

How viruses and beasts affect our opinions (or not)

The role of extendedness in metaphorical framing

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Based on the assumption that extended metaphor may constitute a case of deliberate metaphor and therefore has the potential to influence people's opinions, this paper investigates whether extending a metaphorical frame in a text leads people to perceive policy measures that are in line with that frame as more effective for solving a crime problem than other policy measures. The metaphorical frames 'Crime is a virus' and 'Crime is a beast' were extended in one experiment each via a series of additional conventional metaphorical expressions having crime as the target domain and beasts/viruses as the source domain. Participants (N = 354, Experiment 1; N = 361, Experiment 2) were randomly assigned to one of five experimental conditions with increasing numbers of sentences containing metaphorical expressions, and rated the effectiveness of a set of policy measures to solve the crime problem described in the text. The data yield limited support for our hypothesis. When controlling for political affiliation, the ratings for frame-consistent measures trended in the hypothesised direction in Experiment 2. Experiment 1 yielded a trend for frame-inconsistent measures. These results suggest that metaphorical framing effects may be more subtle than has been assumed.

Keywords: metaphor, framing, framing effects, reasoning, experiments

1. Introduction

One of the most important theoretical claims about metaphor is that it can influence reasoning, for example via the process of highlighting and hiding: metaphorical source domain concepts can lead us to pay attention to specific aspects of a target concept while other aspects are left aside or hidden (Lakoff & Johnson, 1980, p. 10). For instance, when talking about solving a crime problem, one can

say that crime is a *virus* and that it should be prevented by making people *immune*, thereby highlighting the idea that reforming people's behaviour can solve the problem. Alternatively, one can say that crime is a *beast* and that it should be prevented by *trapping* criminals, thereby highlighting the idea that strict law enforcement can solve the problem (cf. Thibodeau & Boroditsky, 2011, 2013; Steen, Reijniere, & Burgers, 2014). In the crime-as-a-virus approach, this idea of law enforcement is hidden, while in the crime-as-a-beast approach, the idea of reform is hidden.

The very fact that highlighting and hiding are at the core of metaphor may make it the framing device *par excellence*, as framing is defined as "[...] select[ing] some aspects of a perceived reality and mak[ing] it more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the described item" (Entman, 1993, p. 52). The angle of how to think about a given issue may influence the way in which that issue is actually understood or evaluated by addressees (Scheufele & Tewksbury, 2007, p. 11). From here, it is only a short step to argue that the choice of a metaphorical frame may have the potential to exert an effect on social-policy questions (Schön, 1979), and that politicians could use this to propagate their own views. For example, in the example about crime discussed above, left-wing politicians might prefer to solve a crime problem by focusing on reform and consequently frame it in terms of a virus. By contrast, right-wing politicians might prefer to approach the issue from an enforcement-oriented standpoint, and frame it in terms of a beast. By investigating the effect of different frames, we can learn more about the possible impact of political viewpoints (represented in the form of a metaphorical frame) on voters' opinions and behaviours.

Empirical studies investigating the effects of metaphorical framing show mixed results. Some studies (e.g., Robins & Mayer, 2000; Thibodeau & Boroditsky, 2011, 2013) have found that people prefer different policy measures when they read different metaphorical frames. Participants in Thibodeau and Boroditsky's (2011, 2013) studies read a text about a city's crime problem in which crime was either framed metaphorically as a beast or as a virus. Then, they were asked to indicate their preferred solution to the crime problem. Across experiments, Thibodeau and Boroditsky (2011, 2013) found that participants in the crime-as-a-beast condition were more likely to prefer enforcement-oriented, direct solutions to the problem, such as increasing street patrols and prison sentences, than those in the virus-condition. Participants in the crime-as-a-virus condition displayed a higher preference for reform-oriented solutions than those in the beast-condition, concentrating on prevention such as reforming education and expanding welfare programs.

This approach has been critiqued for the lack of a non-metaphorical control condition that could serve as a baseline (Hartman, 2012; Steen et al., 2014).

Without such a control condition, it is not possible to determine whether the effect is due to the metaphoricity of the frame, or a general framing effect (see Lau & Schlesinger, 2005, p. 106). Indeed, some studies comparing metaphorical with non-metaphorical frames found that the former have a bigger influence on people's opinions than the latter (e.g., Hartman, 2012; Kalmoe, 2014; Scherer, Scherer, & Fagerlin, 2015). Nay and Brunson (2013) investigated whether support for removing surplus conifers increased as a result of framing the conifer increase metaphorically as an invasion, compared with non-metaphorically as encroachment/expansion. Participants in the invasion-frame rated conifer removal as significantly more acceptable than participants in the expansion-frame (p. 163). On the other hand, other studies found no difference between metaphorical and non-metaphorical frames (e.g., Steen et al., 2014).

These contrasting findings raise the question under which precise conditions a metaphorical framing effect may or may not take place (Steen et al., 2014, p. 22). One essential variable to consider may be the number and type of metaphorical expressions used in the experimental texts. Tewksbury, Jones, Peske, Raymond, and Vig (2000) investigated extended non-metaphorical frames and found that increased presence of a frame within a single text made participants more likely to accept policy measures that were in line with (or suggested by) that frame. Conversely, in a meta-analysis on the persuasive effects of metaphor, Sopory and Dillard (2002, p. 404) investigated the role of extendedness versus non-extendedness of metaphorical frames and did not find statistically significant differences between extended and non-extended metaphorical frames. Steen et al. (2014, p. 20) also found no effect of what they call "metaphorical support": participants' preferences for solutions to a crime problem were not influenced by whether they read a single or multiple metaphorical expressions.

The absence of a metaphorical framing effect in Steen et al.'s (2014) studies could be caused by the fact that, in these studies, the metaphorical expressions extending the initial frame were ambiguous between both frames they investigated ('Crime is a beast' and 'Crime is a virus'). Their experimental texts included metaphorically-used words like 'vulnerabilities', 'weakened', and 'succumbed' (p. 4),¹ which can be interpreted both in terms of the crime-as-a-beast and the crime-as-a-virus frame.

Based on these diverging observations, we examine the influence of textual extendedness as a condition for the appearance of a metaphorical framing effect in the present paper. We do so under the assumption that extended metaphor

1. It should be noted that Steen et al. (2014) used the experimental texts used by Thibodeau and Boroditsky (2011, 2013). However, Thibodeau and Boroditsky did not investigate metaphor extendedness as such.

constitutes a case of deliberate metaphor (Krennmayr, 2011; Steen, 2011, in press) and that it therefore has the potential to draw the addressee's attention away from the target domain to the source domain (cf. Steen, 2008, 2011). This may consequently sway his preference for policy measures. We thus hypothesize that:

H1: Extending a metaphorical frame in a text by increasing the number of metaphorical sentences expressing it will lead participants to display higher ratings of perceived effectiveness of policy measures that are in line with that frame.

2. Method

To investigate our hypothesis, we report two experiments in which we separately extended the metaphorical frames 'Crime is a beast' and 'Crime is a virus' via a series of additional conventional metaphorical expressions having crime as the target domain and beasts/viruses as the source domain ("textual extension", Semino, 2008).

2.1 Ethics statement

Data were collected in accordance with ethical guidelines of our institution.² Participants were asked to tick a box to provide informed consent on the first page of the survey, on which it was also indicated that their answers would be treated anonymously, that they could quit the survey at any moment, and that — by participating — they agreed that their data would be analysed for the purpose of our study.

2.2 Design and materials

Both experiments used a single-factor, between-subjects design. The independent variable was the number of metaphorical sentences in the stimulus text, which varied between 1 to 4. We also included a non-metaphorical control condition.

The experimental materials were loosely based on those used by Thibodeau and Boroditsky (2011, 2013), and Steen et al. (2014), in the sense that they were based in the fictitious city of Addison, and used the same frames (metaphorical: 'Crime is a beast', 'Crime is a virus'; non-metaphorical: 'Crime is a problem', the latter only used by Steen et al., 2014). The texts resembled a short news report in which the Mayor of the city of Addison made an announcement about crime in his city. All metaphorical expressions were positioned in the Mayor's quote, which was preceded by two sentences forming a general introduction to provide some context

2. See <http://fsw.vu.nl/en/departments/communication-science/research/good-researchpractice-guidelines/index.asp>

to the text. Both experiments contained five different versions of the experimental text. In each experiment, the number of words was the same across conditions, which only differed in the number of sentences containing metaphorically-used expressions — from zero (in the non-metaphorical control condition), up to four.

Contrary to earlier studies that used these frames (Thibodeau & Boroditsky, 2011, 2013; Steen et al., 2014), the additional metaphorical expressions that we used could unambiguously be assigned to a single metaphorical frame. With the help of the Macmillan dictionary (Rundell, 2002) and MIPVU (Steen, Dorst, Herrmann, Kaal, Krennmayr, & Pasma, 2010), we selected metaphorical expressions having crime as the target domain and either viruses (Experiment 1) or beasts (Experiment 2) as the source domain. This yielded words like ‘cure’ and ‘symptom’ for Experiment 1, and ‘predatory’ and ‘prey on’ for Experiment 2. The noun ‘plague’, which has a meaning related to illness (Macmillan sense description 1; hereafter MM1 etc., where MM refers to Macmillan, and the number refers to the numbered sense descriptions in the online version of the dictionary), but also one related to animals (MM3), was discarded because it could be connected with both the virus and the beast frame. Table 1 gives an overview of the experimental texts.

We also controlled for conventionality, as the distinction between novel and conventional metaphor might interact with the emergence of a metaphorical framing effect (Sopory & Dillard, 2002, p. 407; Steen, in press; see also Krennmayr, Bowdle, Mulder, & Steen, 2014). In line with MIPVU (Steen et al., 2010, p. 33) and Semino (2008, p. 19), metaphors were considered novel if the metaphorical meaning is not (yet) present in the dictionary. Consequently, the noun ‘diagnosis’, which has only one sense description in Macmillan (‘a statement about what disease someone has, based on examining them’), but could also be applied metaphorically to determine features of the crime problem, was not allowed in Experiment 1. In the same way, the verb ‘domesticate’ was discarded from Experiment 2 because it only has an animal-related sense description in the dictionary (‘to train an animal to live with or work for humans’) and was therefore considered a novel metaphor.

Finally, following a suggestion for further research in Steen et al. (2014, p. 21), we presented the crime problem in Experiment 1 as a long-term problem, and in Experiment 2 as a short-term problem by adding a reference to time in the sentence introducing the announcement of Mayor Smith: crime was said to have increased *over the past 10 years* in Experiment 1, and *over the past year* in Experiment 2. In much the same way as the virus frame might lead to preference for reform-oriented policy measures, and the beast frame to enforcement-oriented policy measures to solve the crime problem, long-term problems may lead to a preference for reform-oriented, and short-term problems to a preference for enforcement-oriented measures.

Table 1. Overview of the experimental materials for Experiments 1 and 2

General introduction	In his latest speech, Mayor Smith of the city of Addison announced that crime has steadily increased in his city over the past 10 years/ year. Smith said:				
Condition	<i>Non-metaphorical control</i>	<i>1 sentence with metaphors</i>	<i>2 sentences with metaphors</i>	<i>3 sentences with metaphors</i>	<i>4 sentences with metaphors</i>
Exp. 1	<p>“Crime is a problem. It is a threat we must prevent from increasing. Even safe communities are showing signs of violence. We need a new policy to make our city secure before the situation gets completely out of hand.”</p>	<p>“Crime is a virus. It is a threat we must prevent from increasing. Even safe communities are showing signs of violence. We need a new policy to make our city secure before the situation gets completely out of hand.”</p>	<p>“Crime is a virus. It is a disease we must prevent from spreading. Even safe communities are showing signs of violence. We need a new policy to make our city secure before the situation gets completely out of hand.”</p>	<p>“Crime is a virus. It is a disease we must prevent from spreading. Even healthy communities are showing symptoms of violence. We need a new policy to make our city secure before the situation gets completely out of hand.”</p>	<p>“Crime is a virus. It is a disease we must prevent from spreading. Even healthy communities are showing symptoms of violence. We need a new cure to make our city immune before the situation gets completely out of hand.”</p>
Exp. 2	<p>“Crime is a problem. It is a dangerous issue taking over many of the city’s communities. It is unpredictable and serious, going out of control. We need to stop it before safe neighborhoods are affected, too.”</p>	<p>“Crime is a beast. It is a dangerous issue taking over many of the city’s communities. It is unpredictable and serious, going out of control. We need to stop it before safe neighborhoods are affected, too.”</p>	<p>“Crime is a beast. It is a dangerous animal preying over many of the city’s communities. It is unpredictable and serious, going out of control. We need to stop it before safe neighborhoods are affected, too.”</p>	<p>“Crime is a beast. It is a dangerous animal preying over many of the city’s communities. It is feral and predatory, going out of control. We need to stop it before safe neighborhoods are affected, too.”</p>	<p>“Crime is a beast. It is a dangerous animal preying over many of the city’s communities. It is feral and predatory, going out of control. We need to trap it before safe neighborhoods are infested, too.”</p>

Note: the first row of this table contains the general introduction to the text that was the same in all five conditions. Participants in Experiment 1 read that crime had increased over the past 10 years, whereas participants in Experiment 2 read that it had increased over the past year. Words printed in boldface indicate the manipulated elements. All illness-related terms are metaphorical extensions of the coordinating frame ‘Crime is a virus’. All beast-related terms are metaphorical extensions of the coordinating frame ‘Crime is a beast’. American English spelling conventions were used as the experiment was carried out in the United States.

2.3 Instrumentation

Dependent variables

Participants were asked to evaluate the effectiveness of a series of policy measures, again loosely based on Thibodeau and Boroditsky (2011, 2013). Two sets of measures were created, one in line with the crime-as-a-virus frame, focusing on reform, and the other in line with the crime-as-a-beast frame, focusing on enforcement (see Table 2). A pre-test was carried out to ensure that the eight policy measures formed two distinct groups of measures displaying reliable scales of reform- versus enforcement-orientedness.

Table 2. Enforcement-oriented and reform-oriented policy measures used as the dependent variables in Experiments 1 and 2

ENFORCEMENT-ORIENTED	REFORM-ORIENTED
Increase prison sentences	Reform education practices*
Increase street patrols	Create after school programs*
Punish criminals faster***	Expand economic welfare programs**
Set higher maximum penalties***	Create jobs**

Note: measures marked with * and ** were combined in Thibodeau and Boroditsky (2011, 2013); measures marked with *** were added in the present study to create an even distribution of enforcement- and reform-oriented measures.

A valid total of 49 participants ($M_{age} = 33.08$, $SD_{age} = 11.07$, 38.8% female) rated the reform- and enforcement-orientedness of the policy measures on a 7-point Likert-scale (ranging from 1 = strongly disagree to 7 = strongly agree). The results of this pre-test showed that, on average, participants rated enforcement-oriented measures significantly higher than reform-oriented measures when rating their degree of enforcement, $t(48) = 5.09$, $p < .001$, $r = .59$. Reform-oriented measures scored significantly higher than enforcement-oriented measures when rated for their degree of reform, $t(48) = 7.70$, $p < .001$, $r = .74$. Also, enforcement-oriented measures were rated significantly higher in the enforcement-oriented than in the reform-oriented question, $t(48) = 7.87$, $p < .001$, $r = .75$, and reform-oriented measures were rated significantly higher in the reform-oriented than in the enforcement-oriented question, $t(48) = 6.36$, $p < .001$, $r = .68$.³ We consequently concluded that we could use these two sets of measures in our main experiments.

Control variables

Metaphors have the ability to make texts more vivid and less complex (e.g., Ortony, 1975). To control for these aspects, we measured perceived complexity and perceived vividness of the experimental texts. Perceived complexity was measured

3. Details, data and data analyses concerning this pre-test are available at <https://osf.io/63ym9/>.

with a scale developed by Burgers, de Graaf, and Callaars (2012). Participants were asked whether they found the text difficult to understand, comprehensible (reverse coded), and clear (reverse coded) on a 7-point Likert-scale (Experiment 1: Cronbach's $\alpha = .74$; Experiment 2: Cronbach's $\alpha = .72$). Perceived vividness of the text was also measured with a scale developed by Burgers et al. (2012). Participants indicated on a 7-point Likert-scale whether they found the text vivid and colourful (Experiment 1: Cronbach's $\alpha = .83$; Experiment 2: Cronbach's $\alpha = .89$).

2.4 Procedure

Data were collected online through Qualtrics (www.qualtrics.com). After an opening page, participants were first asked to read a text about crime in the city of Addison. They were randomly assigned to one of the five conditions. A hidden timer recorded the number of seconds they spent reading the text. Next, participants were asked to list three keywords of the text, in order to filter out those who had not read it. Then, they were asked to rate the two sets of policy measures (see Table 2) for their effectiveness, given the situation in Addison described in the text. Frame-consistent measures were presented first. In Experiment 1, participants thus first rated the set of reform-oriented solutions (Cronbach's $\alpha = .71$), followed, on a new page, by the enforcement-oriented solutions (Cronbach's $\alpha = .88$). In Experiment 2, participants first rated the enforcement-oriented measures (Cronbach's $\alpha = .80$), and then the reform-oriented (Cronbach's $\alpha = .80$) ones. We then collected ratings for the degree of complexity and vividness of the text, and asked participants to fill out a cloze question in which they were asked to complete the first sentence of the quote of Addison's Mayor ('Crime is a _____').

Then participants were asked to indicate their age, gender, nationality, native language, level of education, and political affiliation. Finally, they were thanked for participating, informed that the text was fictional, and they received a confirmation code to collect their remuneration. On average, completing the survey took 6 minutes and 37 seconds for Experiment 1, and 7 minutes and 38 seconds for Experiment 2.

2.5 Participants

Participants in both experiments were collected and paid via Amazon's Mechanical Turk (www.mturk.com). To ensure high-quality work, the MTurk HIT approval rate was set to 95%. Only MTurk Workers located in the USA could participate. Turkers who had participated in any of our earlier studies on a similar topic could

not take part.⁴ Participants received \$0.50 for completing the survey. Data were collected on 28 October (Experiment 1) and 13 November (Experiment 2) 2014.

We set our sampling criteria before collecting data. Using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007), we calculated that 305 completed surveys were needed to be able to detect a medium effect ($f = .25$, Cohen, 1992) with a power of .80, and alpha set at .05. We aimed for 400 completed questionnaires per experiment, because we also set exclusion criteria: participants had to be over 17 years of age, have US nationality, and/or English as their first language, and they should be able to name at least one correct key word. Participants who spent < 5 or > 60 seconds on reading the text were also excluded. Demographic characteristics of the participants are displayed in Table 3.

Table 3. Demographic characteristics of the participants in Experiments 1 and 2

	Experiment 1*		Experiment 2**	
Age — years (SD; range)	32.71	(10.90; 18–65)	32.35	(11.12; 18–74)
Gender — % female (N)	40.4	(143)	56.6	(205)
Education — % (N)				
Elementary school	0.0	(0)	0.3	(1)
Middle school / Junior high school	0.6	(2)	0.0	(0)
(Senior) high school	33.9	(120)	33.2	(120)
Undergraduate study	54.2	(192)	52.4	(189)
Graduate study	11.3	(40)	14.1	(51)
Political affiliation — % (N)				
Republican	15.2	(54)	18.6	(67)
Democrat	42.1	(149)	38.2	(138)
Independent	42.7	(151)	43.2	(156)
Position of Independent participants — % (N)				
More conservative	17.2	(26)	14.1	(22)
More liberal	33.8	(51)	42.9	(67)
In between	49.0	(74)	42.9	(67)

Note: *Total valid N = 354 **Total valid N = 361.

Experiment 1 ('Virus')

A total of 400 participants completed the survey. Applying our exclusion criteria yielded a valid N of 354. Participants were equally distributed across the five

4. Excluding Turkers was done by first directing them to a Qualtrics questionnaire that checked the Worker's MTurk ID; see Peer, Paolacci, Chandler, and Mueller (2012).

conditions regarding age ($F(4,349) < 1$), gender ($\chi^2(4) = 2.79, p = .59$), level of education ($\chi^2(8) = 13.06, p = .11$),⁵ and political affiliation ($\chi^2(8) = 2.64, p = .96$).

Experiment 2 ('Beast')

A total of 397 participants completed the survey. Applying our exclusion criteria yielded a valid N of 361. Participants were equally distributed across the five conditions regarding age ($F(4,356) < 1$) and gender ($\chi^2(4) = 4.31, p = .37$), but not regarding level of education ($\chi^2(8) = 18.47, p = .02$, Cramer's $V = .02$).⁶ Inspection of standardized residuals showed that relatively fewer participants had finished an undergraduate degree ($N = 31$) and relatively more participants had finished a graduate degree ($N = 21$) in the condition without metaphorical sentences. There was no effect of level of education on perceived effectiveness of enforcement-oriented ($F(2,358) < 1$) or reform-oriented measures ($F(2,358) < 1$). Level of education thus did not influence our overall findings.

Regarding political affiliation, participants were also not distributed evenly across conditions ($\chi^2(8) = 16.40, p = .04$, Cramer's $V = .04$). Inspection of standardized residuals showed that there were relatively fewer Democrats ($N = 17$) in the condition with two metaphorical sentences. There were also relatively fewer Republicans ($N = 6$) in the condition with three metaphorical sentences. Significant effects were found between political affiliation and perceived effectiveness of enforcement-oriented ($F(2,358) = 10.24, p < .001, \eta_p^2 = .05$), as well as reform-oriented measures ($F(2,358) = 17.44, p < .001, \eta_p^2 = .09$). Post-hoc tests with Bonferroni-corrections showed that Republicans rated the perceived effectiveness of enforcement-oriented measures significantly higher than both Democrats and Independents ($p < .001$), and that they rated the perceived effectiveness of reform-oriented measures significantly lower than both Democrats and Independents ($p < .001$). Given these results, political affiliation will be added to the main analysis as a factor.

5. Because only two participants completed Middle school/Junior high school, we collapsed these with participants who completed (Senior) high school.

6. Because only 1 participant completed Elementary school, this participant was collapsed with those who completed (Senior) high school.

3. Results

3.1 Control variables

Experiment 1 ('Virus')

There was a significant effect of the number of metaphorical sentences on perceived vividness of the text ($F(4,349)=6.15$, $p<.001$, $\eta_p^2=.07$) and complexity of the text ($F(4,349)=2.50$, $p=.04$, $\eta_p^2=.03$). Regarding vividness, post-hoc tests with Bonferroni-corrections showed that participants in the condition with four metaphorical sentences found the text more vivid than participants in the condition with zero ($p<.001$), one ($p=.01$), two ($p=.04$), and three ($p=.03$) metaphorical sentences. Regarding complexity, Bonferroni-corrections showed two trends: participants in the condition with four metaphorical sentences found the text less complex than participants who read one ($p=.08$), and two ($p=.06$) metaphorical sentences. These findings are in line with our expectations.

Experiment 2 ('Beast')

There was a significant effect of the number of metaphorical sentences on the perceived vividness of the text ($F(4,356)=12.82$, $p<.001$, $\eta_p^2=.12$). Post-hoc tests with Bonferroni-corrections indicated that participants in the conditions with two, three, and four metaphorical sentences found the text more vivid than those in the condition without metaphors (at least $p=.001$). Moreover, participants who read three metaphorical sentences found the text more vivid than participants in the condition with one metaphorical sentence ($p<.001$). For participants in the condition with four metaphorical sentences, this was a trend ($p=.06$). These findings are in line with our expectations. We found no effect of the number of metaphorical sentences on the perceived complexity of the text ($F(4,356)=1.58$, $p=.18$). Overall, average scores were low (less than 2 on a scale from 1–7 in all conditions), which may be because the crime-as-a-beast frame is rather familiar to participants. This was not problematic for our main analyses.

3.2 Hypothesis testing

Data were first analysed with a one-way independent ANOVA with number of metaphorical sentences as the independent variable and perceived effectiveness ratings as the dependent variable (3.2.1). Because previous analyses (see 2.5) had shown a significant influence of political affiliation on perceived effectiveness of enforcement- as well as reform-oriented measures in Experiment 2, political affiliation was added as a factor in the analyses of both experiments, and data were also analysed with a two-way independent ANOVA with number of metaphorical

sentences and political affiliation as independent variables and perceived effectiveness ratings as the dependent variable (3.2.2). Table 4 shows descriptive statistics.

Please note that in Experiment 1 ('Virus'), the reform-oriented measures are considered frame-consistent, and that, in Experiment 2 ('Beast'), the enforcement-oriented measures are considered frame-consistent.

3.2.1 ANOVA without political affiliation as a fixed factor

Experiment 1 ('Virus')

The number of metaphorical sentences did not affect the perceived effectiveness of reform-oriented ($F(4,349) = 1.11, p = .35$) or enforcement-oriented ($F(4,349) = 1.43, p = .22$) policy measures. H1 is thus not supported by the data.

Experiment 2 ('Beast')

The number of metaphorical sentences did not affect the perceived effectiveness of enforcement-oriented ($F(4,356) = 1.77, p = .14$) or reform-oriented ($F(4,356) < 1$) policy measures. H1 is thus not supported by the data.

Table 4. Number of participants and mean scores (with standard deviations) of perceived effectiveness of reform- and enforcement-oriented policy measures for Experiments 1 and 2 as a factor of the number of sentences with metaphorical expressions in the experimental text

No. of sentences with metaphors	N	Experiment 1 — Crime is a virus		N	Experiment 2 — Crime is a beast	
		Reform-oriented	Enforcement-oriented		Reform-oriented	Enforcement-oriented
No metaphors	72	5.25 (1.04)	4.57 (1.52)	76	5.60 (1.21)	4.69 (1.26)
1 sentence	75	5.18 (.86)	4.94 (1.48)	72	5.39 (1.13)	4.95 (1.36)
2 sentences	71	5.29 (1.02)	4.97 (1.45)	67	5.42 (1.07)	4.83 (1.25)
3 sentences	69	5.29 (1.21)	4.50 (1.57)	76	5.50 (.99)	5.13 (1.16)
4 sentences	67	5.52 (.94)	4.77 (1.49)	70	5.50 (1.06)	5.13 (1.23)
Total	354	5.30 (1.02)	4.75 (1.51)	361	5.48 (1.09)	4.95 (1.26)

Note: the perceived effectiveness of the measures was calculated by combining the average scores of all four reform-oriented and all four enforcement-oriented measures.

3.2.2 ANOVA with political affiliation as a fixed factor

Experiment 1 ('Virus')

No main effect was found for the number of metaphorical sentences on the perceived effectiveness of reform-oriented measures ($F(4,339) < 1$), but the main effect of the number of metaphorical sentences on the perceived effectiveness of enforcement-oriented measures was a trend ($F(4,339) = 2.22$, $p = .07$, $\eta_p^2 = .03$). Post-hoc tests with Bonferroni-corrections showed one trend. Participants in the condition with three metaphorical sentences rated the enforcement-oriented measures as less effective than participants in the condition with two metaphorical sentences ($p = .09$). H1 is thus not supported by the data in the sense that frame-consistent measures do not show higher ratings when participants read more sentences with metaphors. For the frame-inconsistent measures, however, the data showed a trend: the more metaphorical sentences participants read, the less effective they found these measures to be.

There was a significant main effect of political affiliation on the perceived effectiveness of reform- ($F(2,339) = 16.15$, $p < .001$, $\eta_p^2 = .09$) as well as enforcement-oriented ($F(2,339) = 8.49$, $p < .001$, $\eta_p^2 = .05$) policy measures. Post-hoc tests with Bonferroni-corrections revealed that Republicans perceived the reform-oriented measures as significantly less effective than both Democrats ($p < .001$) and Independents ($p = .01$), and that Independents perceived them as significantly less effective than Democrats ($p < .01$). Republicans perceived the enforcement-oriented measures as significantly more effective than both Democrats ($p < .001$) and Independents ($p = .001$).

There was no interaction effect between political affiliation and number of metaphorical sentences on the perceived effectiveness of the reform-oriented measures ($F(8,339) = 1.32$, $p = .23$), indicating that there was no difference in how participants with different political affiliations were affected by the number of metaphors they read. For the enforcement-oriented measures, this interaction effect displayed a trend ($F(8,339) = 1.74$, $p = .09$, $\eta_p^2 = .04$). Post-hoc tests with Bonferroni-corrections showed that Democrats in the condition with three metaphorical sentences rated the enforcement-oriented measures as significantly less effective than Democrats in the condition with one sentence with metaphors ($p = .03$).

Experiment 2 ('Beast')

The main effect of metaphorical sentences on the perceived effectiveness of enforcement-oriented measures was a trend ($F(4,346) = 2.23$, $p = .07$, $\eta_p^2 = .03$). Post-hoc tests with Bonferroni-corrections yielded no significant results. However, post-hoc comparisons using the LSD test showed that participants in the condition with three metaphorical sentences rated the enforcement-oriented measures as significantly more effective than participants in the condition with zero ($p = .01$)

and two ($p = .03$) metaphorical sentences. Participants in the condition with four metaphorical sentences rated the enforcement-oriented measures as significantly more effective than participants in the non-metaphorical control condition ($p = .05$). No main effect was found for the number of metaphorical sentences on the perceived effectiveness of reform-oriented measures ($F(4,346) < 1$). The data thus partially support H1, albeit that the results display a trend.

There was a significant main effect of political affiliation on the perceived effectiveness of enforcement- ($F(2,346) = 10.63, p < .001, \eta_p^2 = .06$) as well as reform-oriented ($F(2,346) = 15.77, p < .001, \eta_p^2 = .08$) policy measures. Post-hoc tests with Bonferroni-corrections revealed that Republicans perceived the enforcement-oriented measures as significantly more effective ($p < .001$), and the reform-oriented measures as significantly less effective ($p < .001$) than both Democrats and Independents. The difference between Democrats and Independents displayed a trend: Democrats perceived the reform-oriented measures as more effective ($p = .09$) than Independents.

There was no interaction effect between political affiliation and number of metaphorical sentences on the perceived effectiveness of the enforcement-oriented ($F(8,346) < 1$), or reform-oriented ($F(8,346) < 1$) measures, indicating that there was no difference in how participants with different political affiliations were affected by the number of metaphors they read.

4. Conclusion and discussion

This paper investigated whether extended metaphors influence the perceived effectiveness of policy measures. In Experiment 1, we extended the metaphorical frame 'Crime is a virus' via a series of additional conventional metaphorical expressions (crime as target domain; viruses as source domain). In Experiment 2 we did the same for the metaphorical frame 'Crime is a beast' (crime as target domain; beasts as source domain). Overall, our data show limited support for the hypothesis that extended metaphors influence people's opinions. We found no support for our hypothesis that extended metaphors would show higher ratings of perceived effectiveness of frame-consistent policy measures without controlling for political affiliation. When controlling for political affiliation, we also found no support for our hypothesis in Experiment 1. However, we did find a trend in the opposite direction for frame-inconsistent policy measures: the more metaphorical sentences participants read, the less effective they rated the enforcement-oriented policy measures. Experiment 2 displayed a trend in the expected direction of H1. The more metaphorical sentences participants read, the more effective they found

frame-consistent enforcement-oriented policy measures. No effect was found for frame-inconsistent measures in this experiment.

In both experiments, we found political affiliation to influence the perceived effectiveness of the policy measures. Republicans found the enforcement-oriented policy measures significantly more effective than Democrats and Independents. In Experiment 1, Independents also perceived the reform-oriented measures as significantly more effective than Republicans. Experiment 1 also yielded a trending interaction effect for the perceived effectiveness of frame-inconsistent policy measures, indicating that Democrats, Republicans, and Independents were affected differently by the number of metaphorical sentences they read. Specifically, Democrats in the condition with three metaphorical sentences rated the enforcement-oriented policy measures as significantly less effective than Democrats in the condition with one metaphorical sentence. In Experiment 2, no interaction effects were attested, indicating that there was no difference in how participants with different political affiliations were affected by the number of metaphors they read.

The literature on (metaphorical) framing suggests several issues that may have influenced our results. For example, there is the question of whether or not participants had existing knowledge about the topic of the experimental text (see the metaphor framing termination hypothesis in Robins & Mayer, 2000). Or there may be a role for degree of exposure to the topic (Goodall, Slater, & Myers, 2013), personal characteristics of the participants such as political sophistication (Hartman, 2012), and personality traits (Kalmoe, 2014).

We argue, however, that there are alternative explanations for our findings, which are related to other aspects of the studies. The fact that the data trended in the predicted direction in Experiment 2, but not in Experiment 1 may be caused by the fact that the distance between the crime problem described in the text and the proposed policy measures is smaller in the crime-as-a-beast frame than in the crime-as-a-virus frame. If a wild animal has escaped, the first reaction of authorities is typically to try and catch it and prevent it from escaping again — solutions that can easily be connected to the enforcement-oriented policy measures participants were presented with. However, when a dangerous flu virus appears, authorities will try to prevent it from spreading. Yet none of the reform-oriented policy measures we used were directly related to putting a stop to the spread of violence; they were all focused on preventing future criminal acts from happening by reforming society. While these measures may help to make society more secure in the long run, they may not have been considered to be effective measures to reduce crime given the situation described in the text.

After all, crime remains an issue that requires immediate action, even if it is described as a long-term problem. The general theme of our experiments may therefore have been biased towards enforcement-oriented solutions. This bias may

also have caused the trend in the opposite direction for frame-inconsistent policy measures in Experiment 1: participants may have considered the enforcement-oriented measures to be more clearly ineffective solutions in the crime-as-a-virus frame than they found the reform-oriented measures to be effective in it. Robins and Mayer (2000, p.84) noticed a similar problem in their studies, arguing that some metaphorical frames seem to favour certain solutions more than others — if participants read the metaphor *TRADE IS WAR* this would naturally promote favouring trade tariffs, whereas this would not be the case for the metaphor *TRADE IS A TWO-WAY STREET*. It is thus essential for researchers to carefully consider this possible bias when constructing experimental materials and deciding about the metaphorical frames to be used.

A first step that we are planning to take in this respect in our Lab is to investigate whether crossing the configuration of metaphorical frames and long-term versus short-term crime problems yields different results. In the current study, we presented crime as a long-term problem in Experiment 1, and as a short-term problem in Experiment 2, because this configuration was thought to be consistent with the reform- and enforcement-oriented policy measures, respectively. In the near future, we will test what happens when we present the crime-as-a-beast frame as a long-term, rather than a short-term problem, and the crime-as-a-virus frame as a short-term, rather than a long-term problem.

More importantly, however, the fact that our results show limited support for the influence of extended metaphor on people's opinions may also be attributed to the fact that we asked participants to rate the effectiveness of possible *solutions* to the crime problem. Our hypothesis tacitly assumed that, after reading a text of only five sentences, participants not only (unconsciously) accepted the metaphorical frame to accurately describe the situation, but that they were also able to use that frame when asked to think of a way to solve the problem. This is a rather big leap in the decision-making process. Consequently, the distance between the task of rating the effectiveness of a series of policy measures and our research question of investigating whether a metaphorical framing effect takes place might have been too big. This may have made it impossible to find out whether people actually reason by working out the entailments of the metaphorical frame they were presented with (see Robins & Mayer, 2000, p. 84). If we want to know whether participants pick up a metaphorical frame, future experiments need to investigate earlier stages in the decision-making process and examine whether people already reason along the lines of the frame they read when they are asked to define the problem or identify its cause (see Hartman, 2012, p.293). The results of the two experiments reported in this paper at least show that the influence of metaphorical frames on people's opinions may be more subtle than we have been assuming.

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