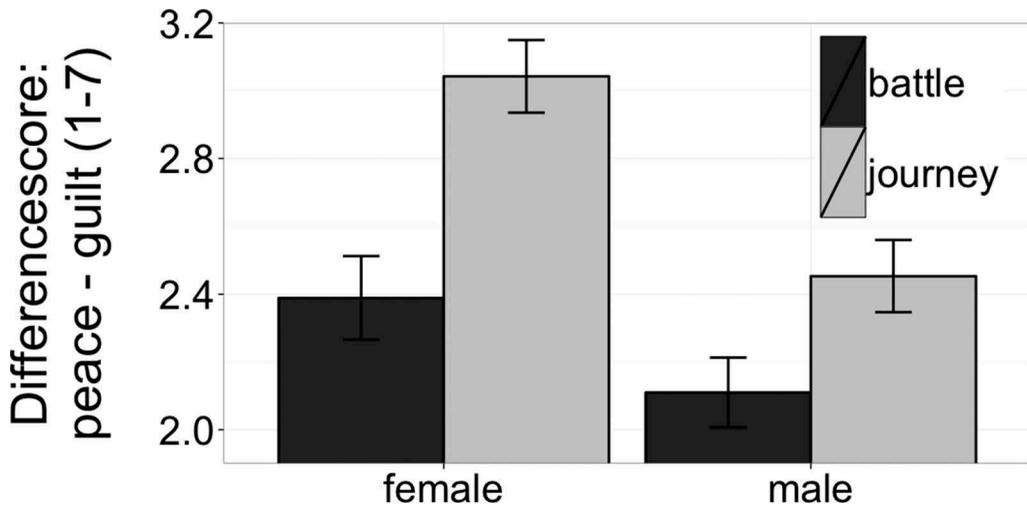


Figure 2. Difference scores (*he will make peace with his situation – he will feel guilty if he does not recover*) by metaphor condition and participant gender.

passages. These included the words (in the “battle” group): *military, war, uphill, win, strength, and give up*. The “journey” group, on the other hand, used the word *walk* metaphorically, even though it was not used in the passage. Other words overused by those in the battle group relative to the journey group include: *prospects, everyday, need, and disease*, while the non-metaphorical words overused by the journey group include *illness, possible, peace, and knows*. Further research will help shed light on whether these words reflect broader differences in the mental schemas constructed by people after encountering one of the two metaphors included here.

Discussion

The series of experiments presented in this article explored the cognitive consequences of metaphor for illness hardships. Participants read about a person’s cancer experience, either framed as a “battle” or a “journey.” They then responded to questions that probed their appraisals of the patient’s emotional landscape: how likely was the protagonist to feel guilty that they had not done enough if they did not recover? How likely were they to make peace with the situation? Participants also generated additional information they imagined about the person’s experience so we could understand their mental models of the hardship experience.

Across the experiments, the metaphorical frames encouraged people to emotionally appraise an illness situation in ways consistent with the language used to describe it. Although people in both metaphor frame conditions (“battle” and “journey”) overall indicated that the protagonist was more likely to make peace with his situation than to feel guilty, the difference between their beliefs about those two feelings was systematically different, as a function of the metaphors they received when reading about the person’s situation. People who read about a fictional character’s cancer (or depression) experience as a “journey” believed that he was more likely to make peace with his situation than feel guilty *to a greater extent* than those who read about the same disease as a “battle.”

In subsequent experiments, we ruled out some potential explanations for the metaphor framing effect: that it arose because of lexical association between the independent and dependent variables (Experiment 2), that it was a function of the character’s gender (Experiment 4), and that it was specifically a consequence of using metaphors to describe a cancer experience, as opposed to another disease (depression; Experiment 5). We also examined the potential role of a participant’s prior firsthand experience with cancer in mediating the influence of metaphors on emotional appraisal (Experiment 3).

The corpus comparisons between free text responses in the two frame conditions showed that respondents tended to use language consistent with the metaphors they were exposed to, demonstrating a kind of priming effect. This involved both the repetition of the metaphorical expressions used in the passage encountered previously and the extension of the original metaphors through additional battle- or journey-related lexical choices.

Together, the behavioral and corpus results illustrate metaphor's capacity for building a framework for thinking about complex concepts, like the hardships of cancer and depression. When these illnesses are framed in terms of a battle or journey, features of the metaphorical source domain (*"battle"* or *"journey"*) are mapped onto the target (cancer or depression). Similarities in relational structure become salient, and the target is imbued with some of the source's features (Gentner & Gentner, 1983). This structure mapping process is likely responsible for the differences we observed in how people think about cancer when it is framed as a *"battle"* or a *"journey."*

Although *"battle"* and *"journey"* metaphors have different sets of entailments, they are not necessarily incompatible, however. In fact, cancer patients and their carers sometimes use the two metaphors together, for example talking about a journey that leads to a place where the illness is engaged in battle journey (Semino et al., 2018).

Do *"battle"* and *"journey"* metaphors push people to make opposite appraisals, or might only one of these metaphors be doing the conceptual work? Our data cannot answer this question because we do not have a baseline condition to examine how people would appraise someone's cancer situation in the absence of metaphors. Such a condition is not necessary to conclude that metaphors can shape appraisals but would be helpful in future work to examine the role that each individual metaphor plays in affecting the way people think about an illness situation.

Future work might also explore additional appraisal inferences and entailments that battle, journey, and other metaphors have for discussing illnesses and hardships. It will also be helpful for additional research to shed light on the individual differences that mediate a metaphor's effect on a person's appraisal. For example, people may respond differently to *"battles"* and *"journeys"* depending on their specific illness situation, their tendencies toward challenges or competition, or their prior life experiences. Some prior work has suggested that epistemic motives—an individual's drive for certainty, consistency, and accuracy—influence the extent to which metaphors shape their thinking about an economic business failure (Landau, Keefer, & Rothschild, 2014). How do people's motives and other characteristics influence the effect metaphor frames have for emotionally appraising hardships?

Conclusion

There are many elements of hardships—and illnesses in particular—that are out of our control, but we can potentially control the mindsets we adopt to cope. The work we have presented in this article shows that linguistic metaphor provides one means of reappraising a situation by shaping the inferences people make about a person's chances of feeling guilty and accepting their illness situation. Given the prevalence of cancer and other illnesses, it is important to continue striving to better understand the role that language has on the way we think about hardships and act when we are faced with difficult situations.

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