

Evidence for effects of metaphor extendedness and position in discourse:

from conceptual accessibility to extent of metaphorical framing of political issues after reading



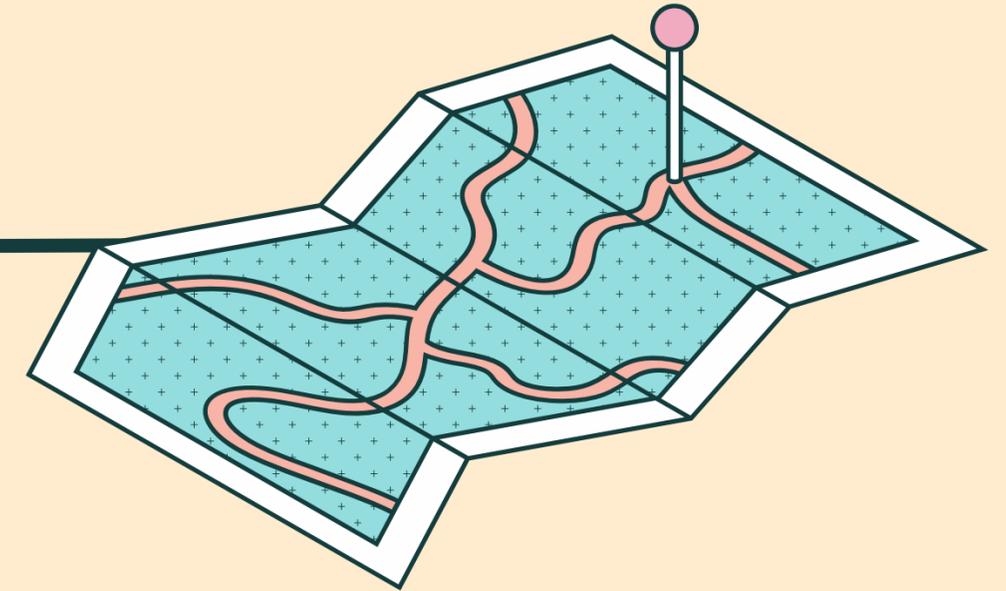
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General discussion & conclusion

Literature Review



Metaphors are able to 'explain a particular problem, persuade people towards a certain viewpoint, and affect people's policy preferences'

(Boeynaems et al., 2017)

Metaphors are able to influence people's perceptions of and attitudes towards a wide range of socio-political issues:

Immigration

Utych, 2018

Hart, 2020

Boeynaems, Burgers & Konijn, 2021

Protest

Hart, 2018

Crime

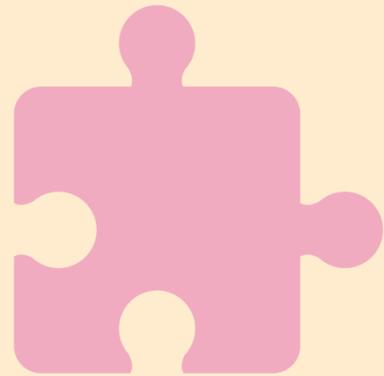
Thibodeau & Boroditsky, 2011, 2013

Climate change

Flusberg, Matlock & Thibodeau, 2016

etc.

Metaphors can be more or less influential under different conditions.



Position

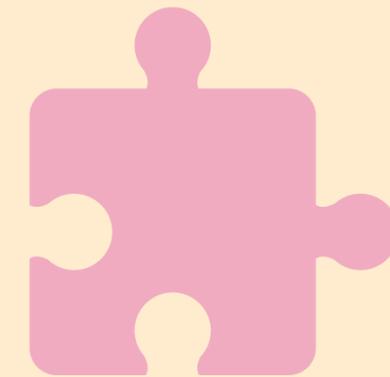
- A metaphorical frame that is presented at the beginning of a text is more influential

Supporting evidence: Sopory & Dillard's (2002) meta-analysis; Thibodeau & Boroditsky (2011) experiment 5

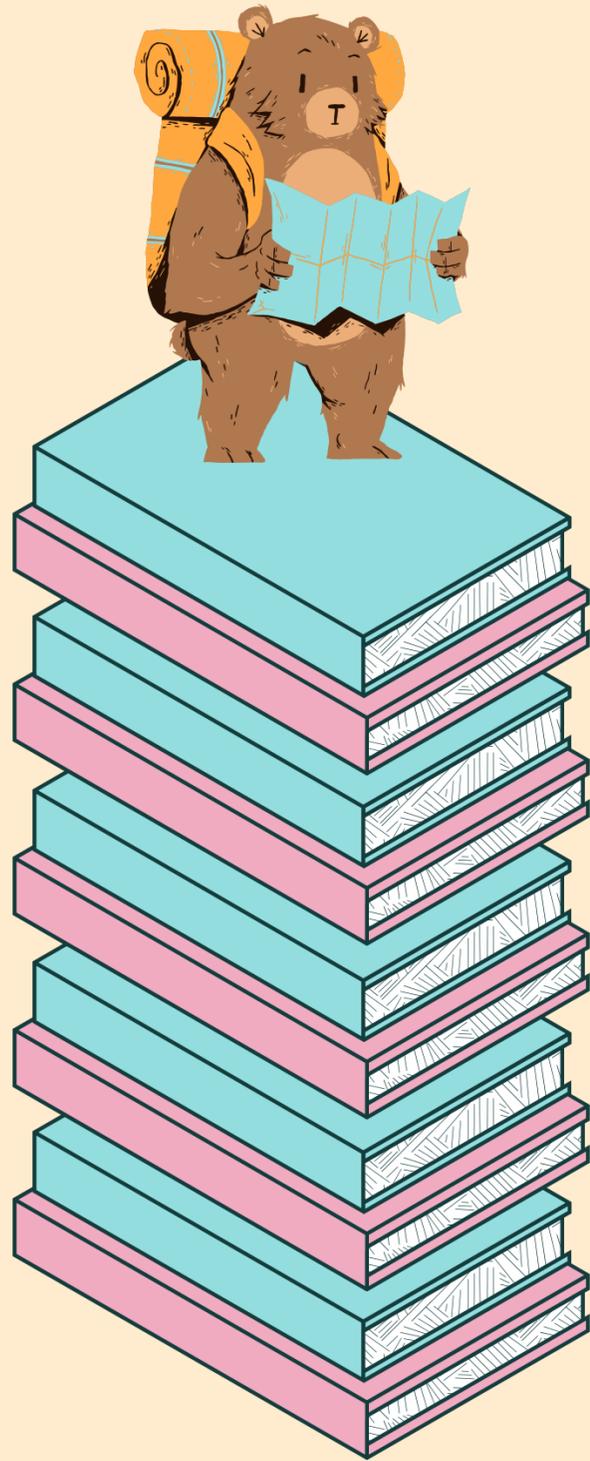
- Extended metaphors are more influential than a single metaphorical expression

Supporting evidence: Thibodeau (2016)

Limited support: Sopory & Dillard's (2002) meta-analysis; Reijnierse et al. (2015)

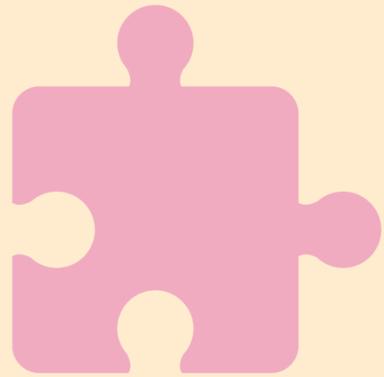


Extendedness



Adding to the conversation:

- The hypotheses of how the extendedness and position of metaphors influence their framing effect are based on explicit theories of how discourse processing unfolds over time and how these influence the extent to which people are able to draw on the metaphorical mappings after reading
- Experiments so far used participants' policy preferences as a measure of the influence of the metaphor – a 'rather big leap in the decision-making process' (Reijnierse et al., 2015)



Participant awareness

- Metaphors influence reasoning in a covert manner
- When beliefs remain relatively implicit in discourse, they tend to be more likely to be taken for granted and are thus more persuasive (van Dijk, 2008; Lombardi Vallauri, 2021)

Supporting evidence: Robins & Mayer (2000); Thibodeau, Hendricks & Boroditsky (2017); Hart (2020)

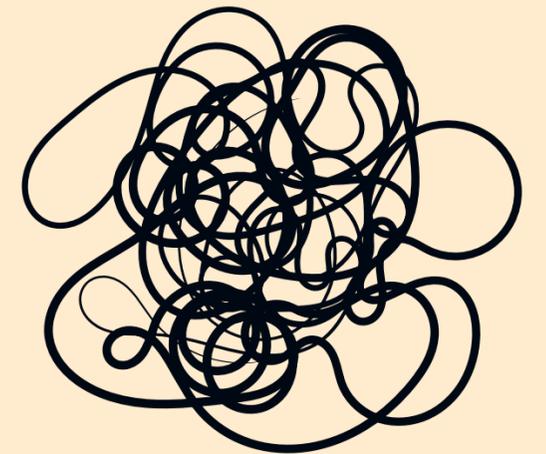
The textual realisations of the metaphor are said to be correlated to the probability of metaphor recognition by ordinary language users (Steen, 2004)

A higher recognition rate for:

- Metaphors that appear at the beginning or the end of a text
- Metaphors that are extended throughout the text



Extended metaphors & metaphors appearing at the beginning of a text can also draw readers' attention to their capability of framing and can lead to resistance to such an effect



Experiment 1

Effects of metaphor extendedness and position on its conceptual accessibility after reading

Participants

- 120 participants, recruited through Prolific
- Participation criteria: English native speakers, approval rate > 95%
- Exclusions:
 - Failed two or more comprehension questions (6 participants);
 - Too slow when reading the materials (2 participants)

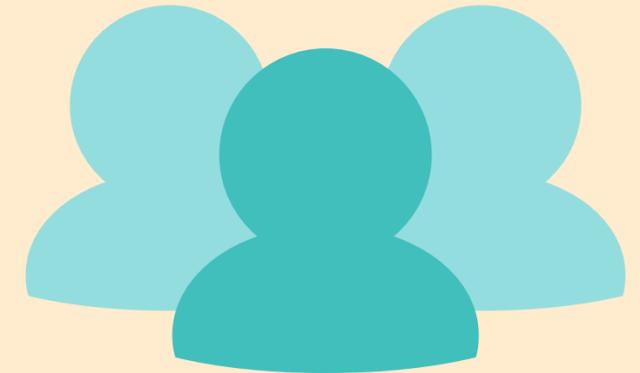


Table 1 Participant demographic information for Experiment 1

Age			Gender		
18-29	30-49	50-69	Male	Female	Other
49 (43.75%)	43 (38.39%)	20 (17.86%)	53 (47.32%)	58 (51.79%)	2 (1.79%)

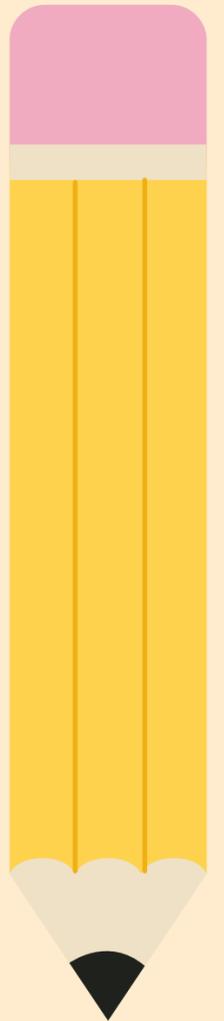
- All reported to be highly proficient in reading English
- None reported to be neurodivergent

Materials & design

- Materials are adapted from Experiment 3 in Thibodeau & Durgin (2008)

Table 2 Example material from Thibodeau & Durgin (2008)

Metaphorical passage 1	<p>The professor told me my argument was <u>shaky</u>: ‘As a student of physics, you have to <u>construct stronger foundations for your theoretical models</u>. Use facts to <u>support</u> your theory.</p> <p>Target: Make sure your <u>blueprints</u> are exact.’</p>
Metaphorical passage 2	<p>The professor told me my argument was <u>off track</u>: ‘As a student of physics, you have to <u>proceed step-by-step toward your theoretical models</u>. Use facts to <u>arrive</u> at your theory.</p> <p>Target: Make sure your <u>map</u> is accurate.’</p>
Literal passage	<p>The professor told me my argument was <u>not well thought out</u>: ‘As a student of physics, you have to <u>carefully justify</u> your theoretical models. Use facts to <u>explain</u> your theory.</p>

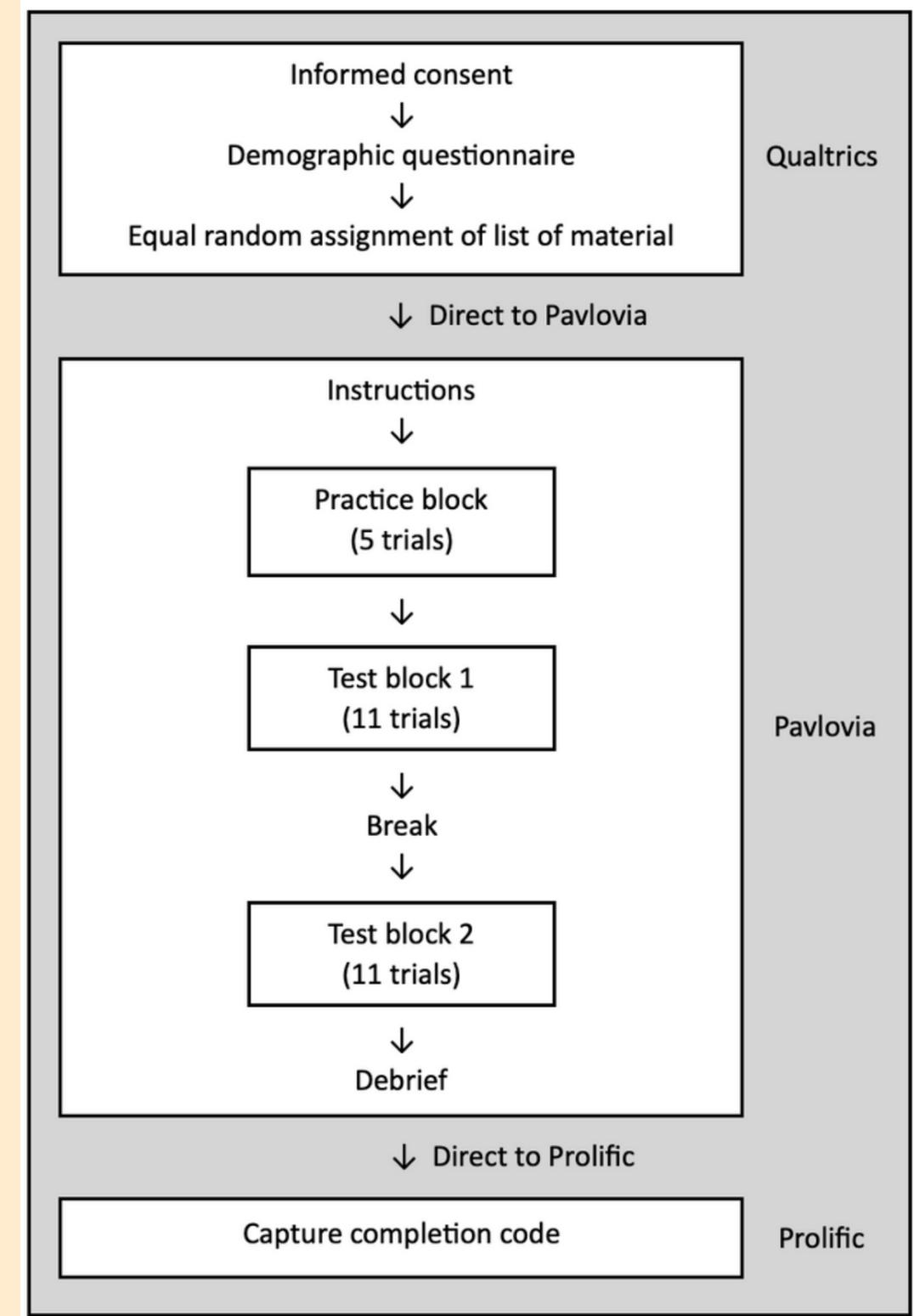


Materials & design

- Critical material: 12 passages
 - Practice material: 5 passages
 - Filler: 10 passages
 - 6 comprehension questions, only appear after fillers
 - 8 list of material to avoid participants from reading variations of the same passage
-
- Qualtrics: informed consent + demographic questionnaire
 - Pavlovia: self-paced reading experiment

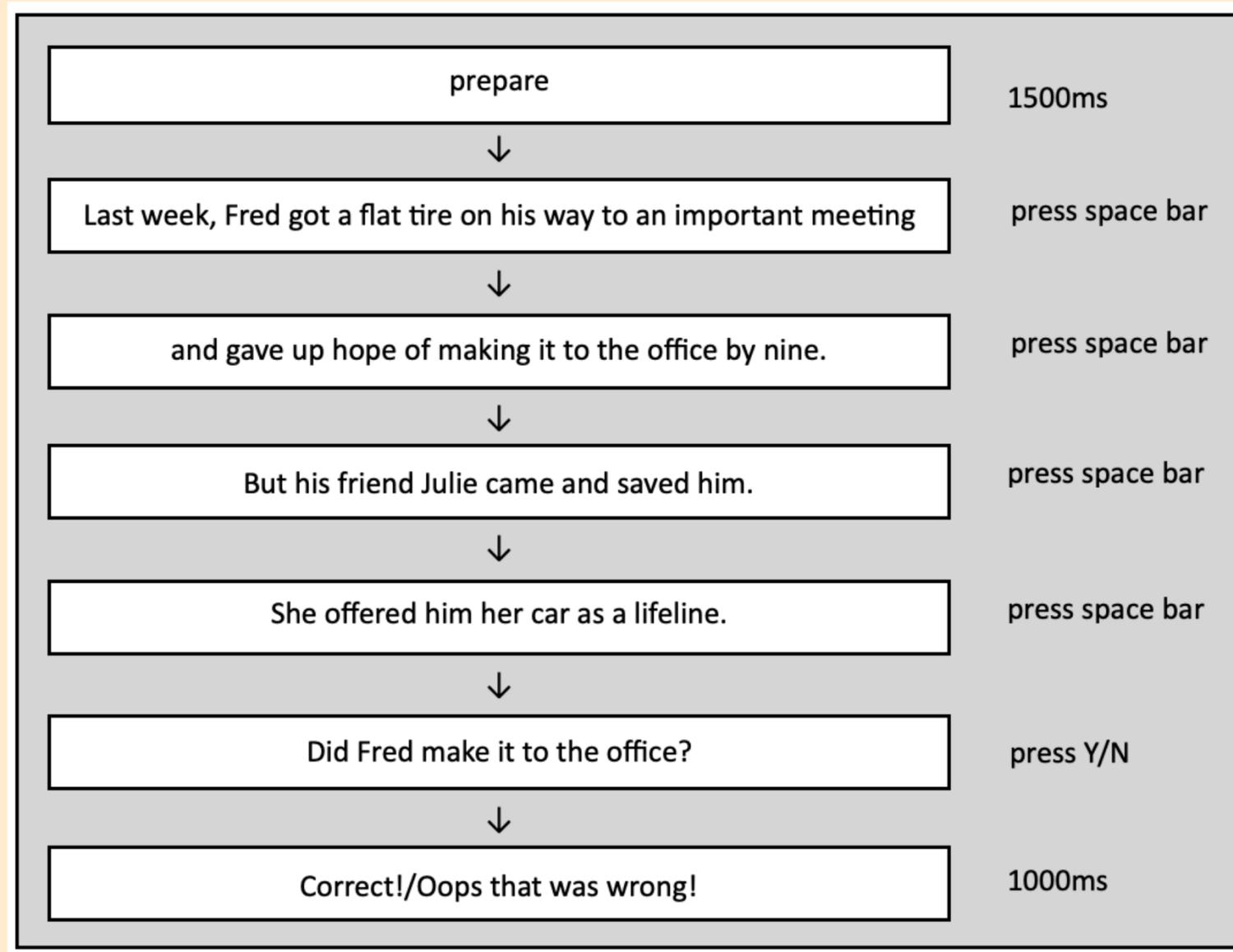


Figure 1 Procedure outline for experiment 1



Materials & design

Figure 2 Example filler trial with a comprehension question



- The passages were broken into 3-5 lines
- Each time the space bar was pressed, the previous line was replaced by the next
- Participants were instructed to press the space bar as soon as they comprehend each line and make sure to answer the comprehension questions correctly.

Results

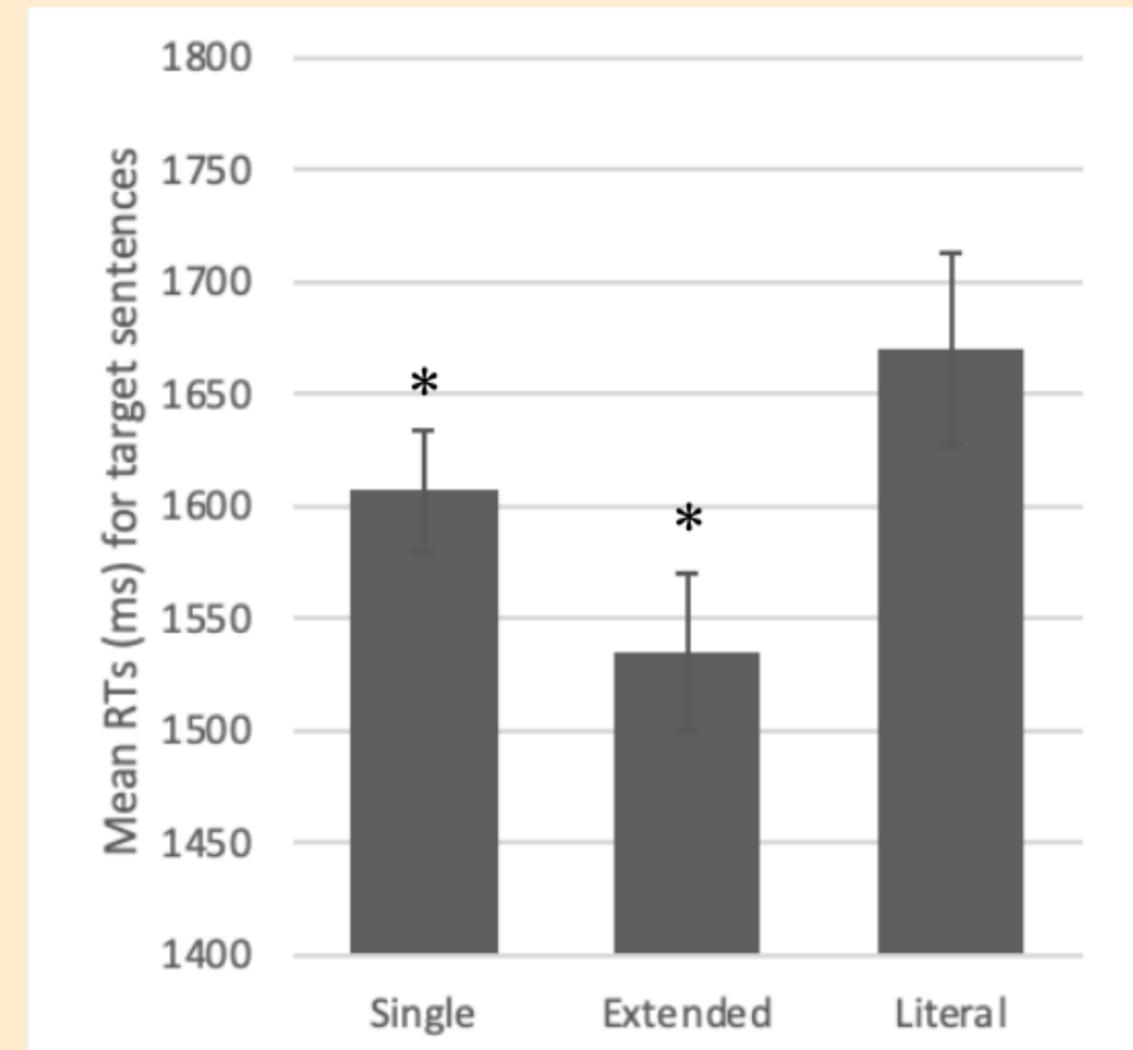
- Average accuracy rate for comprehension questions = 88.92%
- Outliers:
 - RT (any line) < 100ms
 - RT (target line) > Q3 + 1.5*IQR

Results for extendedness

- Linear mixed effect model, main effect of condition and random effects of participant and item
- Significant main effect of condition ($F(2, 1150) = 6.11, p = 0.002$)
- RT for the metaphorical target sentence is reliably faster when it follows a passage that contains a matching single metaphor ($F(1, 847) = 6.36, p = 0.012$) or a matching extended metaphor ($F(1, 505) = 10.9, p = 0.001$) compared to when it follows a literal passage
- No reliable difference found between the single and extended conditions



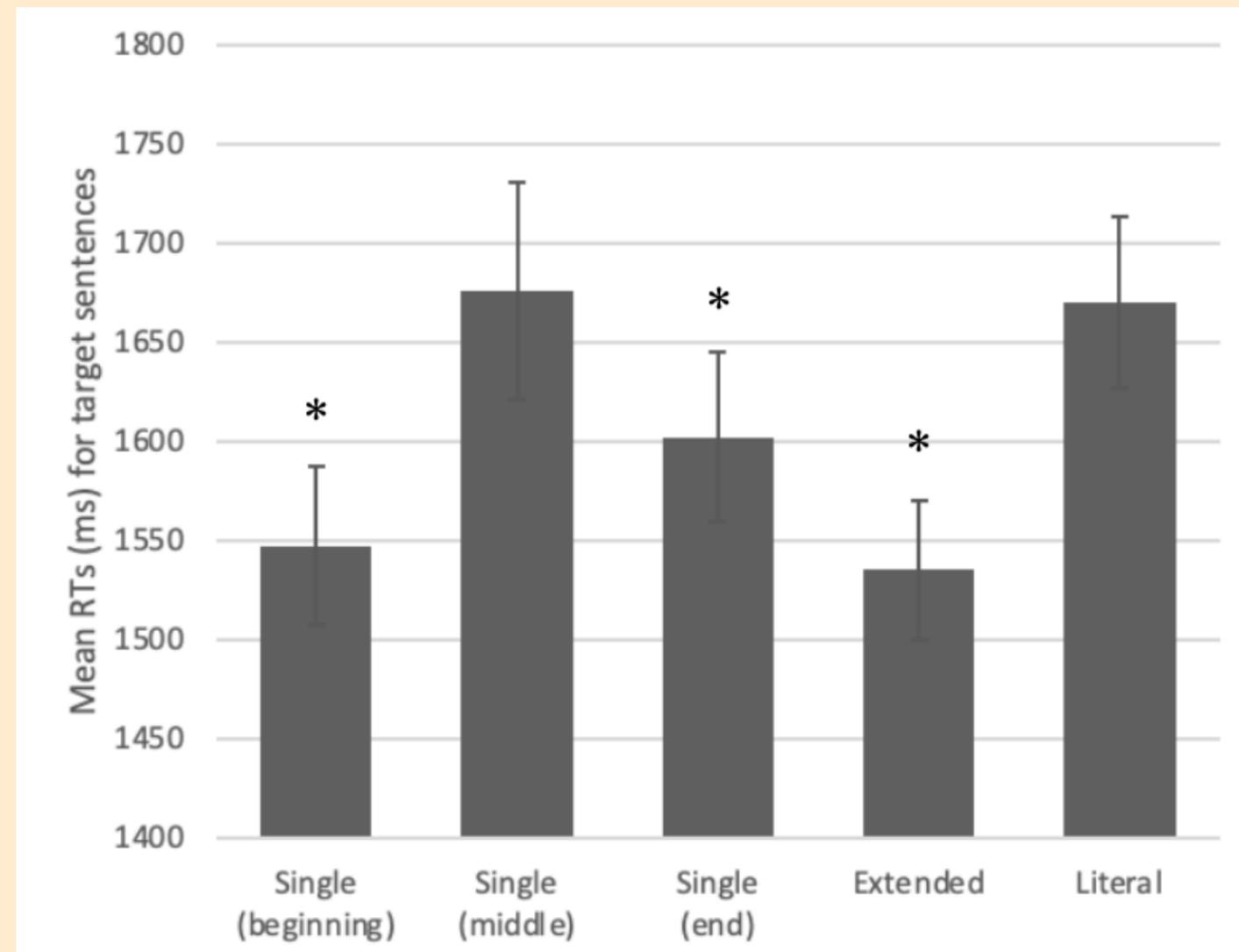
Figure 3 Mean RT(ms) for target sentence by condition



Results for position



Figure 4 Mean RT(ms) for target sentence by position



- Significant main effect of condition ($F(4, 1160) = 3.75, p = 0.005$)
- RT for the metaphorical target sentence is reliably faster when it follows a passage that contains a matching single metaphor appearing at the beginning ($F(1, 443) = 4.18, p = 0.041$) and at the end ($F(1, 481) = 4.84, p = 0.028$) compared to when it follows a literal passage
- No reliable difference was found between the RT for the metaphorical target sentence when it follows a passage that contains a matching single metaphor appearing in the middle and when it follows a literal passage

Discussion: Effects of metaphor extendedness and position on its conceptual accessibility after reading



Limited influence from extendedness on conceptual accessibility after reading

Possible explanations:

- Once a metaphorical frame has been activated, it being reinstated in the subsequent text does not enhance its accessibility in subsequent comprehension
- Nature of the task prevents global-level access

A metaphor's position in a text is crucial to its conceptual accessibility after reading

A metaphor appearing at the beginning or the end of a text is more available for readers to access and make use of in subsequent comprehension

Experiment 2

Effects of metaphor extendedness and position on the metaphorical framing effect under the context of immigration discourse

Participants

- 360 participants, recruited through Prolific
- Participation criteria: non-immigrants, approval rate > 95%
- Exclusions:
 - Failed attention checks (23 participants);

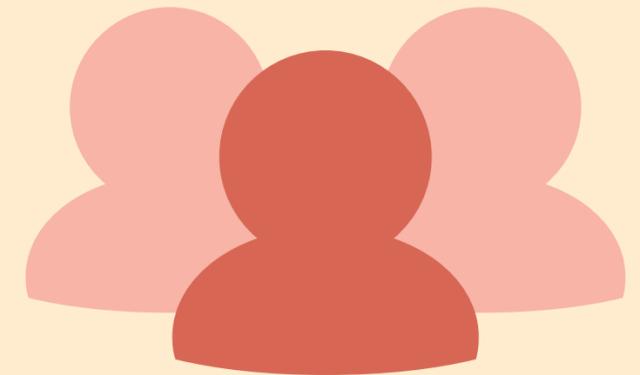


Table 3 Participant demographic information for Experiment 2

Age			Gender			Nationality		Political affiliation		
18-30	31-50	51-88	Male	Female	Other	UK	US	Liberal	Central	Conservative
122	153	62	135	196	6	301	36	193	95	49
(36.20%)	(45.40%)	(18.40%)	(40.06%)	(58.16%)	(1.78%)	(89.32%)	(10.68%)	(57.27%)	(28.19%)	(14.54%)

- Participants of different political affiliations are distributed evenly across different conditions ($\chi^2 = 4.04, p = 0.85$)

Materials & design

- Based on real news stories on immigration in British and American newspapers
- Three news stories: water frame, war frame, literal
- Single condition: variations in position
 - The order of the paragraphs was also changed so that the same metaphorical expression appears at the beginning, middle or end of the text
- Extended & literal condition: variations in paragraph order
 - No significant difference was found between participants' responses for the versions in different orders

Table 4 The three news stories

Water metaphor	War metaphor	Literal
The recent <u>flood</u> of immigrants is a blow to the government officials, who pledged last year to reduce immigration to the extent that it would have become an “infrequent phenomenon”.	The recent <u>onslaught</u> of immigrants is a blow to the government officials, who pledged last year to reduce immigration to the extent that it would have become an “infrequent phenomenon”.	The recent <u>crossings</u> of immigrants are a blow to the government officials, who pledged last year to reduce immigration to the extent that it would have become an “infrequent phenomenon”.
Another <u>wave</u> of immigrants were reported to be <u>pouring</u> into the country yesterday. A new record has been made since the start of this year, the latest official figures show.	Another <u>army</u> of immigrants were reported to be <u>marching</u> into the country yesterday. A new record has been made since the start of this year, the latest official figures show.	Another <u>group</u> of immigrants were reported to be <u>entering</u> the country yesterday. A new record has been made since the start of this year, the latest official figures show.
The former head of border force is concerned that if no immediate action is taken, immigrants are soon to be <u>swamping</u> our country with our asylum system <u>awash</u> .	The former head of border force is concerned that if no immediate action is taken, immigrants are soon to be <u>taking over</u> our country with our asylum system <u>under siege</u> .	The former head of border force is concerned that if no immediate action is taken, immigrants are soon to be <u>crowding</u> our country with our asylum system <u>overwhelmed</u> .

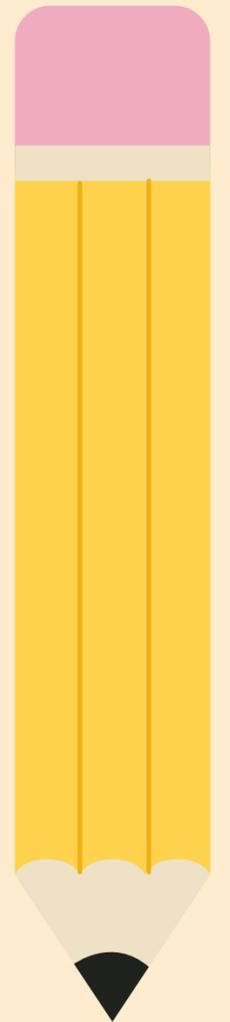
Materials & design

Figure 5 Example material for experiment 2, adapted from Hart (2020)



The screenshot shows the homepage of 'THE DAILY NEWS'. The main navigation bar includes: HOME, NEWS, SHOWBIZ & TV, SPORT, COMMENT, FINANCE, TRAVEL, ENTERTAINMENT, LIFE & STYLE. A secondary navigation bar includes: UK, WORLD, POLITICS, ROYAL, HISTORY, NATURE, SCIENCE, WEIRD, OBITUARIES, SUNDAY, SCOTLAND, WEATHER. The article is by John Smith, published on 31st March, 2022, and updated at 15:53 on the same day. The article text reads: 'The recent flood of immigrants is a blow to the government officials, who pledged last year to reduce immigration to the extent that it would have become an “infrequent phenomenon”.' 'Another wave of immigrants were reported to be pouring into the country yesterday. A new record has been made since the start of this year, the latest official figures show.' 'The former head of border force is concerned that if no immediate action is taken, immigrants are soon to be swamping our country with our asylum system awash.'

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Materials & design

Table 5 Likert scale statements for different metaphorical frames

Metaphorical frame	Perception of immigrants/immigration	Policy preferences
Water	<ul style="list-style-type: none">- The immigrants are entering the country in large numbers.- The immigrants are uncontrollable.- The country is unable to absorb the immigrants.	<ul style="list-style-type: none">- It makes sense to tighten up the borders to limit the flow of immigrants to this country.- It makes sense to shut off the ports to prevent a surge in immigration.
War	<ul style="list-style-type: none">- The immigrants are causing conflict.- The immigrants are aggressive.- The country is losing its territory to the immigrants.	<ul style="list-style-type: none">- It makes sense to use armed forces at the borders to protect the people of this country from immigrants.- It makes sense to use 24 hour security at the ports to defend the borders against immigration.



- Participants rated the statements on a 9-point Likert scale (1 = strongly disagree, 9 = strongly agree).
- Cronbach's alpha coefficient for water frame statements: 0.81
- Cronbach's alpha coefficient for war frame statements: 0.84



high scale reliability

Results

Table 6 Mean agreement ratings for different statements by metaphor type



	Statements consistent with the water frame	Statements consistent with the war frame	All statements
Water metaphor	5.37 (SD = 1.62)	4.45 (SD = 1.74)	4.91 (SD = 1.63)
War metaphor	5.16 (SD = 1.77)	4.32 (SD = 1.97)	4.74 (SD = 1.79)
Literal	5.29 (SD = 1.62)	3.88 (SD = 1.78)	4.59 (SD = 1.62)

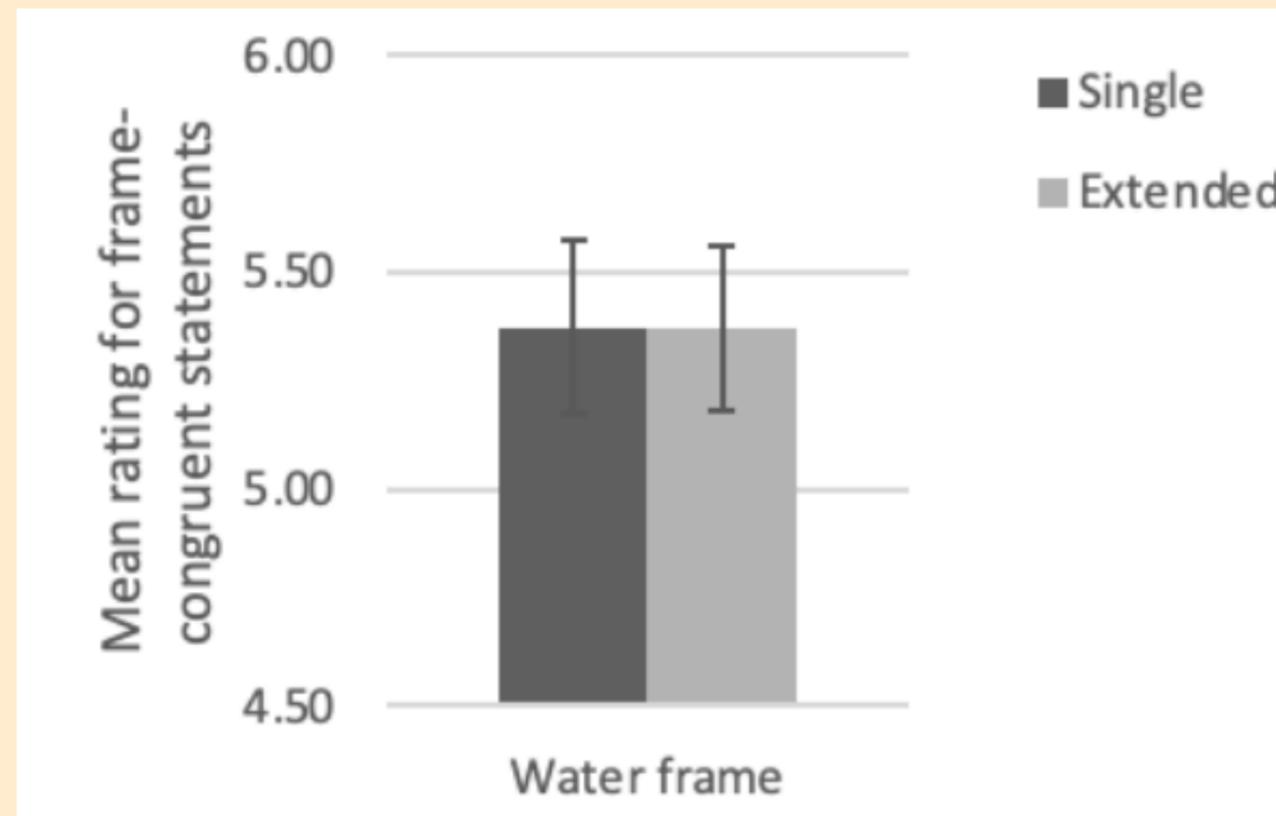
- Linear mixed effect model, main effect of condition with political affiliation and age as cluster variables
- Does negative metaphorical framing lead to more agreement with negative statements about immigration?
 - Yes, but only for news stories containing the water frame
- Does metaphorical framing lead to more agreement with frame-congruent statements?
 - Yes, but only for news stories containing the water frame

Results for extendedness

- Linear mixed effect model, main effect of extendedness with political affiliation and age as cluster variables
- No significant effect of extendedness ($F(1, 134) = 0.27, p = 0.607$)



Figure 6 Mean agreement ratings for frame congruent statements by extendedness

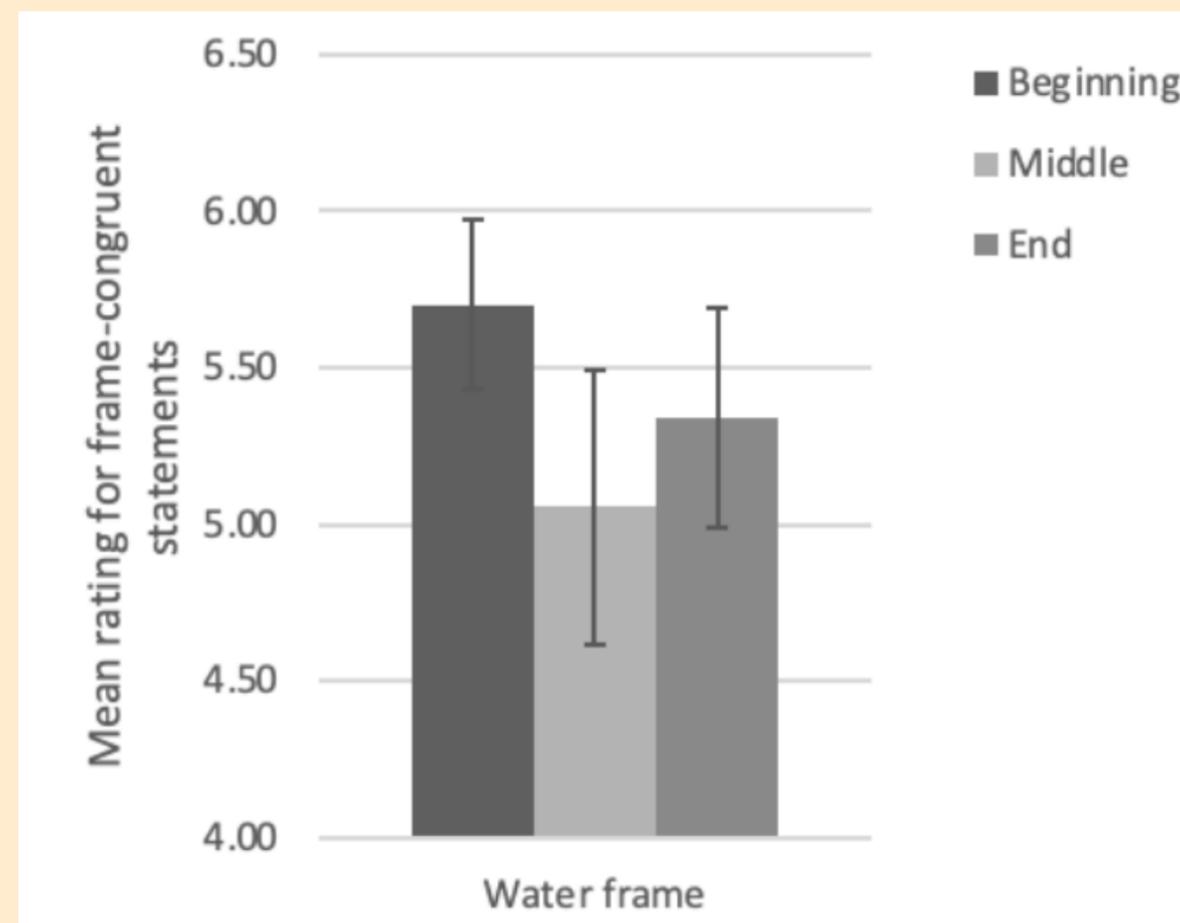


Results for position

- Linear mixed effect model, main effect of position with political affiliation and age as cluster variables
- A trend towards significance ($F(2, 65.2) = 1.95, p = 0.150$)



Figure 7 Mean agreement ratings for frame congruent statements by position



- beginning - middle $F(1, 42.4) = 3.84, p = 0.057$
 - The agreement ratings for the frame-congruent statements are significantly higher for participants who read the news story with a metaphorical expression appearing at the beginning ($M = 5.70, SD = 1.30$) than those who read the news story with a metaphorical expression at the middle ($M = 5.05, SD = 2.07$)
- beginning - end $F(1, 44.7) = 1.39, p = 0.256$
- middle - end $F(1, 42) = 0.45, p = 0.507$

Additional analysis: participant awareness, frame type & textual realisations

- A considerable proportion (29.17%) of the participants pointed out the negative wording of the news story
 - The percentage is reliably higher for the participants who read the war frame (37.69%) compared to participants who read the water frame (27.74%) and those who read the literal news story (15.94%) ($\chi^2 = 24.10, p < 0.001$)
- Extending a water metaphor did not lead to an increase in the mention of the negative wordings, extending a war metaphor did.
- Participants are more likely to mention the negative wording when the metaphor appears at the beginning of the news story



Discussion: Effects of metaphor extendedness and position on the metaphorical framing effect under the context of immigration discourse



Framing effect found for water metaphors but not war metaphors

- conventionality
- extremeness
- emotional valence



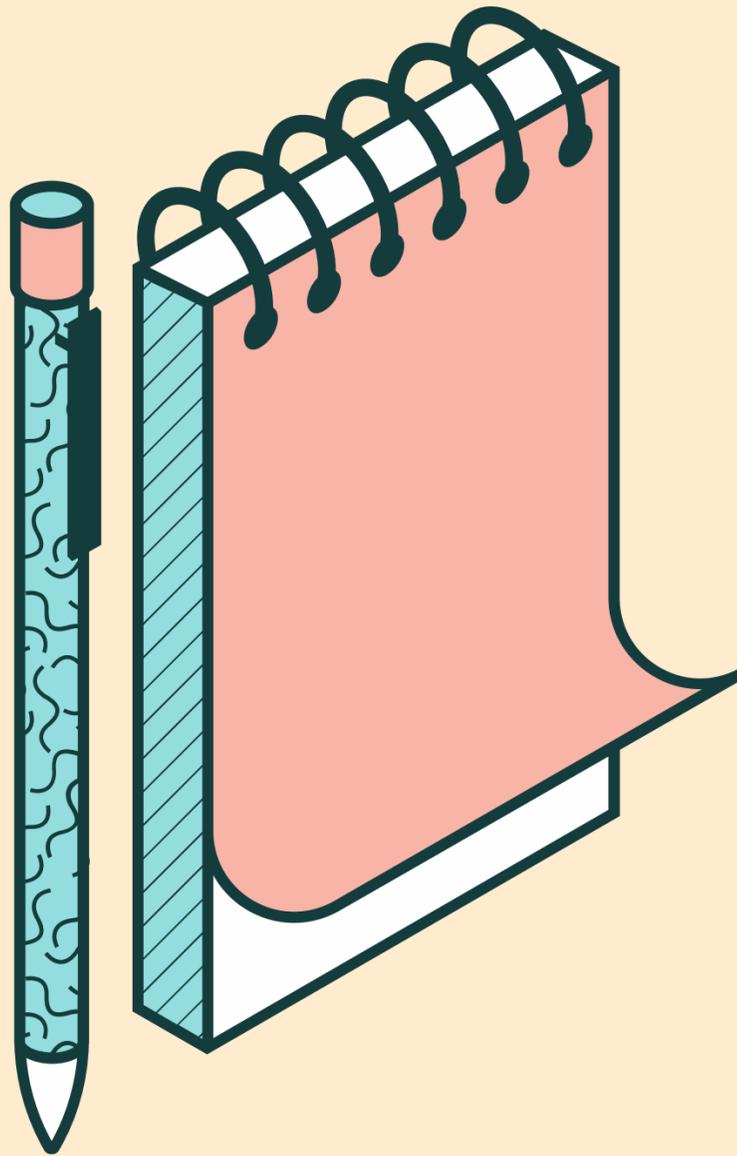
The extendedness of the metaphor did not bolster its framing effect

- Once a metaphorical frame has been activated, it being reinstated in the subsequent text does not enhance its accessibility in subsequent comprehension

A larger framing effect when a metaphorical expression appears at the beginning of a text

A metaphorical expression appearing at the beginning of the news story is also more likely to be identified

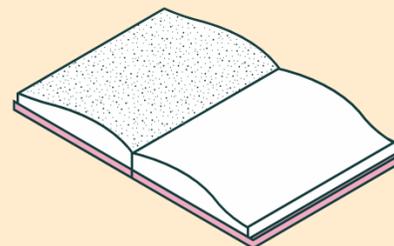
Conclusions



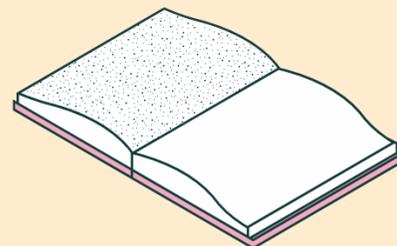
- The two experiments have provided converging evidence regarding the effects of metaphor extendedness and position
- Extending a metaphor does not make it more available in memory for later comprehension
- Extending the water metaphor does not bolster the persuasiveness of the metaphor
- A metaphorical expression is the most influential when it appears at the beginning of a text, as it facilitates later comprehension and increases the metaphorical framing effect

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THANK YOU

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