

Feature Review

How Linguistic Metaphor
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Language helps people communicate and think. Precise and accurate language would seem best suited to achieve these goals. But a close look at the way people actually talk reveals an abundance of apparent imprecision in the form of metaphor: ideas are 'light bulbs', crime is a 'virus', and cancer is an 'enemy' in a 'war'. In this article, we review recent evidence that metaphoric language can facilitate communication and shape thinking even though it is literally false. We first discuss recent experiments showing that linguistic metaphor can guide thought and behavior. Then we explore the conditions under which metaphors are most influential. Throughout, we highlight theoretical and practical implications, as well as key challenges and opportunities for future research.

Metaphor Shapes Thought

Linguistic metaphors describe a topic of discussion in terms of a semantically unrelated domain [1–8]. Recent work in cognitive science has demonstrated that metaphors can shape the way people think (Table 1). For instance, in one study, Alan Turing was seen as more of a genius with more exceptional inventions when his ideas were described as light bulbs rather than as seeds [9]. In another study, people were more likely to support reform, rather than enforcement-oriented, approaches to crime reduction when crime was described as a virus than as a beast [8, 10–11]. Experiments have also shown that personifying changes in stock prices ('climbing' and 'slipping'), rather than objectifying them ('increasing' and 'decreasing' in value), makes people more likely to think recent price trajectories will continue into the future [12, 13]. And framing cancer as an 'enemy' in a 'war' has been found to reduce people's intentions to engage in self-limiting preventative behaviors (e.g., eating less red meat, smoking less; [14]) and to think that it would be harder for cancer patients to come to terms with their situation [15].

Metaphors have also been shown to affect behavior [16–20]. For instance, metaphor-based interventions – describing the brain as a 'muscle' that 'grows' with practice – can encourage students to adopt an incremental, rather than fixed, theory of intelligence [21]. In turn, an incremental theory of intelligence leads students to be more committed to their learning goals and persistent in the face of adversity.

How Metaphor Shapes Thought

Metaphors provide a framework for thinking about abstract concepts like ideas and intelligence, as well as complex social and health issues like crime, the economy, and cancer, by drawing on structured knowledge from a semantically unrelated domain (see Box 1). In this way, metaphors are like analogies – the terms metaphorical reasoning and analogical reasoning are often used interchangeably to describe how people use knowledge of one domain to talk and think about another [22]. As a result, there is considerable overlap in theoretical accounts of

Trends

Metaphors pervade discussions of abstract concepts and complex issues: ideas are 'light bulbs', crime is a 'virus', and cancer is an 'enemy' in a 'war'.

At a process level, metaphors, like analogies, involve structure mapping, in which relational structure from the source domain is leveraged for thinking about the target domain.

Metaphors influence how people think about the topics they describe by shaping how people attend to, remember, and process information.

The effects of metaphor on reasoning are not simply the result of lexical priming.

Metaphors can covertly influence how people think. That is, people are not always aware that they have been influenced by a metaphor.

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Table 1. Overview of Results from a Sample of Recent Metaphor Framing Experiments

Target domain	Source domain	Outcome	Refs
Cancer	Enemy vs neutral	'Enemy' reduces intention to engage in self-limiting preventative behaviors	[14]
Cancer	Journey vs battle	More acceptance of difficult outcomes on 'journey'	[15]
Loving relationship	Journey vs perfect union	Conflict hurts on 'perfect union' more than on 'journey'	[89]
Relationship	War vs two-way street	More guarded communication on 'war'	[37]
Trade	War vs two-way street	More support for trade tariffs on 'war'	[37]
Stock market	Personified as agent vs described as object	Prediction that market will continue on current trajectory when 'agent'	[12,13]
Business failure	Vehicle accident vs storm	More responsibility attributed to CEO on 'accident'; more responsibility to economic conditions on 'storm'	[40]
Crime	Virus vs beast	More support for social reform (rather than enforcement) on 'virus'	[8,10–11]
Climate change	War vs race	More urgency, risk perception, and willingness to change behavior on 'war' metaphor	[90]
Ideas	Light bulbs vs seeds	Ideas seem more exceptional as 'light bulbs'	[9]

metaphorical and analogical reasoning (although there are also a number of notable differences in how metaphors and analogies are used in naturalistic settings and in how cognitive scientists study metaphorical and analogical reasoning; see [Box 2](#)).

There are three components of a metaphor: a source domain, a target (or topic) domain, and a mapping between them. In the metaphor 'crime is a virus', virus is the source domain, and crime is the target domain. Mental representations of virus and crime problems are more than a jumble of associations; they have structure [23–26]. For instance, people know how to address a literal virus problem: by diagnosing the root cause and treating it. People also have knowledge of how to address a literal crime problem: maybe through enforcement tactics like increasing the police force; maybe through social reform like job-training programs.

Typically, the source domain in a metaphor (e.g., 'virus') is more familiar, concrete, or clearly delineated than target the domain (e.g., 'crime'). For instance, there is a stronger consensus on how to address a virus problem than a crime problem [8]. Metaphorically framing crime as a virus creates a mapping between these domains: highlighting relational structure that is similar, in this case, between crime and virus problems; and hiding dissimilarities [24].

A simplified schematic of the relational structure of crime and virus problems is depicted in [Figure 1](#) – and contrasted with another metaphor for crime, as a beast – to illustrate the process of structure mapping in metaphorical reasoning. The figure shows, first, that all three domains are structured by knowledge of what causes the problems and methods for addressing the problems. Second, the figure shows that crime is a more complex issue than a virus or beast problem: there are multiple causes of crime, associated with different ways of addressing the problem; schemas for virus and beast problems are more straightforward. Third, the figure shows that there is structural similarity between the representation of crime and each of the other domains. However, the way in which crime is structurally similar to a virus is different from

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