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The Influence of Metaphorical Framing on Emotions and Reasoning About the COVID-19 Pandemic

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**The influence of metaphorical framing on emotions and reasoning about the COVID-19 pandemic**

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## **The influence of metaphorical framing on emotions and reasoning about the COVID-19 pandemic**

Metaphors can provide a conceptual framework for understanding complex topics and as such, they have frequently been used in COVID-19 discourse. As previous research indicates that conceptual metaphors can influence how people reason about complex topics, the metaphors used to communicate about the pandemic can influence how it is understood and how people respond. This paper investigates the influence of metaphorical framing on emotions and reasoning. An experimental study compares BATTLE and JOURNEY metaphor frames in a hypothetical text (adapted from previous studies) about the pandemic. Our aim is to examine the influence of these frames on readers' affective state, inferences about the attitudes of others and suggestions to stop the virus from spreading. The results suggest that compared to JOURNEY metaphors, BATTLE metaphors can negatively influence affective state and may influence people to suggest more restrictive solutions to reduce the spread of the virus. Yet, metaphors were not found to influence reasoning about the attitudes of others. We interpret these results in relation to previous studies, suggesting that metaphors may influence emotions and reasoning in some ways only. The results have implications for public communication surrounding the pandemic. Limitations and avenues for future research are discussed.

**Keywords:** Conceptual metaphor, Cognitive linguistics, Emotion/Affect, Figurative Framing

## Introduction

During the COVID-19 pandemic, effective communication was vital as many looked to the media for guidance and updates on the events occurring. Leaders faced the challenge of explaining the threat posed by the virus and the precautions needed at different stages of the long-term crisis. Metaphors were frequently used in public communication as they help to convey information in terms that are familiar and easy to understand (Semino, 2021). As such, metaphors can be used to frame a topic within existing knowledge structures to establish a particular viewpoint (Burgers et al., 2016). Framing a topic means presenting information in alignment with a particular perspective to bring focus to a specific problem definition, cause, appraisal or resolution (Entman, 1993, p. 52). In this view, metaphors are considered to contain both linguistic and conceptual content that fulfil the functions of framing (Burgers et al., 2016, p. 412). Linguistic expressions that are used metaphorically within a text and refer to the same underlying frame, construct a conceptual metaphorical frame. For instance, by using adjectives, nouns, and verbs whose basic meaning relates to the domain of wars and battles in a text about the COVID-19 pandemic, as in “*attacking*”, “*invisible enemy*”, “*fighting*” (see Wicke and Bolognesi, 2020; 2021), writers can frame the topic figuratively in terms of a war or battle.

The impact of such figurative framing on readers’ beliefs, attitudes and decisions, remains an open empirical question, with conflicting findings (see next section for an overview of contrasting empirical evidence). The general goal of this paper is to contribute to the fragmented debate on whether, how, and when figurative framing influences attitudes toward a given topic. Specifically, we hereby investigate whether figurative framing affects readers’ emotions, inferences about others’ emotions, and their suggested interventions. The involvement of the affective/emotive aspect into the study of figurative framing and health communication is under-investigated (Flusberg et al., 2018), but important. In public health communication, experimental research on metaphorical framing has typically explored how the effect of figurative framing relates to socio-cognitive variables, such as policy support and behavioral intentions (e.g., Spina et al., 2018). That is to say, the emotional content triggered by language has often been inferred but not explicitly addressed. In the presence of metaphors, however, this is particularly important because on one hand metaphors may produce a framing effect that can trigger specific types of emotions. On the other hand, emotive states affect reasoning. In the case of highly emotive metaphorical language (as for instance military language used metaphorically) we can therefore talk about a “*double framing*” effect (as labelled by Ervas et al., 2021).

In the current study, we investigated whether a text that presents a negative figurative frame (BATTLE<sup>1</sup>) and a text that presents an arguably less negative figurative frame (JOURNEY) triggered different sets of emotions in the reader. We selected BATTLE and JOURNEY metaphors as they are well-known and frequently used in figurative framing research (e.g., Hendricks & Boroditsky, 2016; Hendricks et al., 2018; Hauser & Schwarz, 2019). Based on the empirical evidence reviewed in the next section, we hypothesised that the BATTLE figurative frame would influence readers’ affective states toward the more negative end, compared to the JOURNEY figurative frame.

Moreover, we examined whether metaphor frames influence readers’ inferences about the emotional mindset of others. Previous research (Hendricks & Boroditsky, 2016; Hendricks et al., 2018) revealed that BATTLE and JOURNEY metaphors led to differing

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<sup>1</sup> In the initial stage of the research, we labelled the frame as WAR. The decision to label this frame as BATTLE followed a constructive discussion with the reviewers, who pointed out that BATTLE, as a part of the more inclusive concept of WAR, is more relevant for labelling the frame used.

inferences about others' emotions. Based on these findings, we expected readers' inferences to align with the frame encountered. We expected BATTLE metaphors to elicit inferences involving fear and negativity, while JOURNEY metaphors may lead to inferences that involve more positive emotions (see section "The present study" for a rationale for selecting the JOURNEY frame).

Finally, our third aim was to explore whether metaphorically framing the pandemic with BATTLE or JOURNEY metaphors influenced the proposed solutions to stop the virus. This was inspired by Thibodeau and Boroditsky (2011), who analysed participants' suggested solutions for a crime problem and found alignment with the metaphor frame adopted in the text. We expected that participants would propose solutions aligned to the source domain. Specifically, in line with the BATTLE frame, participants were expected to propose more restrictive measures in contrast to the JOURNEY frame.

The research questions and hypotheses addressed in this study can be therefore summarised as follows.

**RQ1:** Does framing the pandemic with BATTLE or JOURNEY metaphors influence readers' affective state?

**H1:** Participants who read a text about the pandemic containing BATTLE vs. JOURNEY metaphors will report significantly different sets of affect scores.

**RQ2:** Does framing the pandemic with BATTLE or JOURNEY metaphors influence readers' inferences about the attitudes of others?

**H2:** Participants who read a text containing BATTLE vs. JOURNEY metaphors will attribute significantly different sets of emotions to the people described in the text.

**RQ3:** Does framing the pandemic with BATTLE or JOURNEY metaphors influence the types of solutions proposed to stop the virus?

**H3:** Participants who read a text about the pandemic containing BATTLE metaphors will suggest more restrictive solutions to stop the virus than those who read a text containing JOURNEY metaphors.

## Theoretical background

### *Metaphor and emotion*

Broadly speaking, metaphor can influence emotional processing (Lakoff, 2016). Specifically, however, while conceptual metaphors that describe emotions have been the focus of several studies (e.g., Kövecses, 2000; Wilkowski et al., 2009; Reali & Arciniegas, 2014), the question of whether metaphorical framing can influence readers' emotions has received less attention (Hendricks & Boroditsky, 2016).

Emotion and reasoning are interacting processes (Cunningham & Kirkland, 2012) that affect one another dynamically, and both can be influenced by language. The three - language, emotion and reasoning - are constituents of human cognition (Anderson, 1996). Although Lakoff (2016, p. 272) points out that there is no commonly accepted definition of *emotion*, in the present work we adopt the view that *emotions* can be defined as abstract concepts that are constructed as a result of perceptual experience and language, whereas *affect* is a basic sense of feeling good or bad that is reliant upon interoception and is less semantically rich (Barrett, 2017). The term *valence*, instead, is hereby intended as the extent to which an emotion triggers positive or negative affect (Lewis et al., 2007).

In conceptual metaphor theory, the role of emotion and affect has historically received little attention (Flusberg et al., 2018). However, we contend that emotions play a significant role in metaphor processing. On one hand conceptual metaphors may involve

emotions as target domains such as ANGER IS HEAT, where anger is an abstract concept constructed through mappings from heat. On the other hand, metaphors can carry affect (Bolognesi & Bichisecchi, 2014; Citron & Goldberg, 2014; Citron et al., 2016) and are found to be more emotionally engaging than literal language (Citron & Goldberg, 2014; Tay et al., 2019; Tay, 2020). Research by Landau et al. (2018) demonstrates that through cross-domain mappings the emotions associated with a source can transfer to a target domain. For example, in INFODEMIC IS WAR, negative feelings associated with the related concept of WAR are mapped onto INFODEMIC through classic mechanisms of spreading activation, as described by Collins and Loftus (1975). To clarify, an infodemic is defined by the World Health Organization as the spread of too much information, including false or misleading information in digital and physical environments during a disease outbreak.

On the connection between emotions and framing, Hendricks and Boroditsky (2016) investigated whether metaphorically describing a patient's experience with cancer as either a journey or a battle influenced inferences about the patient's emotions. Participants who read a text containing the BATTLE frame were more likely to infer that the patient would feel guilty if he did not recover, while those who read a text containing the JOURNEY frame were more likely to believe the patient could accept their health situation. These hypotheses were motivated by the idea that military metaphors such as BATTLE carry negative associations related to violence, highlighting strength and backgrounding the emotional side of recovery. Conversely, JOURNEY metaphors, which can nevertheless be positive or negative, in principle, have no winning or losing sides and focus more on acceptance and living with the disease (Semino et al., 2015). These findings are also supported by a similar study where BATTLE and JOURNEY metaphor frames influenced participants' appraisals of illnesses in similar ways (Hendricks et al., 2018).

Interestingly, researchers who have investigated emotion and affect as moderating the influence of metaphor have produced different findings. In one study conducted by Scherer and colleagues (2015), participants were more likely to express intentions to get vaccinated when they read about the flu in texts describing it metaphorically as an army, beast or weed compared to a neutral condition (a description of the virus that used literal language). Through investigation of potential mediators, it was proposed that negative affect from source domains might influence vaccination intentions, however this was not observed. Additionally, the results did not indicate that negative metaphors increased fear of the flu (Scherer et al., 2015). In contrast, other researchers found that when sun radiation was described as an enemy and compared to a neutral condition (a message framing the same facts in a literal manner), prevention intentions depended upon the extent of participants' fear and increased worry of physical aggression (Landau et al., 2018).

Turning to the COVID-19 pandemic, Burnette et al. (2021) examined the influence of metaphors on individuals' growth mindset and self-efficacy in managing COVID-19. Participants exposed to a metaphor about change (e.g. "*flatten the curve*") showed greater intentions to adopt recommended behaviors compared to those exposed to a military metaphor. However, the results were not replicated when a control condition was added suggesting that the metaphors were not in fact influential.

Given the complex, fragmented and unclear panorama of empirical studies on the interplay between emotions/affect and metaphorical framing, further research is needed to fully understand how, and in which contexts emotion fits within existing theories of metaphorical framing.

### ***Metaphor and framing***

A body of empirical research suggests that the use of linguistic metaphors has an impact on attitudes, reasoning and behavior. Metaphorical framing research that compares texts containing different metaphorical expressions, and sometimes a literal equivalent, has found that readers reason in ways that are consistent with source domain knowledge (Landau et al., 2018). For example, metaphorically framing climate change as a war (e.g., “*destruction of natural resources*”) influences reasoning about its urgency and risk, and increased willingness to change behavior (Flusberg et al., 2017). Similarly, in health-related contexts, negatively valenced metaphorical frames influenced intentions to change behaviors (Scherer et al., 2015; Hauser & Schwarz, 2015).

Recent research, however, has produced conflicting results suggesting that metaphors do not always influence reasoning. In the context of Covid-19, researchers investigating military vs non-military metaphor frames found that BATTLE metaphors did not increase fear or support for frame-consistent policies (Schnepf & Christmann, 2022). Yet, in other research, individual differences predicted whether a military frame was influential (Panzeri et al., 2021).

In an earlier study, Thibodeau and Boroditsky (2011, 2013) investigated participants’ reasoning in response to a text that metaphorically framed the social problem of crime as either a virus or as a beast. Participants were found to reason in frame-consistent ways, based on the metaphor that they read at the beginning of the text. Those who read about crime in terms of a virus were more likely to favor solutions related to reform while those who read about crime as a beast were more likely to prefer solutions related to enforcement (Thibodeau and Boroditsky, 2013). However, methodological aspects of the study were questioned in a follow-up study by Steen et al. (2014) who found no significant differences in the reasoning outcomes associated with the different metaphorical frames, when several aspects were controlled. In particular, Steen et al. (2014) questioned the lack of a non-metaphorically framed text for comparison and thus included in their study an added neutral frame: “*Crime is a problem*”. Due to the complexities of matching metaphorical and neutral frames along different linguistic dimensions, Thibodeau and Boroditsky (2015) disagreed with this criticism. For example, participants in a norming study judged the term *problem* as only less severe than *beast* and *virus* (Thibodeau, 2017, p. 273). Comparing the different conditions (“*problem*”, “*beast*” and “*virus*”), the authors concluded that the “*problem*” condition generated different outcomes but is not necessarily a control and therefore neutral frame, because it does not differ from the metaphorical frames solely along the dimension of metaphoricity (Thibodeau and Boroditsky, 2015, p. 18). Nevertheless, the contrasting findings of Thibodeau and Boroditsky (2013) and Steen et al. (2014) raise the question of the extent to which metaphors can influence how people reason about complex topics.

Considering the different possible conditions under which metaphors may influence reasoning, different factors may be listed. Firstly, research indicates that when a metaphor appears at the beginning of a text it is more influential (Thibodeau & Boroditsky, 2011). Thibodeau et al. (2019) explain that as individuals take in information, they are actively forming a representation of the message. As such, a metaphor at the beginning of a message activates a conceptual mapping which facilitates the incorporation of subsequent information about the target into the source domain. Thus, when a metaphor features at the end of a text, a representation or alternative mapping may already have been produced. Secondly, a metaphor is more influential when it is extended within a text (Thibodeau et al., 2019). Thirdly, prior knowledge, interests and attitudes may also influence sensitivity toward figurative framing. Some prior knowledge of a target domain is necessary to facilitate mapping, yet attitudes should be flexible

(Thibodeau et al., 2017). In relation to this, we investigate whether figurative framing influences the interventions suggested by readers.

### ***Military metaphors***

Public communication has frequently featured military metaphors to describe the challenges faced by the pandemic, conveying the virus as an enemy to be fought to illuminate the threat posed by the virus and the need to eliminate it (Semino, 2021). As an example, at the start of the pandemic at a G20 virtual summit concerning the COVID-19 pandemic the United Nations Secretary-General Antonio Guterres (2020) said, “*We are at war with a virus – and not winning it. ... This war needs a war-time plan to fight it.*” In the UK military metaphors continued to be used in public communication in 2021 as seen in a statement by previous UK Health Secretary Matt Hancock (2021), “*In this battle against coronavirus, we’re all on the same side. This fight is a global fight.*”

Military metaphors are well known to be employed in public health communication because they draw on a widely shared understanding of the topic of war, therefore they are effective in conveying urgency, emphasising the gravity of a negative situation and effectively calling people to action (Flusberg et al., 2018; Wicke & Bolognesi, 2020; 2021). The extensive use of these metaphors in certain contexts, however, can also have negative consequences (Semino, 2021). Firstly, they convey negative valence that can lead to fear and anxiety, as theorised by Flusberg and colleagues (2017). Secondly, they are divisive and have been found to draw attention to opposing sides (Robins and Mayer, 2000). Thirdly, describing an illness using military terminology can wrongly imply that those who are not able to *win the battle* did not fight enough (Hendricks et al., 2018). Such metaphors can background well-being (Nie et al., 2016) and ignore the question of whether the trade off in terms of mental health and economic loss is commensurate with the sacrifices people have made to stop the spread of the virus (Oswick, 2020). As further added by Semino and colleagues (2017), however, metaphors related to violence, such as military metaphors, can be used by patients in ways that seem to empower and motivate them.

Given the potentially persuasive influence of metaphor frames, military metaphors can be used to gain control and call people to action as citizens can be seen as soldiers who follow commands. This may be beneficial in certain situations, such as a global health emergency. Researchers recently observed that individuals tend to assign more responsibility to the government when presented with a military metaphor, compared to a non-military metaphor (Schnepf & Christmann, 2022). However, Sontag (cited in Nie et al., 2016, p. 6) cautions that military metaphors “*overdescribe*” and “*overmobilize*” and according to Flusberg et al. (2018), the threat evoked by military metaphors can be used to justify extreme responses. In fact, there have been recent moves towards the use of authoritarian measures by governments around the world, justified by the pandemic (Thomson & Ip, 2020). Through a military frame, strict measures and harsh punishments may be considered more acceptable. For example, the previous UK Health Secretary Matt Hancock (2020) employed military metaphors in a statement introducing government responses to the pandemic, including the coronavirus bill that allowed police to detain individuals who may be infectious: “*The measures that I have outlined are unprecedented in peacetime. We will fight this virus with everything we have. We are in a war against an invisible killer and we have to do everything we can to stop it.*”

In response to the prevalence of military metaphors observed in communication at the beginning of the pandemic, and given their potentially negative implications, researchers working on figurative language began collecting alternative metaphors on social media platforms, using the Twitter handle #ReframeCovid. The initiative resulted

in a crowdsourced collection of naturally occurring metaphors for COVID-19 from a variety of languages as a potential resource for research and communication. The list of metaphors offers a variety of alternatives to the pervasive military metaphors for topics related to the pandemic (Semino, 2021). All quoted expressions in the following section have been collected from the #ReframeCovid initiative (2020), available online for review and integrations, at the following url: <http://bit.ly/ReframeCovid>.

Although the collection is intended to be a source of information rather than a set of specific recommendations, Semino (2021) draws attention to fire metaphors in the collection, and also in the media, highlighting that they are flexible in their ability to convey different aspects of the pandemic. For example, “*burning embers*” refers to the virus and humans are described as trees and in turn “*fuel*” for a fire which helps to explain the process of transmission. Similarly, the importance of continued caution can be conveyed through descriptions of the possibility of “*future outbreaks to extinguish*” and avoiding the “*sparks*” that cause them. Sports metaphors also appear in the collection and focus on different aspects of the pandemic depending on the sport. While sports metaphors may refer to opposing sides and the idea of winning or losing, they can also convey the importance of collective effort and are less aggressive than military metaphors. This is seen in a translation of a Mexican football player’s Twitter post, “*We have to play as a team to beat the virus.*” Alternatively, framing the situation as a marathon suggests a longer timeframe and highlights the need for perseverance as in the following translated quote from a Greek journalist, “*It’s not a sprint race, it’s a marathon.*”

### **The present study**

The present study seeks to investigate whether metaphorically framing the pandemic in different ways can influence readers’ reasoning and affective state. Specifically, an experiment was carried out to investigate the influence of reading a text about the pandemic with a negatively valenced BATTLE metaphor frame compared with a more positively valenced JOURNEY frame, which was selected based on previous research. Nie and colleagues (2016) propose JOURNEY metaphors as a peaceful alternative to military metaphors. The concept of a journey is widely understood and relates to collective experience while military metaphors can highlight division as they focus on the existence of opposing sides (Perrault & O’Keefe, 2016). JOURNEY metaphors focus on progression through a larger process and convey a sense of acceptance and optimism which may be suitable for a period of long-term difficulty. For example, research has found that participants encouraged to view academic goals through a JOURNEY frame displayed greater intention and engagement in their academic studies (Landau et al. 2014). Hendricks et al. (2018) found that the JOURNEY metaphor frame was associated with greater acceptance of hardship (Hendricks et al., 2018).

It is important to note that JOURNEY metaphors may be used in different ways which can be disempowering in certain contexts (Semino et al., 2015). Semino (2021, p. 53) points out that they can imply a lengthy and difficult process sometimes without a certain result. For example, seafaring descriptions such as “*sailing without a compass in the eye of the storm*” suggest a lack of control and uncertainty. Conversely, statements like “*In this voyage, you are the captains*”, imply control over decisions that influence the future. Some JOURNEY metaphors are effective in emphasising a need for caution without the negative valence found in military metaphors such as the following interview quote from Boris Johnson on easing lockdown restrictions in May 2020:

*“Mountaineers always say that coming down from the peak is the most dangerous bit. That's when you're liable to be over-confident and make mistakes. You have very few options on the climb up — but it's on the descent you have to make sure you don't run too fast, lose control and stumble.”*

Considering the potential double valence of the JOURNEY frame, it is important to note that language conveys both positive and negative types of journeys through specific hyponyms of journeys, such as *odyssey* (a negatively connotated subtype of journey) or *honeymoon* (a typically positively connotated subtype of journey). The more generic and inclusive category of journeys, designed by the word JOURNEY, however, is associated with a mean valence of 6.65 on a 9 point scale of human judgments of affective ratings, when provided as a decontextualized word (Warriner et al., 2013). This suggests, in an empirical manner, that the generic concept of a journey tends to be positively valenced. Context helps shape with more precision the type of valence afforded by its sub-types. In the online repository we report a brief norming study that corroborates our arguments, showing that on average the concept JOURNEY is perceived to be more positive than negative concepts such as WAR and DEATH, as well as to a neutral concept like LOGIC.

To clarify, we acknowledge that collecting positivity ratings about concepts presented in isolation may reveal only a partial story about their interpreted meanings. In fact, the same concept used in different contexts can have different connotations that may be judged as more positive or more negative. The conceptual category JOURNEY, when used as a word in different contexts can convey different types of valence (a positive or a negative journey). It is not our contention that framing the discourse surrounding the pandemic through the lens of a JOURNEY metaphor imbues the pandemic with a semblance of mirth or happiness in the minds of readers. Rather, our assertion is that, as a conceptual framework, JOURNEY exhibits a propensity for a less overtly negative valuation when compared to the alternative framework of BATTLE.

With this study we contribute to shedding light on the interplay between metaphorical framings and readers' reasoning. Specifically, we explore whether the emotional valence associated with different metaphorical framings (BATTLE vs. JOURNEY) affects:

- (1) readers' affective state
- (2) readers' inferences about others
- (3) readers' suggestions to stop the virus from spreading.

## **Materials and Methods**

The experiment was carried out in accordance with the University of Birmingham's Code of Ethics. Before beginning research, the experiment was approved by the College of Arts and Law Ethics Review Committee at the University of Birmingham. Participants were informed that their data would be treated anonymously and that they could end the experiment at any time without providing a reason for doing so.

All experimental data can be found on the online repository Open Science Framework ([https://osf.io/4yhqt/?view\\_only=04768cab65ae400d8b84b974a5cd4693](https://osf.io/4yhqt/?view_only=04768cab65ae400d8b84b974a5cd4693) ).

## *Participants*

Before the main experiment, 10 participants volunteered to participate in a pilot test online (see section 3.5 below for details). All participants were native English speakers between the ages of 27 and 56. There were 5 participants in the BATTLE metaphor group and 5 participants in the JOURNEY metaphor group. The pilot was carried out in order to refine the task design and instructions, thanks to participants' feedback.

The main experiment was conducted online with 140 participants recruited through the online platform Prolific (<https://www.prolific.co>). 70 participants were in the BATTLE metaphor group and 70 participants were in the JOURNEY metaphor group. In exchange for participation in the study, participants were paid £1 consistent with an hourly rate of £7.50 as the study took between 5-10 minutes to complete. Settings were used to ensure participants were not able to participate more than once and that only participants living in the United Kingdom with a fluent or native English level could participate.

Participant demographic information is shown in Table 1. We collected detailed demographic information to allow for the possibility of a future study, once the pandemic is over, to compare responses with the data hereby presented. As can be seen in Table 1, 58.6% of participants were female and 40% were male. Their ages ranged from 18 to 76 ( $M=34$ ,  $SD=14.3$ ). There were two participants who did not specify their gender and one did not provide an age. 43.6% of participants completed GCSEs or A Levels as their highest level of education while 37.9% of participants and 17.9% of participants had completed undergraduate or postgraduate study, respectively. Regarding political preferences, 49.3% of participants described themselves as on the left, 33.6% of participants as in the middle and 14.3% as on the right of the UK political spectrum. There were 4 participants who preferred not to provide this information.

**Table 1.** Demographic profile of main study participants ( $N = 140$ ).

Variables	Categories	N	%
Gender	Female	82	58.6
	Male	56	40
Education	Primary	1	0.7
	GCSE	18	12.9
	A Level	43	30.7
	Undergraduate	53	37.9
	Postgraduate	25	17.9
Political Preference	Left	69	49.3
	Centre	47	33.6
	Right	20	14.3

## *Materials*

The study was carried out online and Google Forms was used to present all questions and record responses. An informed consent section contained information about the study, the procedure and how to contact the researchers. The survey also included the following information: a demographic questionnaire, a metaphorically framed text, the International

Positive and Negative Affect Schedule Short-Form (I-PANAS-SF) questionnaire, a free-response question on how to stop the spread of COVID-19, an attention check question, and three statements about the text.

The text used as stimulus was adapted from a paragraph used in a previous study by Steen, Reijniere and Burgers (2014). The two versions of the text differed only in the embedded metaphor where the COVID-19 pandemic was described as either a battle or a journey. Efforts were taken to ensure that the different words used in both frames were closely matched in frequency where possible. The frame was presented as the title and was also extended throughout the text (seen in bold). There was a slight difference between the stimulus text in the pilot test and the one used in the main study. Based on feedback from the pilot test, an additional sentence (underlined) was added to make the text more interesting and relatable. Words were not bolded or underlined in the materials presented to participants. The paragraph read:

*“Addison’s **battle** with COVID-19 / Addison’s **journey** with COVID-19  
Efforts to **fight the COVID-19 battle / navigate the COVID-19 waters** are underway in the city of Addison. Last year, Addison was safe with no cases. Unfortunately, conditions have changed and today there are more than 3000 active cases. Schools and universities are now closed. However, groups of young people and families continue to socialise outdoors in local parks. There is a concern that if new measures to stop the virus are not introduced, more problems may start to develop. Even when **the fight is over / the coast is clear**, residents might still have to modify their behaviour to stay safe. City officials gave the following statement, ‘We are in the middle of a difficult **battle / journey**, but we will **defeat the enemy / reach our destination.**’”*

The two versions of the text were also normed by two small groups of participants (N=30), who were asked to read one of the two versions of the text and a control text (which was shown to both groups). Each participant therefore read and judged an experimental condition (a text framed with JOURNEY or with BATTLE) and a control text. Readers were asked to rate the vividness, understandability and metaphoricity of the texts on a 5-point scale. We found no significant difference for either of these three variables between the judgments given by the two groups to the control text (as expected) nor between the judgments given by the two groups to the two experimental conditions ( $F(6, 23) = 0.38, p = 0.88$ ).

The International Positive and Negative Affect Schedule Short-Form (I-PANAS-SF) developed by Thompson (2007) was used to measure positive and negative emotions in response to the text. This tool is frequently used to assess positive affect (PA) and negative affect (NA) as discrete constructs. The short-form PANAS comprises 10 adjectives describing emotional states and uses a 5-point interval measure response format. In this protocol, the 5 positive adjectives are: active, alert, attentive, determined and inspired. The 5 negative affect states are: afraid, ashamed, hostile, nervous and upset. In the present study, participants were asked to rate each item according to the extent to which it described the way they felt while reading the text using a 5-point Likert scale, from 1 (very slightly or not at all) to 5 (extremely). The final scores are the sum of the ratings for all positive items and all negative items resulting in two scores respectively (one score for positive affect and one score for negative affect). During the pilot test, a statistical reliability test of positive and negative affect suggested that the item *ashamed* did not correlate with the other negative items, indicating that it was not measuring negative affect. Therefore, the research by Thompson (2007) and (Watson et al., 1988) was consulted and an *irritable* was taken from the 20 item PANAS and selected as a replacement for *ashamed* in the main experiment.

### *Design and procedure*

This study used a between-subjects experimental design. The independent variables were the metaphorical frames in the text. The dependent variables were self-reported measures of positive and negative affect, ratings of agreement with statements about residents' feelings of hope, acceptance and shared responsibility, and the solutions proposed by participants to stop the spread of the virus.

Participants (N=140) completed an online survey during the first week of March 2021 in which they were presented with one of the two versions of a fictional text about the COVID-19 pandemic. After reading an information section about the study and agreeing to take part, participants completed the demographics section. Then, they were asked to read the text and answer the questions that followed. Below the text, participants were asked to indicate how much they felt 10 different emotions while reading. The emotions were: upset, hostile, alert, irritable, inspired, nervous, determined, attentive, afraid and active. The next question asked participants for the number of active cases of COVID-19 in Addison to check they had read the text and were paying attention. Then in the next question participants were asked to provide one suggestion to reduce the spread of COVID-19 in the following question: *In your opinion what should residents of Addison do to stop the spread of COVID-19? Please suggest one idea.* Finally, participants were asked to rate their level of agreement with three statements on a scale from 1 (strongly disagree) to 5 (strongly agree):

*Residents are likely to feel hopeful about the future.*

*Residents are likely to accept the situation in Addison.*

*Residents are likely to feel a shared responsibility to stop the virus.*

On the last page of the survey participants were thanked for their time and were given a code for the Prolific system as evidence of completion, to receive their reward.

Figure 1 contains a visual summary of the experimental design which outlines the research questions and the experimental process including the methods and analysis.

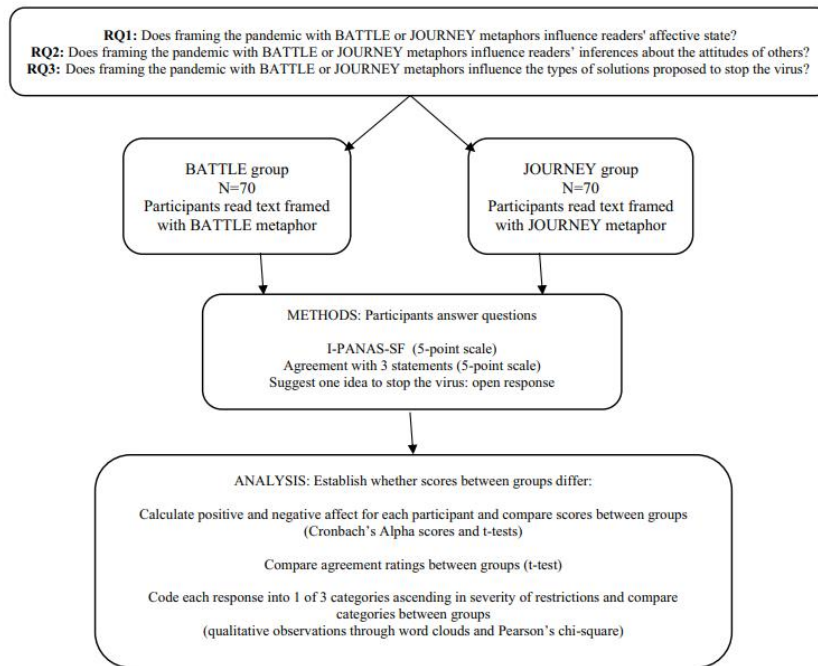


Figure 1. Flowchart that visualizes the experimental design of the present study.

## Results

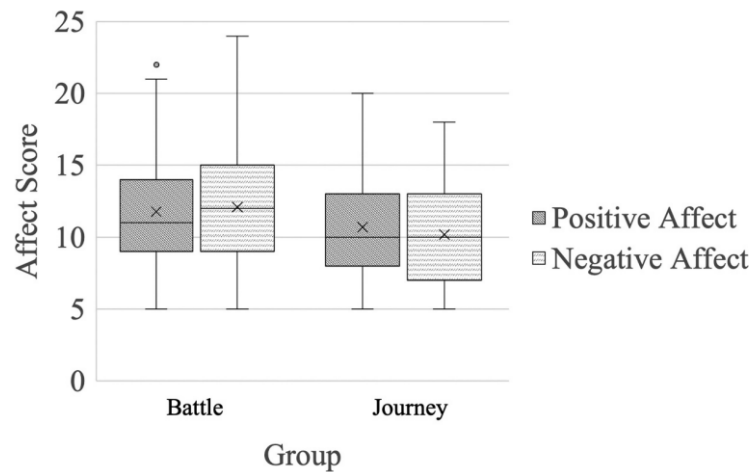
All statistical analyses were conducted using SPSS and an alpha level of .05 was used for all statistical tests.

### *Positive and negative affect scores (attitude toward the virus spread described in the texts)*

The means and standard deviations for each condition and affect score are presented in Table 2. Mean positive and negative affect scores were calculated from each participant's total positive and negative affect scores (the sum of the individual ratings for positive and negative items respectively). The distribution of scores is visualised in Figure 2.

**Table 2.** Means and standard deviations for responses under each condition (in relation to the first research question: personal attitude toward the virus spread).

Affect score	Condition	N	Mean	Std. Deviation
Positive affect	BATTLE	70	11.77	3.91
	JOURNEY	70	10.69	3.66
Negative affect	BATTLE	70	12.09	4.34
	JOURNEY	70	10.19	3.63



**Figure 2.** Affect scores by type of frame.

An independent-samples t-test was conducted to compare positive and negative affect scores between the BATTLE and JOURNEY groups. There was a significant difference in the negative affect scores for BATTLE ( $M=12.09$ ,  $SD=4.34$ ) and JOURNEY ( $M=10.19$ ,  $SD=3.63$ ) groups;  $t(138) = 2.81$ ,  $p = 0.006$ ,  $d=0.475$ . This suggests that participants who read the BATTLE frame experienced higher negative affect than those who read the JOURNEY frame. There was no significant difference in the positive affect scores for BATTLE ( $M=11.77$ ,  $SD=3.91$ ) and JOURNEY ( $M=10.69$ ,  $SD=3.66$ ) conditions;  $t(138) = 1.69$ ,  $p = 0.09$ ,  $d=0.286$ , suggesting that levels of positive affect did not differ between those who read the BATTLE frame and those who read the JOURNEY frame.

To address the reliability of the positive and negative affect scales, Cronbach's Alpha scores were calculated. The results showed acceptable levels of internal reliability for both the positive ( $\alpha = 0.75$ ) and negative ( $\alpha = 0.78$ ) affect scales. There were no problematic items on either scale as corrected item - total correlations did not fall below 0.2. Good items should correlate above 0.3 with the total score, and not be below 0.2 (Kline, 1986).

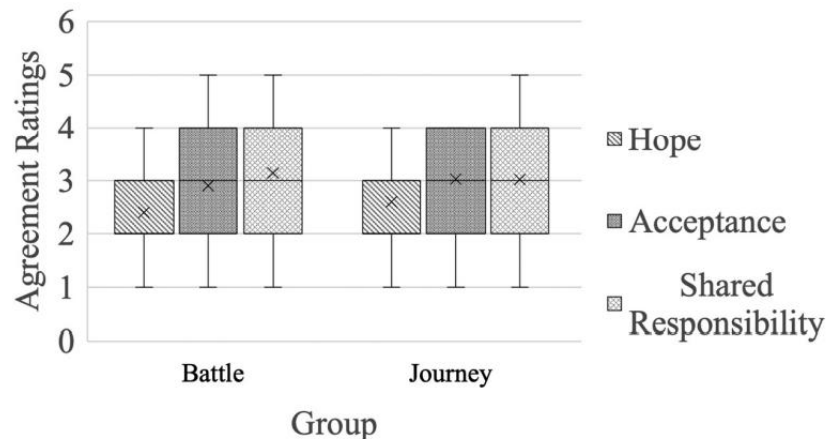
#### ***Agreement ratings for statements (inferring the attitude of others toward the virus spread described in the texts)***

The means and standard deviations for agreement ratings for each condition are presented in Table 3. The ratings data are visualised in Figure 3.

**Table 3.** Means and standard deviations for statement agreement ratings under each condition (in relation to the second research question: attributing to others specific attitudes toward the virus spread).

Statement	Condition	n	Mean	Std. Deviation
Hope	BATTLE	70	2.4	0.81
	JOURNEY	70	2.6	0.82
Acceptance	BATTLE	70	2.9	0.99
	JOURNEY	70	3.03	0.93
Shared responsibility	BATTLE	70	3.14	1.15
	JOURNEY	70	3.01	1.01

An independent-samples t-test compared ratings of agreement for statements about residents' feelings of hope, acceptance and shared responsibility between the BATTLE and JOURNEY groups. No significant differences were found between the two conditions for levels of agreement with hope statements;  $t(138) = -1.45$ ,  $p = 0.149$ ,  $d = -0.245$ , acceptance statements;  $t(138) = -0.79$ ,  $p = 0.431$ ,  $d = -0.133$ , or shared responsibility statements;  $t(138) = 0.7$ ,  $p = 0.483$ ,  $d = 0.119$ .



**Figure 3.** Agreement ratings by type of frame.

### ***Proposed solutions to counteract the virus spread described in the texts***

To investigate the solutions proposed by participants, the free responses were first collated and entered into Voyant (Voyant-tools.org), an online corpus analysis tool. In the BATTLE condition, the suggestions consisted of 533 words and in the JOURNEY condition there were 525 words. The most common words in each condition are visualized in Figure 2 and 3. In the word clouds, the larger the word print, the more frequent its occurrence. The most frequent words in the BATTLE condition responses (with frequency of occurrence in brackets) were stop (22); socializing (12); lockdown (11); social (11); stay (11). While the most frequent words in the JOURNEY condition were stop (21); socializing (16); social (14); stay (12); home (11).



Figure 4. Word cloud of the 25 most frequent words in participant responses in the BATTLE condition.



Figure 5. Word cloud of the 25 most frequent words in participant responses in the JOURNEY condition.

Before the statistical analysis was conducted, participant suggestions were coded into categories as in previous research (Thibodeau and Boroditsky, 2011). Responses were coded into three categories of ascending severity of restrictive measures based on those listed in the UK government's tier system (UK Government, 2020). Extreme suggestions were responses that involved the most restrictive measures such as lockdown, punishment or policing. Moderate suggestions were restrictive measures such as not mixing with others. Relaxed suggestions involved responses that mentioned being careful and considerate of others. Participant suggestions were coded blindly by two coders and any disagreements were resolved before analysis. Cohen's kappa was 0.86 indicating good agreement between the coders ( $p = .001$ ).

Pearson's chi-square tests were applied to response categories to investigate the relationship between the two conditions and the categories of proposed solutions. As the expected values were less than 5 for relaxed responses in both groups, we then removed the relaxed category of responses. There was a significant difference between groups for the type of solution proposed,  $p = .047$ , Cramer's V/Phi = 0.209. Figure 4 shows the differences in response categories between the two conditions.

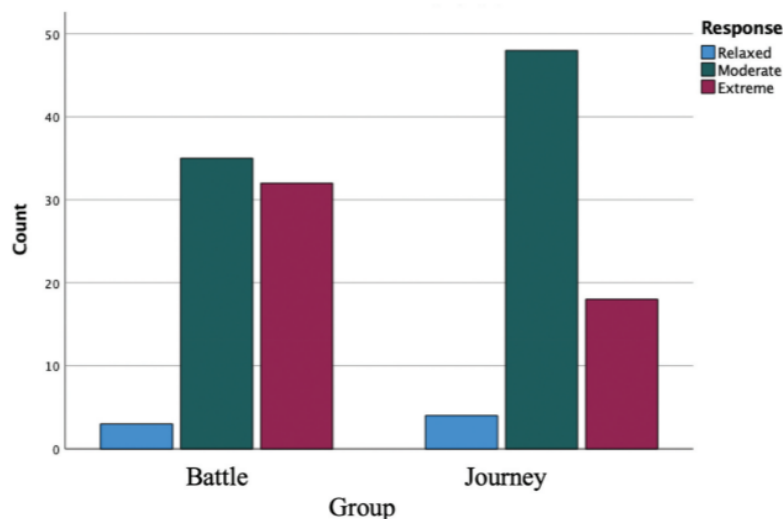


Figure 6. The number of suggestions for each response category between the two conditions.

Table 4. Cross tabulation of response frequencies per condition.

Response category		Condition		$\chi^2$
		battle	journey	
Moderate	n	35	48	5.94
	%	42.2%	57.8%	
	Residual	-6.8	6.8	
Extreme	n	32	18	
	%	64%	36%	
	Residual	6.8	-6.8	

Following the initial statistical analysis, as recommended by Sharpe (2015, p.7), low frequency cells (the relaxed category of responses) were removed, and a Pearson's chi-square test was applied to two response categories (moderate and extreme) between the two conditions<sup>2</sup>. As can be seen by the frequencies cross tabulated in Table 4, there is a significant relationship between the metaphor frame read and the type of solutions proposed to stop the virus:  $\chi^2 = 5.94$ ,  $p = .015$ , Cramer's V/Phi = 0.211. Residuals exceeding +/- 2 are considered a statistically significant deviation (Sharpe, 2015, p. 3). The results indicate that there is a significant association between the group of participants who read the text framed with BATTLE and the category of extreme solutions, as well as a significant (negative) association between this group and the category of moderate solutions. Conversely, there is a significant association between the group of participants who read the text framed with JOURNEY and the category of moderate solutions, as well as a significant (negative) association between this group and the category of extreme solutions.

[Table 4 near here]

## Discussion

The aim of this study was to explore and thus provide additional data for an informed discussion on figurative framing, specifically whether framing a text about the COVID-19 pandemic with BATTLE and JOURNEY metaphors influenced affective state and reasoning in different ways. We hereby summarize and discuss our results in relation to our three specific research questions. To clarify our position, we argue that our study may

<sup>2</sup> We also ran the Chi-square analysis on the 3 categories of solutions, despite the fact that the "Relaxed" category of solutions violated the cell frequency assumption of the Chi-square test. The pattern of results is the same.

not be taken as confirmatory findings or proof of a concept. This is seldom the case for any study based on linguistic occurrences and language use, and any study that aims to unravel the complex interplay between language and thought. We contend that empirical investigations like the present study should be taken as exploratory contributions that shed light on complex topics such as the influence of figurative framing in language and readers' attitudes, emotional responses and decisions about specific topics. Moreover, we contend that the current results may be time-sensitive, and partially affected by the stage of the pandemic that characterised the time at which we collected our data. As suggested in the beginning of the paper, these results may reveal a different pattern, once the pandemic is over.

The results indicated that the BATTLE metaphor frame influenced participants to produce higher scores for negative affect, while the JOURNEY metaphor frame did not significantly affect positive affect scores. There were also no significant differences in agreement ratings between the groups for statements that residents in the text would feel hopeful about the future, accepting of the situation and a shared responsibility to stop the virus. However, the BATTLE frame led readers to propose more restrictive suggestions to stop the virus compared to the JOURNEY frame.

In relation with RQ1: Does framing the pandemic with BATTLE or JOURNEY metaphors influence readers' affective state? The results hereby reported suggest that a BATTLE metaphor frame evokes a greater negative affect than a JOURNEY metaphor frame. This is in line with studies that highlight the negative emotions associated with military metaphors. For example, Flusberg et al. (2017, p. 780) point to the “*affective consequences*” of BATTLE metaphors in messages about climate change which led to increased feelings of urgency and risk. Additionally, Thibodeau, Crow et al. (2017) reported negative attitudes towards police when referred to as warriors rather than guardians. The present results may point to a negativity bias, which refers to the tendency for individuals to focus more on negative information in various domains (Baumeister et al., 2001). Indeed, research suggests that metaphors that convey negative emotions are found to be more efficient, or considered better metaphors, compared to metaphors for positive feelings (Littlemore et al., 2018). As such, it seems that metaphors may work best when they convey negative emotions as is the case with BATTLE but not JOURNEY in the present study.

Moreover, our results also suggest that in the context of COVID-19, a JOURNEY metaphor frame may not evoke a positive affective state. These findings contrast with survey results reported in the online repository where positivity ratings were significantly higher for the generic concept of JOURNEY compared to WAR. Understandably, it may be difficult to positively influence affective state when communicating about an outbreak of the virus during the pandemic and the situation may be different once it is over. Perhaps in the future, by replicating the current study, we may indeed observe an influence of this frame on positive affect. Future studies could combine measures and collect both affect scores and positivity ratings for further insight.

A further point to consider regarding the results is that the mean positive and negative affect scores showed relatively high standard deviations, indicating a high variation from the mean. However, the data was thoroughly checked before the analysis, and it was decided not to remove the three outliers found, as they could be attributed to natural variations in human emotions. According to Howitt and Cramer (2016, p. 67), deviations from ideal distributions can be overlooked when there are 30 or more scores as they are unlikely to significantly impact the results. Further investigation revealed that removing the outliers had no effect on the significance of the group differences in affect scores.

Regarding our RQ2: Does framing the pandemic with BATTLE or JOURNEY metaphors influence readers' inferences about the attitudes of others? As mentioned, no significant differences were found between groups for agreement with the three statements about the text. This suggests that the metaphor frames investigated had no influence on participants' inferences. This is consistent with research that indicates metaphor frames are not influential to participants' reasoning (e.g., Steen et al., 2014). However, these results contrast with research that found JOURNEY metaphors to positively influence attitudes (Landau et al., 2014). In the present study, the mean agreement ratings indicated that overall participants did not infer that individuals described in the text would feel hopeful about the future indicative of a more negative outlook in general. However, for statements about acceptance of the situation and shared responsibility to stop the virus, mean ratings sit between agreement and disagreement. Once again, we believe that these results may be affected by the fact that the pandemic is still ongoing. We are currently preparing a second data collection that replicates the current experimental design with different groups of participants (matching the demographics of the current groups for comparability). We hypothesise that with the end of the pandemic readers may be less susceptible to the figurative framing effects involving emotions related to the COVID pandemic.

The presence of a framing effect in self-reported affect, but not in inferences, raises the question of whether participants were more self-focused than empathetic towards others. Compared to previous research, the results contrast with findings where similar metaphor frames influenced emotional inferences, specifically acceptance of hardship was less likely when a message was framed with BATTLE metaphors, compared to JOURNEY metaphors (Hendricks & Boroditsky, 2016; Hendricks et al., 2018). While the metaphorical frames in the present study influenced affective state in different ways, perhaps they were simply not sufficient to influence attitudes in frame-consistent ways. Still, the experimental design in the present study differed to previous studies where participants were asked to indicate their level of agreement with two contrasting statements, each matched to one of the metaphors investigated (Hendricks & Boroditsky, 2016). Metaphors may be more influential when response options are congruent with metaphor frames (Thibodeau et al., 2019, p. 10). The present study used three statements specifically addressing feelings of hope, acceptance and shared responsibility, consistent with a JOURNEY frame (Nie et al., 2016). Thus, the addition of contrasting statements aligned to frames could provide a clearer picture of whether metaphor frames influence reasoning in frame-consistent ways.

Regarding RQ3: Does framing the pandemic with BATTLE or JOURNEY metaphors influence the types of solutions proposed to stop the virus? After coding the responses into categories of severity and achieving a high degree of reliability in the annotation, the analysis revealed that overall, readers of the BATTLE frame proposed more restrictive suggestions to stop the virus than readers of the JOURNEY frame. It is important to note that there were few responses that were categorized as relaxed, so while readers of the BATTLE frame proposed more restrictive suggestions overall, the majority of suggestions were considered moderate and extreme, in line with those imposed in the UK. These results support the idea that BATTLE metaphors may influence support for more severe responses to the pandemic. This aligns with findings by Flusberg and colleagues (2017), where reading a WAR frame led to a willingness to change behavior. However, it is important to recognize that the influence of the BATTLE frame may vary depending on the topic. The present finding is also consistent with research on metaphor framing where participants proposed frame-consistent solutions to a crime problem (Thibodeau et al., 2011, 2013).

It is important to mention, as observed by Thibodeau and Boroditsky (2015), that different methods of coding can produce different results and it is acknowledged that the process of coding the data involves a degree of subjectivity. Nevertheless, in the present study efforts were made to ensure a systematic approach in assigning responses to categories that aligned with the UK government's (2020) previous tiered restrictions, given that participants were UK residents living in accordance with these rule categories at the time of the study. Future research could investigate further by asking individuals to indicate their level of preference for specific measures that vary in severity to assess whether frames are influential when individuals are presented with solutions that they may not have previously considered (similar to research by Thibodeau and Boroditsky, 2013).

Considering the responses in closer detail, initial analyses of the data found similarities in the most frequent words for both groups, namely *stop* and *socialising*. As the text stimulus mentioned that residents had been socializing outdoors, it is not surprising that readers appear to have proposed this as a solution to stop the spread of the virus. However, the most notable difference found between groups was that *lockdown* appeared in 11 suggestions as one of the most frequent words from readers of the BATTLE frame, while only 3 readers of the JOURNEY frame used this term. Although *lockdown* has the same general meaning as *stay home* (amongst the most frequent words for JOURNEY readers), as a military term it can be seen as a response that is consistent with the BATTLE frame while *stay home* is a more neutral term. This points to the possibility of lexical priming as a potential influence on the results, consistent with the idea that lexical associations may support metaphorical mapping (Thibodeau et al., 2017, p. 859). Therefore, metaphorical frames may also be influential to the language produced by participants, as was found by Hendricks et al. (2018) in an analysis of participant free responses.

To conclude, one could argue that a potential drawback of the current analysis is that the two metaphorical frames were not contrasted to a non-metaphorical control condition. Yet, it would have been extremely difficult to construct a literal control condition with a perfectly neutral affective valence, to be compared with the more positive affective valence of JOURNEY and the negative affective valence of BATTLE. Steen et al. (2014) include a non-metaphorical frame of *problem* in their study, however this would be unsuitable in the present study as a problem may be viewed as negative and although it is not metaphorical, it is not neutral. As a starting point, a *situation* may be a more suitable term for the purposes of neutrality. Yet, describing the pandemic as a situation may underemphasize its gravity. Although Flusberg et al. (2017, p. 772) agree that a non-metaphorical frame can be a useful comparison, they also recognize that a non-metaphorical text is not a suitable control condition due to differences not only in terms of metaphorical language but also features such as vividness and general arousal. This could lead to difficulties in establishing the reasons for differences between group responses. However, experiments comparing solely metaphorical frames, and metaphorical frames with neutral alternatives could be contrasted to provide further insight (e.g., Burnette et al. 2021).

A final point to stress again, is that the timing of the present study carried out while the pandemic is ongoing, may have contributed to the results. Steen et al. (2014, p. 23) explain that for current social issues, it is likely that people have already formed opinions about them. Therefore, it is unclear if or how metaphor frames have influenced prior attitudes or beliefs, aside from emotional state. The present study was carried out a year after the start of the pandemic and as such, individuals had formed opinions about the situation based upon their experiences during the pandemic and the information they

encountered. However, if attitudes towards a topic are flexible, metaphors can be influential (Thibodeau et al., 2017). Further investigation is necessary to explore the role of affect in metaphor framing and under what conditions emotional states influence reasoning.

## Conclusion

The COVID-19 pandemic is a long-term crisis and while military metaphors may have helped to convey the danger associated with the virus and the importance of preventing its spread, at the later stages of the pandemic in the UK where the public understood the danger of the virus and vaccinations were underway, their use became unnecessary. Moreover, considering that a military metaphorical frame may influence support for more extreme responses to the pandemic this could potentially extend to other topics as literal and metaphorical boundaries can become blurred (Semino, 2021, p. 53). As the results of the present study indicate, military metaphors can also negatively influence how people feel and given their potential negative impact on public well-being (Flusberg et al., 2018) and the adverse influence of the pandemic on mental health (Pfefferbaum & North, 2020), other more suitable metaphors should be considered. Wicke and Bolognesi (2020) suggest composing an assortment of metaphor frames for the different stages of the pandemic to support communicators. A JOURNEY frame may be more suitable for messages that describe the ongoing nature of the pandemic and new developments. Although the present study did not find evidence of a positive influence on attitudes, previous research found motivating effects associated with a JOURNEY frame (Landau et al. 2014) that may help people to persevere, depending on the message communicated. Adam (2020) proposes framing the virus as something to live with given that people have experienced changes to the way they live and suggests the metaphor of FRIENDSHIP. Many alternative metaphors were proposed for various aspects of the pandemic in the #ReframeCovid collection (2020), which could also support public communication in future epidemics.

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