

Choosing source domains to guide metaphoric health reasoning

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1. METAPHORS AND DECISION-MAKING

Framing shapes reasoning - and metaphoric mappings allow source frame reasoning to guide target-frame reasoning.

Choice of metaphoric framings may affect people's choices and actions (Thibodeaux & Boroditsky 2013) - e.g. priming with descriptions of CRIME

- CRIME AS A PREDATORY ANIMAL (*preying on victims, roaming the streets*) shifted subjects' preferences towards incarceration solutions to crime
- CRIME AS AN EPIDEMIC DISEASE (*an epidemic of crime, spreading through neighborhoods*) shifted preferences towards treatment and social programs.

In healthcare, choice of reasoning patterns can save or lose lives. (See Matlock *et al.* 2017 on risk assessment.)

Medical decision-making

Can linguists help public health language to evoke productive behavior from members of the public?

Perhaps metaphors can be chosen to encourage the right health inferences. Using data from the Coronavirus Corpus (english-corpora.org), we compare English metaphors for COVID-19 (and the pandemic) with metaphors for cancer found in a previously compiled multi-genre corpus (LaParle and Sweetser 2018, Sweetser and LaParle 2019). We hope to identify more and less productive metaphoric patterns for public health discourse.

Human scale

Invisible cell-level vectors and large-population disease-spread are currently both of huge conceptual importance, in the COVID-19 pandemic. Human minds have no direct experiential handle on statistics over world-population-size numbers and global physical distances, nor on microscopic cellular interactions of the immune system.

Like many medical (and other scientific) data-sets, these phenomena are not within everyday “human-scale” spatial perception.

Metaphor is a basic way to construe them in terms of human-scale events. Understanding a non-human scale event or situation in terms of a human-scale one is a common human cognitive tactic, as argued by Fauconnier and Turner (2001).

Intersubjective accessibility

Dancygier and Sweetser argue (2014) that the primary determinant of direction of metaphor mapping - that is, of a choice of source domain to fit a target domain - is *intersubjective accessibility* rather than concreteness.

By this we mean (1) the degree of directness of perceptual or experiential access and (2) the level of confidence that other conspecifics will share that access and develop a shared experiential assessment.

We cannot perceive COVID-19 or cancer cells in our own bodies, except indirectly via symptoms. We cannot perceive them in another person, nor does another person perceive them in us.

A classic case for a human-scale metaphor with a more intersubjectively accessible source domain.

Metaphors and human scale

As in many other metaphor systems, the metaphors for microscopic disease situations are typically not in terms of (for example) invisible atomic particles, or galaxies - instead, having a disease is frequently understood metaphorically in terms of direct perceptible physical or social interactions.

Dealing with Cancer or COVID is *fighting, struggling, being kidnapped*. The viruses or cancer cells or T-cells are *combatants*.

Since any long-term purposeful activity is understood in terms of goal-directed motion, it is also no surprise that longer-term disease situations (Cancer treatment) are *journeys*. COVID is not usually long-term but when it is, we can see some Journey mappings (*long-hauler*).

2. METAPHORS FOR DISEASE: Combat and more

Sontag (1978) brought Combat metaphors for cancer treatment to public awareness, arguing that they were harmful, objectifying the patient as a battleground or guilt-tripping the patient for “giving up the fight.”

Semino and colleagues have noted that both patients and medical staff use both Combat and Journey metaphors for cancer treatment, and argued that by no means all combat metaphors have a negative impact on the patient’s construal of the situation (Semino *et al.* 2015, Potts and Semino 2019).

LaParle and Sweetser have argued that distinctions need to be made between kinds of Combat metaphors in particular; they do not all have the same inferences. (Laparle and Sweetser 2018, Sweetser and Laparle 2019).

Cancer: metaphors focus on individual patient

Because cancer is not transmissible (though it can be “epidemic” due to shared external carcinogen exposure), therefore most cancer metaphors focus on the specific patient and case.

A variety of metaphors emerge.

Cancer: BODY AS FIGHTER/DEFENDING ARMY

Cancer: Body as Fighter/Defending Army

- (1) In a calculated gamble, her doctors suggested a radical new option: becoming a test subject in a trial of an experimental therapy that would, for the first time, use gene therapy to **train** a patient's immune system to recognize and **destroy** their cancer in the same way it **dispatches** bacteria and viruses.

<http://time.com/4895010/cancers-newest-miracle-cure/>

Cancer as a Harmful Living Being (HLB)

Cancer as HLB

(2) <http://thispodcastwillkillyou.com/wp-content/uploads/2021/06/TPWKY-COVID-20-Looking-Forward-by-Looking-Back.pdf><http://www.butdoctorihatepink.com/search?updated-max=2018-08-14T17:08:00-07:00&max-results=7>

(3) “Unbeknown to me, **slithy** growths had burbled through my abdomen, **whiffling** through my omentum, ovaries, fallopian tubes, uterus and a section of my bowels, all of which had to be snicker-snacked...There is no **vorpal sword** with the magical capacity to decapitate the **Jabberwocky** once and for all.”

<https://www.nytimes.com/2018/05/17/well/live/the-jabberwocky-in-a-cancer-lab.html>

3. CANCER AND COVID – similarities and differences

A crucial factor in the Harmful Living Being class of metaphors - Invading Army, Attacker in personal combat, Kidnapper, Stalker, Predator - is that there is a conscious purposeful entity who is responsible for the harm undergone by the Cancer or COVID patient (Attack victim, Prey, Stalk-ee).

This is a powerful set of inferences. A Cancer patient (or in many cases, a hospitalized COVID patient) has no agent whom they can blame for the harm they are experiencing. Cells and viruses are not intentional entities. The inference of the (metaphoric) right to *moral grievance* is part of what this metaphor brings to the user.

Microscopic COVID-19: BODY AS DEFENDING ARMY

- (4) When a new, unknown invader proves difficult to distinguish, the body sometimes gets desperate and calls out the entire **immune-system military**—and also the National Guard, and the Boy Scouts, and anyone who has a pitchfork or a torch. <https://www.theatlantic.com/health/archive/2020/05/coronavirus-antibody-test-immunity/611005/>
- (5) “The cell is **mounting a profound battle** to prevent the virus from entering or, on entering, to alarm everyone around it so it can’t spread,” she said. “The virus’s intent is to overcome this **initial surge of defense**, to set up shop long enough to reproduce itself and to spread.”
<https://www.nytimes.com/2020/06/02/health/coronavirus-profile-covid.html?action=click&module=Top%20Stories&pgtype=Homepage>
- (6) The virus is the Dark Side. We have a cellular defense system of hundreds of antiviral proteins” — **Jedi knights** — “to defend ourselves. Our lab is studying one specific Jedi that uses one particular weapon, and how the virus fights back.
<https://www.nytimes.com/2020/06/02/health/coronavirus-profile-covid.html?action=click&module=Top%20Stories&pgtype=Homepage>

Fighting against COVID-19: a collective solution

So far there is no cure for COVID-19 - only preventive vaccination or treatment strategies for individual sick patients.

This means that the pandemic is a *collective* problem needing a collective solution: individual actions (wearing masks, distancing, hand-washing, even getting vaccinated) have to be taken *in concert* to be effective against it.

Communal Combat/Defense metaphors are more relevant to this necessity than Individual Combat metaphors or Microscopic Army metaphors.

Are individual Fight metaphors useful for public health?

Once you are engaged in an individual fight with COVID - that is, once you are sick - it is too late to prevent COVID by collective public health measures.

Whereas the communal Fight is relevant at every stage.

Fire and Flood metaphors are also communal - there is no individual response to a large wildfire or a flood

Community Combat

The fight against COVID-19 is particularly visible in the healthcare community. Healthcare workers are seen as soldiers fighting a battle, and masks and other equipment (gloves, medical suits) are conceptualized as necessary military equipment to prevent their defeat.

“Sending health-care workers into hospitals with too few masks is a betrayal akin to sending **soldiers into battle without armor**”

<https://www.theatlantic.com/ideas/archive/2020/04/case-drafting-doctors/610696/>

NATION AS BODY

State of pandemic is a “national” or “communal” health state.

(7) Bloomberg Tax’s Colin Wilhelm notes the division between Democrats and Republicans over the next package has its roots in a fundamental difference of perspective between the two parties, with the former generally believing the goal of the next bill should be “to provide another **tourniquet** for the economy” and the latter believing the primary objective should be to provide “**a crutch** to help return it to normal.

<https://www.lexology.com/library/detail.aspx?g=d0a59c2c-c1a1-48ec-a831-c37810311d06>

(8) Even if America as we know it **survives** the coronavirus, it can hardly emerge unscathed.

<https://www.nytimes.com/2020/04/10/opinion/sunday/coronavirus-america.html>

COVID as a natural disaster

COVID-19 has been conceptualized as natural disaster (flood, fire, etc.), where the mapping takes place between the uncontrollable and often dangerous natural phenomenon and the pandemic's behaviour.

Natural disasters: Flood

(9) But health-care workers, physically exhausted and emotionally battered from a year of relentless work, are once again facing **flooded emergency rooms** and insufficient amounts of protective gear.

<https://www.theatlantic.com/health/archive/2020/10/coronavirus-election/616884/>

(10) The **pandemic wave**, similarly, will be with us for the foreseeable future before it diminishes. But, depending on one's geographic location and the policies in place, it will exhibit variegated dimensions and dynamics traveling through time and space.

<https://www.nytimes.com/2020/06/02/health/coronavirus-profile-covid.html?action=click&module=Top%20Stories&pgtype=Homepage>

Natural disasters: Fire

(11) The coronavirus has been relatively slow to take hold in Africa, but **blazing hot spots** are beginning to emerge on the continent.

<https://www.nytimes.com/2020/05/17/world/africa/coronavirus-kano-nigeria-hotspot.html>

(12) Think of the coronavirus pandemic as a fire ravaging our cities and towns that is spread by infected people breathing out invisible **embers** every time they speak, cough, or sneeze.

<https://www.theatlantic.com/health/archive/2020/04/dont-wear-mask-yourself/610336/>

Other Natural Disasters

(13) The virus is not following one single course through the nation, but, like a **tornado**, is taking a meandering and at times incomprehensible path through cities and counties.

<https://www.theatlantic.com/science/archive/2020/06/america-giving-up-on-pandemic/612796/>

(14) Less than a week after Malaysia said it would not discount the likelihood of hastening a stimulus package to bolster the economy amid **fierce headwinds**, the ministry of finance (MoF) is now preparing the booster shot to overcome the economic impact of the rampaging Wuhan virus.

<https://maa.theedgemarkets.com/article/malaysia-prepping-its-booster-shot-economy>

(15) Dealing with the aftermath of the human devastation wrought by the virus will be another **seismic chapter** in some painful national journeys.

<https://www.columbian.com/news/2020/may/04/national-traumas-familiar-for-virus-hit-unscathed-countries/>

4. The MTurk Experiment - Design

Big question: what metaphoric framing best primes people to understand the urgency and severity of the pandemic?

1. Present participants with a short paragraph containing information about the presence of the virus in their community and healthy and safety measures meant to address it
 - Four framings: neutral, combat, fire, flood
2. Ask participants a series of questions about their opinions of various health and safety measure, focusing on how important they think it is for them to partake in the measures.
3. Collect demographic data in five categories - age, gender, education, income bracket and political leaning.

The Neutral paragraph

Covid-19 is still with us. As it continues to persist in the United States, places like New York and Arizona continue to be sites of major transmission. Medical professionals remain in hospitals during the pandemic, working hard, and attempting to end it. Essential workers are also hoping to control this virus. For now, everybody is expected to wear masks and isolate themselves while our country is affected by this pandemic.

The Combat paragraph

Covid-19 is still with us. As it *wages war* on the United States, places like New York and Arizona continue to experience *major casualties*. Medical professionals remain *on the battlefield* during this pandemic, *fighting* hard, and attempting to *beat it into retreat*. Essential workers are also hoping to *combat* this virus. For now, everybody is expected to wear masks and isolate themselves while our country is *assaulted* by this pandemic.

The Fire paragraph

Covid-19 is still with us. As it *burns across* the United States, places like New York and Arizona continue to experience *hot spots*. Medical professionals remain *on the fire line* during this pandemic, *putting out flare ups*, and attempting to prevent *fire explosions*. Essential workers are also hoping to *extinguish* this virus. For now, everybody is expected to wear masks and isolate themselves while our country is *scorched* by this pandemic.

The Flood paragraph

Covid-19 is still with us. As it *floods across* the United States, places like New York and Arizona continue to experience viral *waves*. Medical professionals remain *at the levees* during this pandemic, *resisting the tide*, and attempting to prevent an *all out tsunami*. Essential workers are also hoping to *contain* this virus. For now, everybody is expected to wear masks and isolate themselves while our country is *drowned* by this pandemic.

Design cont'd - Questions Asked

1. How important do you think it is for people to use personal protective equipment (face masks/coverings, sanitizer, gloves, etc.) when you go out in public?
2. How important do you think it is for people to limit personal trips to stores/other enclosed spaces to reduce the spread of the virus?
3. How important do you think it is for people to listen to and obey local health regulations?
4. How important do you feel your individual actions are in dealing with the effects of the coronavirus pandemic?
5. Despite more and more Americans being inoculated during the ongoing vaccination campaign, public health officials are still advising recipients to remain masked in public areas to limit asymptomatic transmission. If given the vaccine, how important is it to continue to follow these guidelines?

Data and Analysis

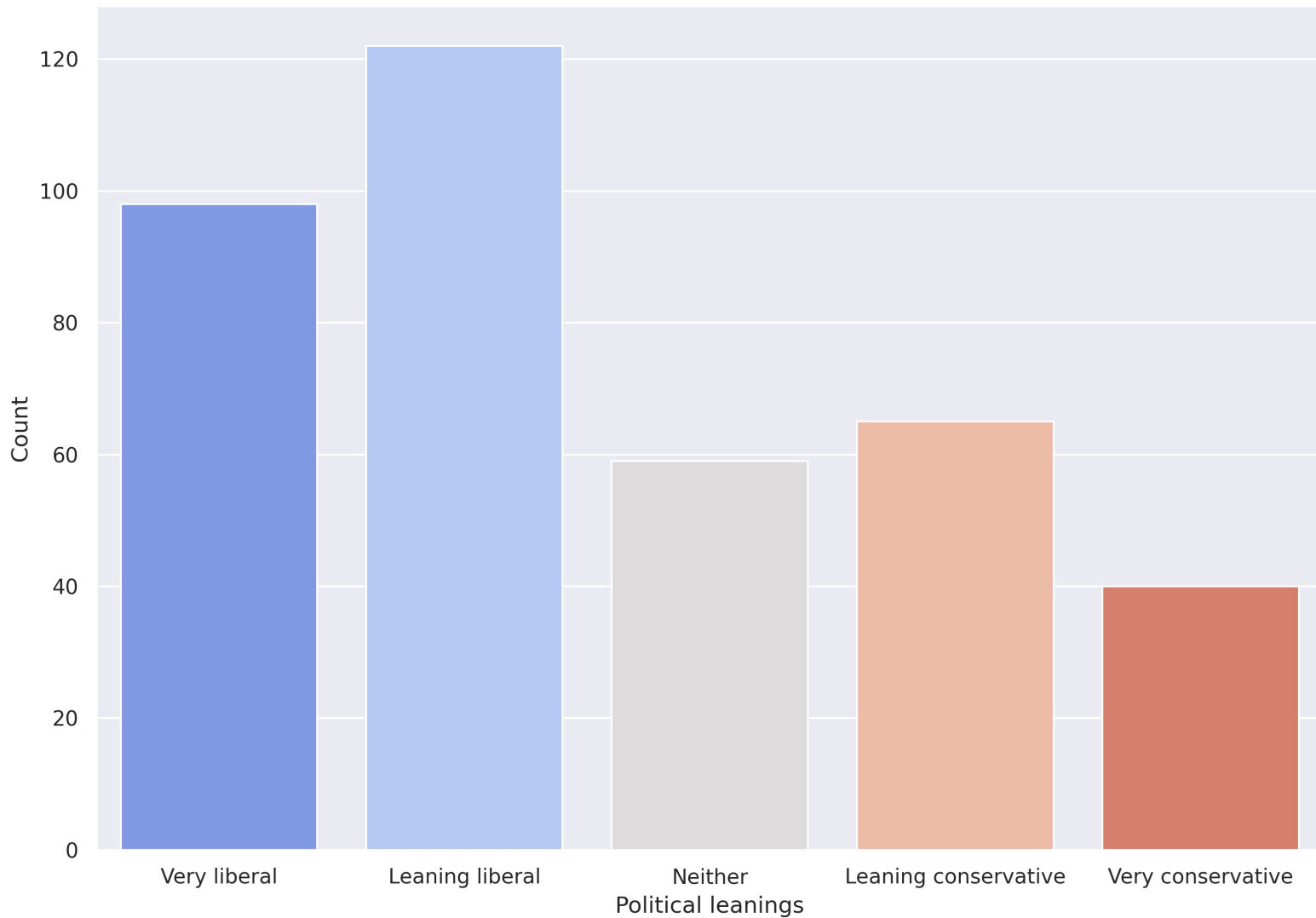
- 384 survey participants (all located in the USA with 95% approval rating). Between 95-97 respondents for each of the four conditions
- Personal Responsibility Score (PRS) = Average of an individual's Likert responses to five questions. Strongly agree = 5, Neutral = 3, Strongly disagree = 1
- Higher scores correspond to greater perceived importance of individual responsibility.

Does metaphor interact with personal responsibility score?

- War
 - 71.1% of the war group believed personal responsibility was important (PRS>3) compared to 67.3% of the control group: $\chi^2 = 0.16$, $p < 0.68$
- Fire
 - 76% of the fire group believed personal responsibility was important, compared to 67.3% of the control group: $\chi^2 = 1.37$, $p < 0.24$
- Flood
 - 73.9% of the war group believed personal responsibility was important, compared to 67.3% of the control group: $\chi^2 = 0.71$, $p < 0.4$

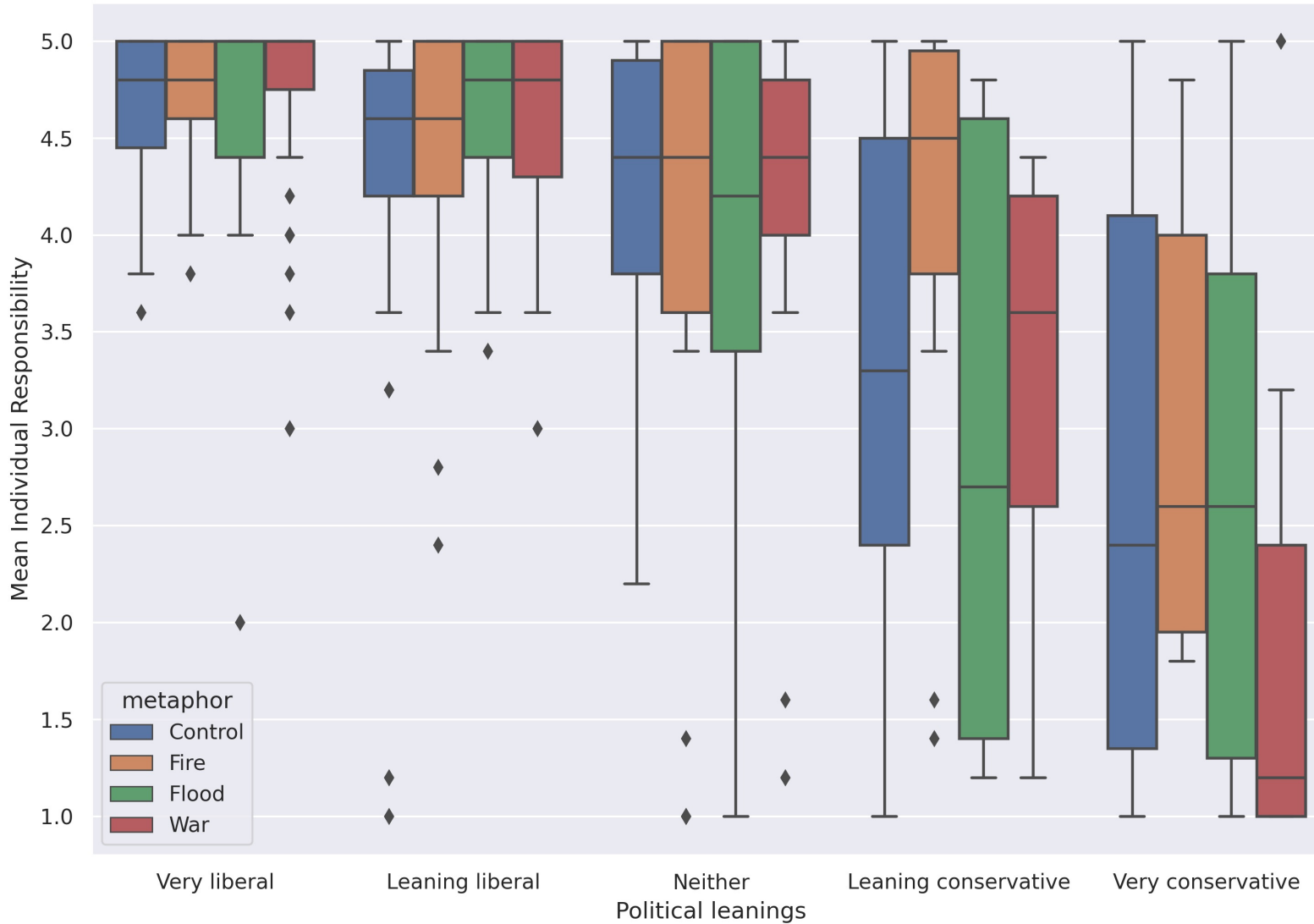
Appears that metaphor does not affect personal responsibility score. But did not control for demographic variables. In particular, we know political leanings matters.

Political leanings of participants (n=384)



Response skewed liberal but decent representation across the aisle.

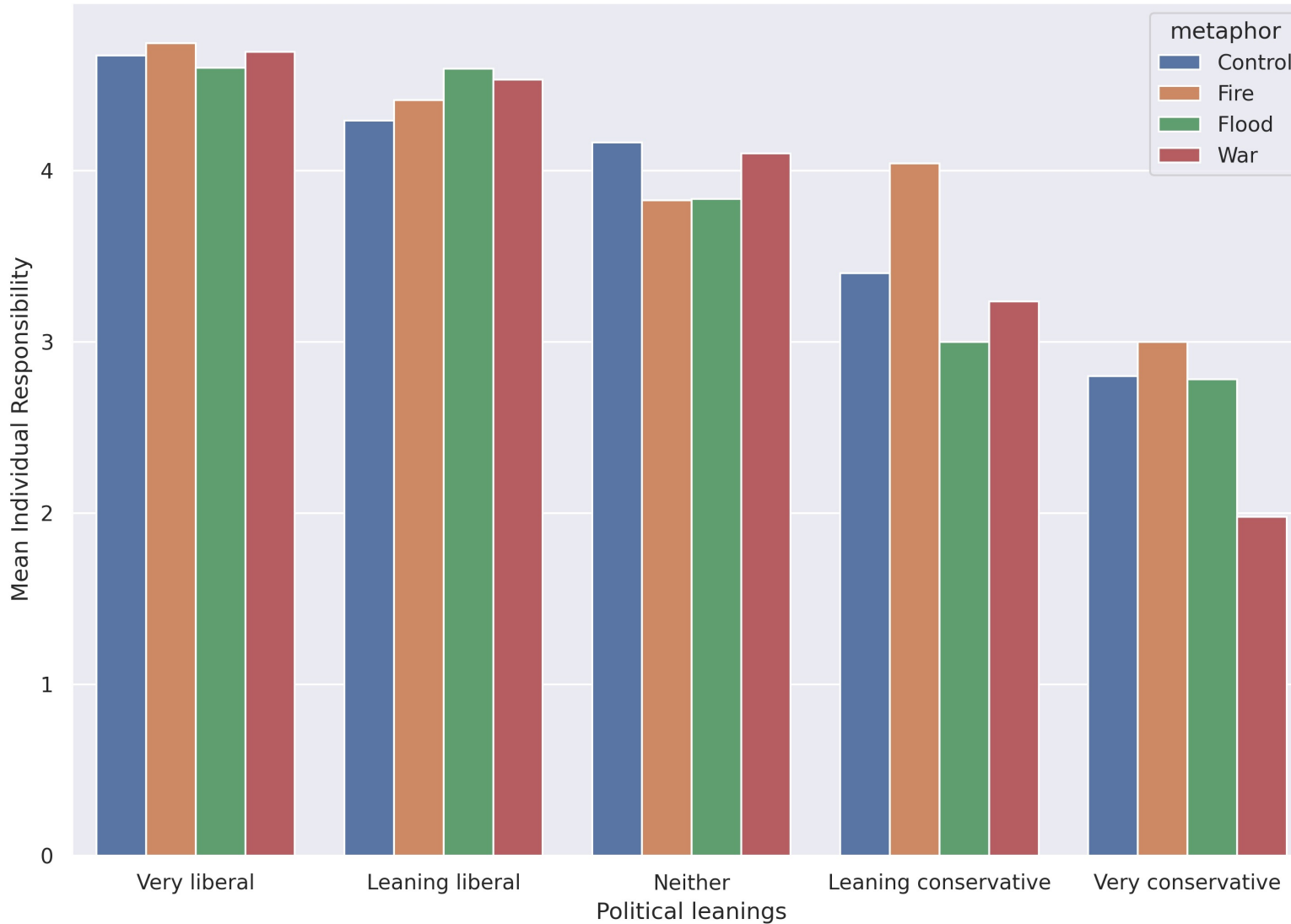
Political leanings of participants (n=384)



As expected, political leaning has a strong effect on personal responsibility score

Conservative respondents had wider distributions compared to liberal respondents.

Political leanings across metaphor groups



Means of **conservative** respondents fluctuate more than **liberal** respondents depending on the metaphor presented, especially **Fire** vs **War**

In other words, whether metaphor matters may depend on the political ideology of the individual.

ANOVA analysis that controls for political leanings

Results from a two-way ANOVA Type 3 test

	sum_sq	df	F	PR(>F)
Intercept	254.320000	1.0	276.513963	1.362056e-46
metaphor	8.136737	3.0	2.948938	3.276193e-02
Political_leanings	37.769811	4.0	10.266476	6.913940e-08
metaphor:Political_leanings	15.565264	12.0	1.410301	1.585496e-01
Residual	334.784106	364.0	NaN	NaN

When controlling for the political leaning:metaphor interaction, metaphor choice had p value 0.03.

What we can see

This has been an initial exploration of a quantitative approach to how metaphor can frame an individual's pandemic decision-making.

The subject pool is still small; with the intended larger pool, current trends may achieve greater significance.

Meanwhile: CORRELATION BETWEEN POLITICAL STANCE AND PERSONAL RESPONSIBILITY.

It seems clear that levels of PERSONAL RESPONSIBILITY (as gauged by our questions) are higher in the left-leaning side of the subject pool compared to the right-leaning side.

What we can see cont'd

Although we can't get significant comparisons yet, there are some added clear **TRENDS**.

In particular, framing the pandemic as **Combat** seems to evoke **LESS** personal responsibility than framing it as **Fire** for right-leaning individuals.

Framing has no effect on politically left-leaning subjects, as responsibility is consistently high.

If this trend holds, to best reach all members of the public, pandemic health messaging is **best framed** with **Fire** metaphors and **Combat** metaphors should be **avoided**.

The MTurk survey - Conclusion

When analysed in isolation, metaphor interactions were not significant. Closer analysis reveals potentially significant interactions after controlling for political leanings.

Deeper analysis, larger sample sizes and looking at other demographic factors (urban vs rural?) are needed to further understand how metaphor frames beliefs.

THANK YOU for your attention!

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