Metaphors for vaccination and defeasible reasoning

Ervas, Francesca [1] Salis, Pietro [0] Fanari, Rachele [0]

[1] *University of Cagliari, Italy*

ABSTRACT

The project considers metaphor as a reasoning and a communicative device in health communication, to let people understand an abstract concept, vaccination, in terms of a concrete one, the beehive. The use of metaphors in vaccine communication might be crucial to let people understand vaccination as an important collective health phenomenon. We conducted a study to investigate whether and when a novel metaphor ("the beehive"), extended via the relevant property for vaccination ("cooperative"), can be an effective reasoning and communicative device. We proposed to participants three scenarios, described in both literal vs. metaphorical terms, comparing a safe scenario vs. a "free rider" scenario (undercutting defeater) and a "non-vaccinated community" scenario (rebutting defeater). Indeed, different premises in defeasible reasoning about vaccination could show that uncertain situations, depending on the proportion of unvaccinated people, could make a relevant difference for the conclusion on the need for being cooperative in vaccination. We hypothesized that metaphors could improve the communicative effects of pro-vaccination texts, especially in uncertain reasoning scenarios, in terms of persuasion, emotional impact, trust in experts/institutions, and vaccination intentions.

1. INTRODUCTION

Metaphor can be a useful device to grasp an unknown concept (the target) by using a known concept (the source) ([Lakoff & Johnson, 1980](#); [Bowdle & Gentner, 2005](#)), to explain vaccination, which otherwise might remain unintelligible to lay people. However, metaphor might also influence people's views about the target, because of its framing effect, which might modify how people reason about a specific problem ([Thibodeau & Boroditsky, 2011](#), [Thibodeau & Boroditsky, 2013](#)). A variety of metaphors have been proposed in vaccine communication, ranging from the conventional military metaphor of the "garrison" to the novel metaphor of the "beehive" ([Ervas, 2018](#)), to let people understand the concept of "herd immunity". The "herd immunity" is in turn a

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conventional metaphor, criticized by people who are hesitant to be vaccinated and deplore the fact that it makes them feel like mindless sheep (Biss, 2014).

Scherer and colleagues (2015) presented texts where flu was metaphorically described (as a beast, riot, army, or weed) to understand the metaphorical framing effect on participants' vaccination intentions. The results of the study showed that the metaphorical scenarios had some impact on the intention to get vaccinated, especially in the case of hesitant participants. However, the texts presented to participants were focused on reasoning scenarios that was *consistent* with the metaphorical frame. In other words, participants' disposition to get vaccinated was assessed via a text that did not bring participants to question the metaphorical frame. On the contrary, in every-day life specific reasoning scenarios may defeat conclusions about the necessity for vaccination to be collective, ranging from the phenomenon of single "free riders" to entire "no-vax communities". However, no empirical study on the effects of metaphor for vaccination in defeasible reasoning conditions was conducted and it would be important in the current COVID-19 pandemic.

We conducted a study to investigate whether and when a novel metaphor ("the beehive", Biss, 2014), extended via the relevant property ("cooperative") for argumentative discourse about vaccination in uncertain scenarios, can be an effective reasoning and communicative device for laypeople's understanding of vaccination as a crucial collective endeavour. The study aimed at understanding the communicative effects of metaphors in uncertain reasoning situations, in terms of persuasion, emotional impact, trust in experts/institutions, and vaccination intentions.

2. METHOD

Six groups of participants (Ntot=196) were tested online, by providing with a text presenting a vaccination scenario for each condition, as described below. We then asked to rate the text on a 1-7 Likert Scale for the logical acceptability of the text conclusion, for the understandability, ambiguity, emotional impact of the text, and for the participants' feeling of safety, control over the situation, commitment to vaccination,

trust in experts' and in institutions, uptake of the experts' advice and vaccination intentions.

2.1 Assumptions

The first assumption is that a metaphor can be explicitly meant to better understand an argument (deliberate metaphor, Steen, 2017). We therefore designed the scenarios having an expert intentionally talking about immunity in literal vs. metaphorical terms.

The second assumption is that diagnostic reasoning in the case of vaccination is a non-monotonic process (Salis & Ervas, 2021). Different from standard deductive reasoning, certain premises may indeed be rebutting defeasors, liable to make the conclusion a bad one, or undercutting defeasors, liable to make the other premises bad to draw certain conclusions.

2.2 Hypotheses

We hypothesized that a novel metaphor for vaccination (the "beehive"), extended via a relevant property for the reasoning task ("cooperative") entails stronger communicative effects, and that it makes more logically acceptable, when compared to its literal counterpart, especially in defeasible reasoning scenarios.

2.3 Experimental design

Based on the assumptions and hypotheses, the empirical study had a 3×2 experimental design, presenting 3 "reasoning" scenarios:

a. safe reasoning scenarios,

b. defeasible reasoning scenarios (undercutting-type; the "free rider" condition),

c. defeasible reasoning scenarios (rebutting-type; the "no-vax community");

and 2 "metaphorical frame" conditions:

a. metaphor;

b. literal counterpart.

3. PRELIMINARY RESULTS

The preliminary results of the study are reported in Ervas et al. 2020, at the address: https://doi.org/10.31234/osf.io/rvxpd. These results confirmed that a novel metaphor (extended in the text via a relevant property, "cooperative") enhances the overall communicative effects of the message, in terms of understandability, persuasion, perceived safety and feeling of control over the health situation, collective trust in expertise and uptake of experts' advice. However, the results show that this effect is significantly nuanced by the type of defeasible reasoning, especially in the case of participant's trust in expertise and commitment to experts' advice. It is not the ability of highlighting relevant similarities between the beehive and vaccination per se that automatically makes the extended metaphor a good reasoning strategy for the overall argument. In the cases of vaccination analysed in the study, both a communicative and reasoning competence seem to be required to boost trust and vaccination commitment, which finally is at the core of the vaccine hesitancy problem also in these pandemic times.

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