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**A metaphor is a device for thinking and talking:
FrameWorks' applied theory of metaphor**

A FrameWorks Working Paper

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by
Michael Erard

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Introduction

This paper articulates the applied theory of metaphor that was developed at FrameWorks as a foundation for our approach to strategic communications, Strategic Frame Analysis™. It is written for both external audiences (clients and users of FrameWorks reframing products and advice) and internal audiences (FrameWorks staff) to clarify some frequently asked questions. What is the definition of metaphor that we deploy? What is the theory of metaphor that we use, and how does this theory shape our expectations for what simplifying models are designed to do? How do we develop and test metaphors, and why do we test them? And what have we learned about applying metaphors to social policy discourse from our extensive applied experience with them?

In answering these questions, the purpose of this paper, which draws from FrameWorks research experiences as well as scholarly literature on metaphor, is to unravel an apparent paradox. On one hand, we agree that metaphors are powerfully central to the puzzle of cognition and language, as cognitive scientists, psychologists, and others have argued for decades.¹ Metaphors not only change thought; they help to constitute what thought is. On this basis, FrameWorks seeks to harness the power of metaphors as cognitive and social devices in order to lead to the specific discursive ends and policy goals of FrameWorks clients. On the other hand, FrameWorks typically recommends a single metaphor per issue domain rather than encouraging advocates in the field to generate metaphors of their own. How are we justified in doing this? As I will argue, there is no paradox at all, if one sees a metaphor as a device for thinking and talking that must be tested before it can be safely and meaningfully used.

WHAT IS METAPHOR?

¹ See, for example, Black, M. (1962). *Models and metaphors: Studies in language and philosophy*. Ithaca, NY: Cornell University Press; Kittay, E. (1987). *Metaphor: Its cognitive force and linguistic structure*. Oxford, England: Oxford University Press; Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. Chicago, IL: University of Chicago Press; Gentner, D. (1982). Are scientific analogies metaphors? In D. Miall (Ed.), *Metaphor: Problems and perspectives*. Brighton, England: Harvester.

At the outset of an academic paper about metaphor, it is customary to reach as far back as Aristotle's *Poetics* and *Rhetoric* to begin to define "metaphor."² It can also be customary to finish by describing the brain imaging of metaphor and analogy processing.³ Such a history would necessarily encompass the approaches that have informed and inspired FrameWorks' own practice: conceptual metaphor (George Lakoff and Mark Johnson), structural alignment (or structure-mapping) (Dedre Gentner), the career of metaphor (Dedre Gentner and Brian Bowdle), and generative metaphor (Donald Schön). These I will cover, not in chronological order, but as appropriate in the discussion that follows.

The basic definition. A concise theoretical way to define a metaphor is as a mapping between two separate conceptual domains. Metaphors can be visual and musical as well as linguistic, though this discussion focuses on the linguistic. For the sake of convenience, the metaphor is conventionally represented in propositional form as "A is B" or "A is like B" (though metaphors do not necessarily appear this way, and as some have noted, this disciplinary convenience appears to privilege noun metaphors, though verbal metaphors appear to be more common in actual discourse⁴). It is also customary to talk about the A as the "target" domain and the B as the "source" domain. (Another label for the B is the "vehicle."⁵)

A concise *applied* definition of a metaphor is that it is a device for thinking and talking with. A good metaphor is a device that leads people to think and talk about something they were not previously proficient in thinking or talking about. The metaphor device works this way

² In *Poetics*, Aristotle called metaphor "the application of an alien name by transference either from genus to species, or from species to genus, or from species to species, or by analogy, that is, proportion." (Aristotle, *Poetics* 21, 1457b9–16 and 20–22). Commentators note that only the metaphors of the fourth type, by analogy, are like modern metaphors; the others work either by metonymy or synecdoche. See the Stanford Encyclopedia of Philosophy; <http://plato.stanford.edu/entries/aristotle-rhetoric/>

³ See, for example, Rapp, A., et al. (2004). Neural correlates of metaphor processing. In *Cognitive Brain Research*, 20(3), 395–402. In normal subjects, silent reading of metaphors activated brain regions, suggesting semantic inferencing processes. See also Grady, J. (2000). Cognitive mechanisms of conceptual integration. *Cognitive Linguistics*, 11(3-4), 335–345.

⁴ Steen, G. (1999). Metaphor and discourse: Towards a linguistic checklist for metaphor analysis. In L. Cameron & G. Low (Eds.), *Researching and applying metaphor*. Cambridge, England[ok?]: Cambridge University Press.

⁵ In the colloquial sense, an "A is like B" statement is an analogy, not a metaphor, so some clarification is necessary. From a psychological and linguistic standpoint, the analogy and the metaphor are both classed as metaphors, because our brains process them in related ways. In fact, our brains process unfamiliar "A is B" statements as if they were "A is like B" statements, and people also find it easier to process an "A is B" statement if it appears in the form "A is like B." See Gentner, D., Bowdle, B., Wolff, P., [stet] Boronat, C. (2001)[stet] Metaphor is like analogy. In D. Gentner, K. J. Holyoak, & B. Kokinov (Eds.), *The analogical mind: Perspectives from cognitive science* (p. 234). Cambridge, MA: MIT Press.

because it preferentially cues some directions of thinking and talking⁶ over others; it transports a cluster of usable meanings into a domain with which listeners or readers are less familiar; it is linked to a wealth of other linguistic associations that users can generate and use; it does not become the topic of discussion but provides the grounds for further discussion; and it is usable in people's attempts to communicate with each other. These positions have substantial empirical support in the research literature.⁷

An example from FrameWorks research. An example from our research illustrates this definition of metaphor.⁸ For a project on the developmental causes of addiction, this science or expert position is the "target" domain of the metaphor, what we hope people will understand more fully or think about in ways that they currently do not. If we were to use earthquake science to elucidate addiction, this would be the "source" for the metaphor. We are using attributes of the geology of earthquakes to communicate a cluster of ideas about the developmental causes of addiction. The "A is like B" statement is that "addictions happen in the same way that faultlines sometimes result in full-blown earthquakes." In this proposition, our understanding of A depends upon, and is structured by, our understanding of B.

What people may still want to know is:

- Why "faultlines" and not some other metaphor?
- Why do we know that "faultlines" works the way we want it to?
- How can "faultlines" possibly work if people think the language is drab or ugly?
- Why can't people come up with their own metaphors to explain the developmental causes of addiction, especially if they don't favor "faultlines"?

The remainder of this paper is devoted to answering these questions. We begin with elaborating some aspects of how metaphors work.

⁶ By "directions of thinking and talking," I refer to the online processing of linguistic and non-linguistic information, as well as the choice of topics and styles of a particular discourse interaction in which one is a participant, even if only receptively.

⁷ See, for instance, Thibodeau, P., & Boroditsky, L. (2011). Metaphors we think with: The role of metaphor in reasoning. *PLoS ONE*, plosone.org/article/info:doi%2F10.1371%2Fjournal.pone.0016782. Also, Gentner, D. (1983). Flowing waters and teeming crowds: Mental models of electricity. In D. Gentner & A. Stevens (Eds.), *Mental models*. Hillsdale, NJ: Lawrence Erlbaum Associates..

⁸ Erard, M. (2011). *Cracks in the brain: Enhancing Albertans' understanding of the developmental causes of addiction*. Washington, DC: FrameWorks Institute.

Elaborating the basic definition. Above I defined a metaphor as a mapping between two domains. Where do these domains exist: in language or in the mind?

We begin with the notion that they exist in language. The terms used for A and B (whether words or phrases) are frequent, salient "surface descriptors" (Cameron, 1999) embedded in semantic networks. Semantic networks are indices of cultural uses of language, and hence impressions or inscriptions of cultural systems. This may leave someone with the notion that the metaphor exists solely on a page or in the air, but this is too narrow.

More powerful is the notion that the A and B terms exist in cognitive domains. Even the ugliest of words or phrases is tied to knowledge structures that people acquire over their lifetimes and carry in their heads. We can presume they have these structures in their heads by virtue of being native speakers of a language, being members of a culture, and being human. FrameWorks draws on two influential lines of work that bring metaphor into this cognitive realm, where meaning works in a different way from its quotidian form.

Conceptual metaphor. George Lakoff and Mark Johnson's *Metaphors We Live By* (1980) helped to re-orient people away from the notion of metaphor as a special type of ornamented language that speakers may or may not elect to use, redirecting them to re-appraise how metaphor is deeply implicated in perception of the world and thought itself. Lakoff and Johnson argued that human experiences in the body are key to the construction of perceptual schemas; hence, they are fundamental to human cognition across cultures and languages. No direct evidence of conceptual metaphors exists; scholars working in this area typically derive underlying conceptual metaphors from surface linguistic metaphors. To take a famous example from Lakoff and Johnson, the conceptual metaphor of "an argument is a journey" is derived from a cluster of English sentences, such as "We have set out to prove that bats are birds" and "We will proceed in a step-by-step fashion."⁹

The cognitive linguistics approach also assumes that metaphors and conceptual domains are uniform across speakers in any speech community, based on the uniformity of cognitive processes. However, this disciplinary asset also brings a weakness: it has no methodological tools for dealing with forms of variation. Despite this, applied linguists urge the need to distinguish between the *universality* and *particularity* of these domains. They ask, do these

⁹ Lakoff, G., & Johnson, M. (1980). *Metaphors we live by* (p. 90). Chicago, IL: University of Chicago Press.

knowledge structures exist for all native speaker users in a culture in invariant ways, or do they exist in individual speakers' minds in varying ways (Cameron, 1999)?

FrameWorks begins by presuming that the knowledge structures that a metaphor ties together are a) universal and b) systematic. Yet we also acknowledge that these characteristics likely do not exist in a pure state but can be perturbed by a) the experiences of individual users, b) topics and directions in the public discourse and media environment, and c) cues in the testing situation itself (whether from moderators/interviewers, other participants, materials, or environmental exposures – e.g., the magazines someone reads in the waiting room). Because source and target domains can be dynamic and amorphous, FrameWorks tests candidate metaphors in order to find pockets of systematicity and universality *despite* these local perturbations. Without testing simplifying models in a range of settings, we would be unable to make secure claims about why metaphors succeed or fail in the ways they do.

Generative metaphor. The second productive notion of metaphor is that of "generative metaphor" in the work of MIT architecture professor Donald Schön.¹⁰ Schön was interested in the construction of social reality and the intractability of certain social problems that resolved from the language that was used to set the problem. Metaphors could be used deliberately, he argued, to re-set or "re-figure" the problem. He defined "metaphor" as a process of seeing two domains, A and B, then taking an existing description of B as a "putative" redescription of A. The result was the generation of new ways of seeing the nature of A.

In his essay, one example he gives is of a group of researchers who re-describe paintbrushes as pumps, so that "everything that everyone knows about pumping has the potential of being brought into play in this redescription of painting."¹¹ For instance, "they notice the spaces *between* the bristles, for example, rather than just the bristles; and they think of these spaces as channels through which paint can flow."¹² This leads them to focus on other properties of brush bristles that might be engineered or expanded.

Schön's definition of metaphor is not entirely isomorphic with FrameWorks' definition. In his conception, people know A and B equally well. In our work, people know B less well than A;

¹⁰ Perhaps best represented by his 1979 essay, "Generative metaphor: A perspective on problem-setting in social policy." In A. Ortony (Ed.), *Metaphor and thought*. Cambridge, England: Cambridge University Press.

¹¹ *Ibid.*, 141.

¹² *Ibid.*, 141.

however, they can still use B to infer, induce, or deduce dimensions of A that they might not have otherwise known. Also, Schön might have insisted that local settings of use should be free to invent as many metaphors and simplifying models as they find useful. His generative metaphors retain a "back of the envelope" heuristic feel. In industries and work environments where the product is not language itself, the metaphors can be disposable like paper cups. The instrumentalist ends of FrameWorks metaphors are different from Schön's, because FrameWorks metaphors are designed to be durable objects. Though Schön describes a metaphor's evolution from novel construction to a worn, usable tool (or the career of a metaphor, as I discuss below), its lifecycle is ultimately very short.

However, the FrameWorks approach to metaphor shares an important dimension with Schön's, which is that we know very clearly what a "good" metaphor is: A good metaphor is a device that gets people to think and talk about a topic in ways they did not think and talk about previously.

What a metaphor is not. Much of what is colloquially thought of as "metaphor" consists of literary language encountered in literature or writing classes. These are poetic metaphors that provide an aesthetic experience to readers or listeners through striking imagery and unusual language. They were created by poets and writers who are culturally licensed to perceive reality in new ways and to re-cast those perceptions in concrete forms. Most likely, these metaphors would appear once in a single work. If they were repeated at all, it would have been either because subsequent poets and artists would honor the part they played in a literary tradition by echoing or evoking them, or because students of those works were required to memorize and recite them. Out of a democratizing impulse and a questioning of the cultural license that poets and writers possess, students are often encouraged to try their hands at inventing metaphors themselves, and rightly so: the perceptual gifts that underpin poetic metaphors are not owned by special individuals. However, FrameWorks' metaphors are not intended to be beautiful, linguistically striking, or bold. Nor are they created by someone with exceptional "perceptual gifts." The actual creation of metaphors is a small part of FrameWorks' research and development process; the greater part belongs to making sure the metaphors are durable, usable, comprehensible, and discursively productive. By "discursively productive," we mean that the metaphor is an effective device to get people to think and talk in ways they did not before they encountered the metaphor.

If the metaphor is a device for thinking and talking, not an aesthetic experience, then these three entailments of this metaphor-as-device idea will structure this paper:

1. Metaphors are designed for a purpose. What do we intend for them to be able to do?
2. Metaphors are built objects. How are they built? How do we think they work?
3. Metaphors must be tested. How are they tested? Why are they tested?

METAPHORS ARE DESIGNED FOR A PURPOSE

One of the foundational frame elements in FrameWorks' approach to strategic communications is the "simplifying model."¹³ The simplifying model is a "metaphorically-based frame cue that fundamentally restructures the ways that people talk and reason about ideas."¹⁴ Understanding the work of the simplifying model is the first step to understanding the role of the metaphor on which these models are based.

FrameWorks considers the simplifying model to be a foundational frame element. A "frame element" is a manipulable dimension of communications which therefore is crucial for reframing public discourse. In its current form, the simplifying model consists of 1) a metaphor, 2) several of the entailments of the metaphor, which are the explicit matches between a source domain and a target domain, and 3) additional items that are not entirely captured by the metaphor but which are priorities to communicate. The simplifying model often begins with material that sets a social or discursive context for the discussion, as at A.

The anatomy of the simplifying model is laid out here, with the example taken from our child mental health project:

[A] Scientists say that children's mental health affects how they socialize, how they learn, and how well they meet their potential. [1] One way to think about child mental health is that it's like the levelness of a piece of furniture, say, a table. [2] The levelness of a table is what makes it usable and able to function, just like the mental health of a child is what enables him or her to function and do many things. Some children's brains develop on floors that are level. This is like

¹³ The other elements that make up Strategic Frame Analysis™ are values, tone, visuals, messengers, social math, and causal chains.

¹⁴ For details, see Kendall-Taylor, N. (2010). *An empirical simplifying models research process: Theory and method*. Washington, DC: FrameWorks Institute.

saying that the children have healthy supportive relationships, access to things like good nutrition and health care. For other children, their brains develop on more sloped or slanted floors. This means they're exposed to abuse or violence, have unreliable or unsupportive relationships, and don't have access to key programs and resources. Remember that tables can't make themselves level – they need attention from experts who understand levelness and stability and who can work on the table, the floor, or even both. [3] We know that it's important to work on the floors and the tables early, because little wobbles early on tend to become big wobbles later. [1] So, in general, a child's mental health is like the stability and levelness of a table.

In real-world discourse, one frequently comes across examples of similar types of explanatory metaphors. This first one came from a brain health website:

A healthy brain should look like a lush, vibrant jungle (as opposed to an island with a single palm tree), because it is full of dense cellular connections. You might think of a neurodegenerative disease like Alzheimer's as a weed-whacker which invades the brain and begins to do its damage by destroying brain cells. However, it takes AD a much longer time to show any impact if it has to destroy a jungle's worth of brain cell connections. In contrast, AD can manifest itself fairly quickly after infiltrating a brain with only a relatively few cellular connections. At any point in your life, you can build these connections with a regular, balanced routine of mental stimulation.¹⁵

Here is science fiction author Charles Yu talking about genre conventions:

Yu, author of "How to Live Safely in a Science Fictional Universe," noted that genre conventions can have their uses. "Rules are fences, and interesting things happen around fences," Yu said. "People are trying to

¹⁵ <http://www.fitbrains.com/science/>

break in or out; you can write on fences or just look at them and wonder why they were built there and not somewhere else."¹⁶

This slightly inapt example came from a personal finance article related to the social and cognitive impact of retirement:

If you think of the brain as a computer, physical and mental activity are "essentially upgrading its hardware and programming," Dr. Kennedy says. If we don't stay engaged, cognitive processes slow down and depression often sets in, he says.¹⁷

This example came from the e-mail listserv from my neighborhood association:

The Willard Square area and the entire neighborhood is very special for the people who live here and the many people who come to visit....A neighborhood is like an ecosystem that needs to be thoughtfully kept in balance. The City Council, residents and businesses of the Willard Square neighborhood are the stewards of this gem. This is a responsibility that should not be taken lightly. Once mistakes are made it is much harder to reverse the situation – preventative medicine (mindful planning) is crucial to the health of our community.

This came from a news story about stabbings in China:

Some have pointed blame at the desperate frustration building up over social injustices. Many commentators have blamed the nature of Chinese society under repressive, one-party rule. "The fundamental problem is that our society is sick," Zhou Xiaozheng, a retired sociology professor in Beijing, told the Monitor earlier this month. "We suffer from corrupt officials, unfair distribution of resources, and an unjust legal system. These are the sorts of things that attack a society's

¹⁶ <http://www.statesman.com/life/books/about-35-000-attend-texas-book-festival-with-1930048.html>

¹⁷ Zimmerman, E. (2011, October 23). Should 65 be your magic number? *The New York Times*, p. B10.

immune system.”¹⁸

These examples, from a wide-ranging set of topics, have numerous elements in common: 1) each involves the redescribing of one domain in the terms of another, which is usually established in the first sentence; 2) each is variable in the quality of the fit between the domains; 3) each is more or less novel (seeing a society as a body that can be sick is less novel than seeing a brain as a jungle); 4) each is variable in the consistency of presentation; 5) each seeks not to provide ornament or color to a more literal description but to communicate a cluster of ideas rapidly; and 6) in each, the speaker or author sets up an entailment of one domain and makes an explicit match with the other domain. The simplifying model takes these real-world textual moments as its closest sibling.

The simplifying model is not the only important part of a frame. It could, however, be considered indispensable as well as the hardest to control, because so many factors impinge on how metaphors are constructed, interpreted, and deconstructed in making meaning. Early in FrameWorks history, the metaphor was isomorphic to the frame, an expansionist view of metaphor that came from a cognitive linguistics perspective which was, as yet, untested by the everyday world of communications. Experience has demonstrated that reframing efforts can fail even when new metaphors are supplied; conversely, such efforts might succeed for reasons that have nothing to do with the metaphor itself. This led to the elaboration of other elements that contribute to reframing efforts. It also led to a need to rethink the support that metaphor gives to thinking and to talking, and of ways to empirically test the function of these devices.

The way the simplifying model (and the metaphor on which it is based) works is through a specific cognitive mechanism that cues a set of other concepts and language surrounding a particular topic. It is also designed to give people new access to one set of concepts over another, thereby changing their attitudes. There are several versions of the scientific story about the nature of this effect.¹⁹ Moreover, we assume that this access to one set of concepts will help to filter incoming information and help people make sense of it in different ways. Over time, new connections between concepts become strengthened in the brain, and the metaphorical "nugget" of the simplifying model becomes part of the way that people think about the target concept.

¹⁸ <http://www.csmonitor.com/World/Asia-Pacific/2010/0504/In-China-s-primary-school-stabbings-some-see-social-injustice-as-culprit>

¹⁹ See A. Stringaris, et al. (2006). How metaphors influence semantic relatedness judgments: The role of the right frontal cortex. *NeuroImage*, 33, 784–793.

We also argue that a robust cognitive device will be a robust social device. That is, strong cognitive devices have an advantage for success in the social world, and social devices are socially successful because they are workable cognitive devices: though they are new, they are easily comprehensible, interpretable, and relatable. Consider how individuals consciously deploy metaphors in their daily conversations, telling stories about themselves and others, bantering and telling jokes, making arguments, and countering other arguments, as well as writing them to each other in letters and e-mails (and now via social media). A useful metaphor is one that can be used in these myriad ways and actually applied to life. We cannot know the full range of the social operations of our metaphors because we do not accompany them back into the public discourse, but we design them to be as cognitively strong as possible, and attempt to simulate the social situations in which they would find themselves relevant to test their functioning and see what happens.

METAPHORS ARE BUILT

How do metaphors work?

Just as electronic devices are constructed in order to complete certain functions, metaphors are designed to lead people to talk and think more proficiently than they did before. What follows is an approximated description of what occurs inside the metaphor device.

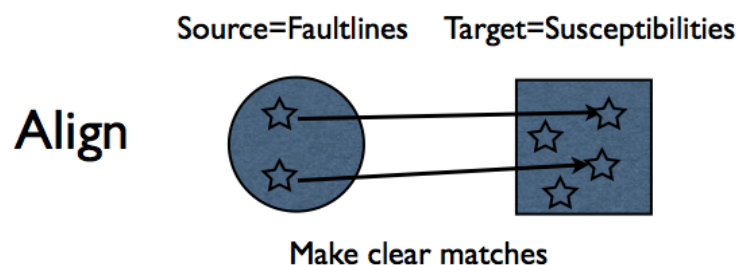
The power of metaphor. For the instrumental purposes of reframing strategic communications, the power of metaphor derives from the matches between A and B that are generated by the mapping. That is, there are structural correspondences, or "entailments," between the two domains that are accessible to listeners/readers; moreover, because these matches ramify into other unstated correspondences, the metaphor communicates a lot with a minimal amount. It is like an iceberg. A very effective metaphor is one that will make all of its entailments available without any of these correspondences having to be explicitly stated.

In the case of the addiction metaphor provided above, some of its entailments are that earthquakes – catastrophic events – come from faultlines; that faultlines are naturally occurring, not the result of human activity/agency; that faultlines form over time and lead to results that are

separate from distal causes but are triggered by proximate events; and though invisible, faultlines can be noticed, mapped, and predicted.

Metaphor in the mind. The mechanism by which entailments are generated has been a frequent topic of discussion among metaphor researchers. Do these matches amount to a comparison between the two domains? Or are they the salient properties of a category? In the comparison view, similarities are enhanced and differences are suppressed. In the category view, the category itself is ad hoc, and taken as such. People do not literally believe that faultlines are causes of addiction, but are willing to entertain the suggestion that they might be.

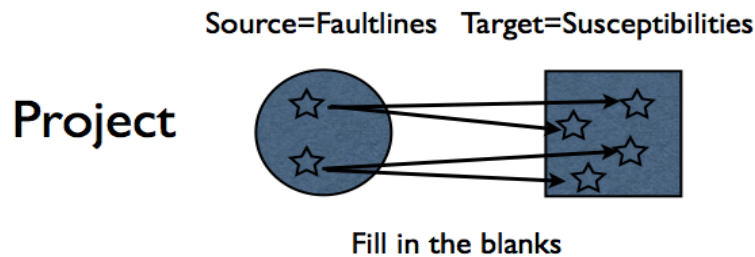
The structural alignment approach by Dedre Gentner (1983) and Dedre Gentner and Brian Bowdle (1999) parallels the FrameWorks practice mostly closely. Structural alignment posits that the comprehension of a metaphor occurs in two stages, "alignment" and "projection." In the alignment stage of metaphor comprehension, the shared structural properties between the source and the target are matched or aligned. These matches include direct ones between two features of the two domains. To use an example from the addiction metaphor above, both faultlines and the susceptibilities that cause an addiction are invisible.²⁰ Additionally, also matched is the order of relations between salient parts of each domain; thus, faultlines lead to earthquakes, just as susceptibilities lead to addictions. This alignment part of the process is crucial when people are exposed to novel metaphors.



In the projection stage of metaphor comprehension, the source domain provides unmatched features to the target. Because projection preserves the structures of relations between features

²⁰ Structural alignment incorporates categorization approaches, as by Sam Glucksberg and Boaz Keysar (1990, 1993), in which two items are categorized together in an ad hoc fashion; the source item is acceptable and comprehensible as a prototypical example of that category. To take a FrameWorks example, "air traffic control" is a prototypical example of a category of activities that require a high degree of coordination among many moving parts, with extremely high costs for the failure of that coordination.

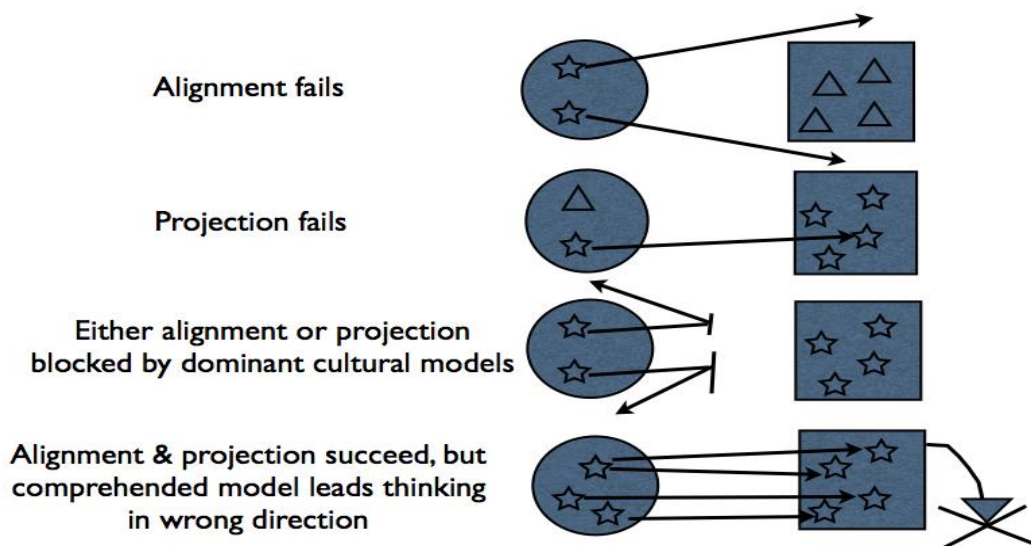
from the source to the target, the operation becomes more complex than simply finding similarities between two domains.



For FrameWorks' work, this mechanism of projection is crucial, because it explains how people can understand something new about a domain (say, addiction) on the basis of the metaphor. This is because the processor searches for matches for salient features of the source domain in the target domain, and then projects relations among those features as well. The success of the applicability of the metaphor depends, of course, on 1) the strength of the alignment, and 2) the strength of the projection. It is possible to predict most of the features that will match in the alignment stage. But predicting what will be successful in the projection stage is less reliable.

In addition, structural alignment provides a way to conceive of why any given candidate metaphor device is not comprehensible (and therefore cannot be discursively productive), as in the following diagram.

Why do models fail?



In the top instance, the entailments from one domain do not match up to anything relevant or useful in the other domain. In the second instance, a few of the most salient or obvious entailments match, but they do not project onto other features of the target domain. In the third instance, there are cultural models that derail either the alignment or projection that might, in fact, otherwise succeed in linking the two domains.

The final instance in which metaphors fail is perhaps the hardest scenario to grasp, though it is the most frequently encountered. In this case, the metaphor is perfectly comprehensible – which is often taken as a sufficient end goal of metaphor-making. Despite its comprehensibility, the metaphor is not a working device, because it cues thinking and talking that are diametrically opposed to specific discursive ends.

For instance, the metaphor of a child as a plant is highly comprehensible. It is even highly conventional within American culture. However, FrameWorks stays away from that group of metaphors because it reinforces dominant cultural models about individual self-making and the family bubble. That such a metaphor would cue in those directions was not predictable; it had to be discovered via testing. Another example is given below, that of "dandelion child" and "orchid child." Such metaphors are devices that encourage people to think and talk in unproductive ways.

How are they built?

One way to understand FrameWorks' process is in terms of the work of ethnobotanists, people who search for potent but unexploited pharmaceutical compounds. Some of these compounds have been developed by small groups as a part of their folk medicine practices. Others exist entirely in the wild. These compounds are brought back to the laboratory and tested under controlled conditions to determine their constituents and their efficacy. Likewise, we scour interviews with dozens of people (experts, members of the lay public, advocates, and others) for metaphors "in the wild." Then we put these bits of meaning through rigorous tests that speed up their evolution and give us a clearer picture of what will (and won't) work in communications venues. When we recommend releasing a metaphor into public discourse, it's with a clear idea of how people will use it and how it works.

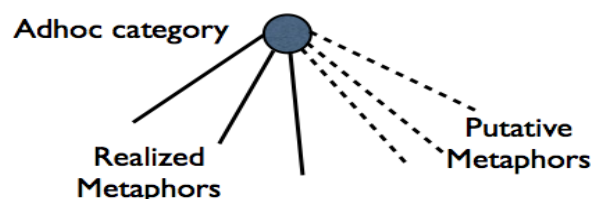
In order to capture usable semantic material, the earliest stage of research consists of interviews with experts, who are asked how they explain concepts with analogies and metaphors to different audiences. Some of these become candidate metaphors, while some are altered. The

transcribed interview texts are also mined for other metaphorical possibilities. Other candidate metaphors are developed by decomposing an identified "communication gap" into constituent semantic properties, then searching for concrete, familiar objects, events, and processes that would match some or all of those properties. What research will reveal is 1) whether the source properties can entail those other properties, 2) whether the source properties entail other undesirable properties, and 3) whether the new metaphor adds to or detracts from people's understanding of the issue.

The candidate simplifying models are written as categories with specific metaphors in each category. The categories are the ad hoc categories whose members are the A domain to be explained and X number of individual iterations; examples of categories are "structures," "operations that are well coordinated," "people who are stranded," etc. Sometimes the categories reflect broader conceptual understandings, for instance that "the body is a container," "genes are surfaces," or "change is a path."

The metaphors nested in those categories could be called children of that category. This makes them each other's siblings. These models are (or seem to be, according to our introspections) prototypical members of that category. For example, restaurants are prototypical "operations that are well coordinated." The goal of the design process is to discover as many workable sibling metaphors as possible in each category. This discovery process can be systematic and tedious – it requires neither inspiration nor perceptual gifts. Just as devices are engineered, these metaphors are the result of repeated, mundane analysis.

It is worth noting that not all of the matchable A-B combinations appear as candidates. The metaphors listed in the category are not exhaustive, and presumably there are comprehensible metaphors that we do not discover and do not write up, though they are still children in terms of the conceptual system. What we list are the "realized" metaphors, not the putative ones.



Aptness and conventionality. One important set of considerations in metaphor design is choosing a source domain that maps onto the target domain with a high degree of correspondence, or a high degree of "aptness." These considerations help to govern the process of discovering candidate metaphors within each category.

Various authors have described "aptness" as a property of metaphors that is perceptible by people who encounter them for the first time. Following other writers (Gibbs, 1993, 1994; Katz, 1989, 1992; Malgady and Johnson, 1976; Tourangeau and Sternberg, 1981, 1982), Chiappe, Kennedy, and Chiappe (2003) define aptness as "the extent to which a comparison captures important features of the topic." Subsequently, Jones and Estes (2006) define aptness as "the degree to which the figurative meaning of the source describes a relevant feature of the topic." Measures of aptness have their origin in researchers' need to account for how people can understand a metaphor – and how they can do so relatively rapidly – even though they had never encountered it before. "Aptness" became crucial in discussions of the comprehension of metaphor, and aptness measures lie at the intersection of several strains of experimental research into the comprehension of metaphors. Thibodeau and Durgin (2011) conclude that "aptness is normally a necessary but not a sufficient condition for a metaphor to gain traction in natural language."²¹

Career of metaphor. Dedre Gentner's model of structural alignment joins comparison and categorization approaches of metaphor comprehension and arrays them in sequence over the lifespan or "career" of a metaphor. Gentner and Bowdle (2005) posit that individuals exposed to a new metaphor will first understand it in terms of a comparison. For this reason, people find it easier to process novel metaphors that appear in an "A is like B" format – in other words, where "like" is added. Over time, they will begin to construct the category (e.g., "operations that are well coordinated," "people who are stranded") out of the source and target domains.

Because Frameworks is in the business of creating new metaphors and injecting them back into public discourse, the notion that figurative language has an evolutionary cycle both in the brain and in social settings is attractive. In some projects, we introduce these novel pairings as resources to use in discourses that have no ready metaphors at all (as in executive function for

²¹ Thibodeau, P., & Durgin, F. (2011). Metaphor aptness and conventionality: A processing fluency account. *Metaphor and Symbol* (in press), p. 11.

an early child development project); in discourses where people deploy plenty of cultural models, sometimes contradictory, which have not necessarily hardened into a lexicon (as in the child mental health project); and also to counter or replace the profusion of linguistic resources that exist in a discourse which may or may not be incorrect in a technical sense, but which do not help set a tractable policy agenda. An example of this is FrameWorks' work on addiction. Some of this language in this discourse represents folk understandings of these processes; some of it represents breakthroughs from an earlier age of addiction science; some of it comes from approaches to addiction treatment that have become highly visible in the culture (such as Alcoholics Anonymous). Examples include "short circuits," "baggage," "hitting rock bottom," and "addictive personalities."

Operationalizing aptness. Several FrameWorks quantitative experiments have contained a question that asks respondents about the degree of fit between "the idea" (or the simplifying model) and an area being explained. In one of these experiments (Child Mental Health; N=2,000), the simplifying model with the highest "aptness" score also produced the highest scores on the understanding and application questions, and went on to perform very well in Persistence Trials. This suggested a high degree of predictive value of an aptness score. However, in a later experiment (Addiction; N=2,000), we split the aptness question into two components, one asking how well people liked the metaphor and the other asking [ok?] how much fit they thought there was. A high degree of correlation between these two suggests that the aptness question was being interpreted as a "liking" question; that is, despite our best efforts, comprehension was still being confused with appreciation. We are currently exploring ways to capture "aptness" using other methods in the large-sample online survey environment.

While it remains intuitively obvious that a highly apt metaphor would be more usable than a less apt one in social interactions, we have been unable to secure an adequate measure for aptness. Experimental work from psycholinguistics has confirmed the problems with aptness as a construct, throwing into question much of two decades of work on aptness, comprehensibility, appreciation, and novelty.²²

²² See Thibodeau & Durgin, op. cit. See also Glucksberg, S., & Haught, C. (2006). Can Florida become like the next Florida? When metaphoric comparisons fail. *Psychological Science*, 17, 935–938.

Others note that aptness is related to comprehensibility, defined as "how easy it is to understand a comparison."²³ If one can "construct an interpretation relatively easily," then a metaphor can be considered highly comprehensible. Chiappe, et al. (2003) suggested that comprehensibility and aptness reflected two different kinds of metaphor understanding; though they may be simultaneous, comprehension "may indeed emphasize initial reactions to statements and aptness judgments may often be relatively late."²⁴ Other factors can affect aptness and comprehensibility ratings, including the order of presentation²⁵ and the inclusion of adjectives that literally have something to do with the source domain.²⁶

However, some additional considerations should be added about aptness. One of them is that the source domains should contain potential matches that are not assigned in the metaphor itself. This has been called "unassigned structure." One example of unassigned structure was in the "levelness" metaphor for child mental health. This simplifying model compares the mental health of a child to the levelness of a piece of furniture, like a table. In both On-the-Street interviews and Persistence Trials (for details on these methods, see below), people began expanding their conception of child mental health through aspects of tables as physical objects: e.g., they contain multiple supports or legs, and they rest on floors. When we ask about aptness, we are asking about the explicit matches as well as the implicit ones. Stated in terms of structural alignment, we want people to report on their comprehension based on the alignment and projection processes they *did* use and those they *might* use to comprehend a metaphor.

METAPHORS MUST BE TESTED

Why Metaphors are Tested

Just as electronic devices are tested in order to make sure they function as advertised, FrameWorks tests metaphors. Most people can easily identify metaphorical language and even generate useful comparisons in order to explain, teach, or argue. Yet metaphors are also integral to human thought at much deeper levels that evade conscious detection and reflection. Each

²³ Chiappe, D. L., Kennedy, J. M., & Chiappe, P. (2003). Aptness is more important than comprehensibility in preference for metaphors and similes. *Poetics*, 31, 51–68.

²⁴ Chiappe, et al., op. cit., p. 53.

²⁵ Gerrig, R.J., Healy, A.F., 1983. Dual processes in metaphor understanding: comprehension and appreciation. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 9, 667–675.

²⁶ Glucksberg, S., & Haught, C., op. cit.

metaphor exists in a web of other meanings that are not always initially apparent; some of these meanings may ultimately endanger the very purpose we want a metaphor to serve. Thus, FrameWorks tests its simplifying models and the metaphors at their core in order to observe the actual directions that metaphors take in social interaction and discourse. These tests allow us to "see around the first bend" – to observe what happens to metaphors in use well after their off-the-cuff creators pay attention to them. These tests enable us to avoid subjective responses to metaphors, and inoculate against arguments about a metaphor's effectiveness based on from-the-hip assessments of "what most people think" or "what most people know."

Even if we adopt the strongest position on conceptual metaphor as embodied cognitive schema, the reality is that no two conceptual domains align perfectly. Testing is necessary to locate the systematic in the semantic patchwork; the ordinary user would not have the resources to be able to do this. Mapping the scope of variation in precise ways outstrips the resources of an applied workplace, so we can only anticipate the sources of variation and deal with them consistently. We probably overprivilege the influence of items in texts over other sources, such as social variation in language use, individual variations in higher-order cognitive skills (such as working memory), and even time on task.

The relationship between aptness and conventionality suggests a path toward widespread adoption of simplifying models. Many of the very persistent metaphors that we use in our daily language have evolved over long periods of time to fit their cultural circumstances and be usable by human brains. We use them because they are present in our language and our culture, and they are so because they have outlasted, or proven to be more fit than, other related attempts.²⁷ Because issue advocates do not have the luxury of long periods of time to see what might emerge "naturally," the best alternative is to compress the evolutionary schedule in order to produce a cognitively and socially "fit" metaphor. And our testing methods (described extensively in the following section) comprise one form of a compressed evolutionary schedule.

Here are three examples of the benefits of metaphor/simplifying model testing.

²⁷ Critically aware intellectuals who are sensitive to the manufacture of social and political compliance might question this Darwinian approach and ask, are conventional metaphors conventional because they are good, or are they conventional because their conventionality is produced? I would argue that the conceptual and linguistic structures that underlie conventional metaphors predate our contemporary technocracy of memes, which can succeed only to the degree that it[what is the reference here? Technocracy?] has learned how to manipulate those structures. To put it another way, humans might sit in fashionable but uncomfortable furniture for brief periods, but the furniture that cultures choose and reproduce in the long run is always predicated on homogeneity among human bodies.

1) The first example concerns what happens to armchair metaphors with intuitive appeal. In a project having to do with the determinants of child well-being, two metaphors we brought into the field were that of "dandelion children" and "orchid children." These are metaphors that were developed and used by developmental psychologists Tom Boyce and Bruce Ellis to describe resilient and overly sensitive children. Intuitively, "dandelion children" has a lot of immediate appeal, and one can use it to good effect in social interactions. A good argument can also be made for its durability, given that it comes from a Swedish idiom, *maskrosbarn*, "dandelion child." (Boyce and Ellis formed *orkidbarn* from *maskrosbarn*.)

Surprisingly, we found in on-the-street interviews that participants' first response was to make judgments about both types of flowers based on their physical beauty, and then to extend those judgments into the discussion about the factors that influence child development. In socio-economic terms, since orchids are beautiful flowers they must be high-class flowers, whereas more common and ordinary dandelions must be low-class ones. In this way, the simplifying model's putative illustrative power needed significant prompting or was lost altogether. In America, no one wants a "dandelion child."²⁸

2) The second example relates to explaining the success of a simplifying model more completely. The simplifying model developed for teachers' unions is Scaffolding, which contains a subordinate comparison of teachers to "brain builders." In on-the-street testing, this comparison proved very powerful. Was it possible that the success of the Scaffolding simplifying model was attributable to "brain builders" and not to any cognitive assets of Scaffolding itself? Only because we have tested this information in a range of settings do we know this is not the case. "Brain builders" was included in another model, Blueprints, which did not fare as well as Scaffolding in the quantitative experimental survey.

3) The third example relates to the issue of the universality and particularity of conceptual domains. In the budget and taxes project, a candidate simplifying model titled "Backsliding" tested the notion of a society as a vehicle that "lost ground" because it would or could not pay for public goods and services. It seemed immediate and accessible enough.

²⁸ A small amount of Web research also turns up potential drawbacks to these terms. The original Swedish use of "dandelion child" (*maskrosbarn*) is to define an identified population of childhood abuse survivors, which has become a social identity. It is also a subset of the population, whereas the usage we were testing supposed that the population is either one or the other – there is no "normal" flower. But in the Swedish context, it would sound strange to say that "we need to make more dandelion children" – it would be saying that we need more abused children who survive.

However, when this model was tested in Atlanta and Baltimore, we found that "backsliding" had another meaning among African-American Christians. In that context, a "backslider" is a church-goer and believer whose behavior has become ungodly and who has stopped attending church. Participants were willing to acknowledge this additional meaning and set it aside for the broader meaning, but the moral connotations of "backslider" remained in their appraisal of the efforts of elected officials. Here, the particulars of the conceptual domain for a sub-population interfered with the universal application of the simplifying model.

In that same project, we did not test a simplifying model titled "Pay it Forward," choosing instead to title it as "Forward Exchange." The thinking was that the popular 2000 movie (and source of the term) "Pay it Forward" would make inaccessible the metaphor of a society passing along present benefits to the future. However, "paying it forward" is exactly the metaphor that underpinned Elizabeth Warren's now-viral social contract speech:

You built a factory out there – good for you! But I want to be clear. You moved your goods to market on the roads the rest of us paid for, you hired workers the rest of us paid to educate, you were safe in your factory because of police forces and fire forces that the rest of us paid for....Now look, you built a factory and it turned into something terrific, or [had a] great idea – God bless. Keep a big hunk of it. But part of the underlying social contract is you take a hunk of that and pay forward for the next kid who comes along.

A quick Google search turned up very few comments on Warren's speech related to the movie, and these were not negative – something that FrameWorks might have discovered if we had tested a simplifying model titled "Pay it Forward." A fuller frame analysis would demonstrate that Warren's message was so appealing because it combined a number of powerful frame elements (tone, messenger, simplifying model, value).

Other reasons for testing.

1. The workings of a device should be able to be described. When a metaphor works, we want to be able to describe, precisely and empirically, the effects it has on reasoning and verbal

interaction. Armchair approaches provide conjecture and can be important sources of guidance during the development and testing process, but empirical findings remain the gold standard.

2. The functioning of a cognitive device should be described in cognitive terms. The feedback that people are used to giving and receiving about metaphors (or any other linguistic or verbal performance) comes in the form of positive or negative emotional assessments that promote social solidarity. That is, they are used to saying that they "like" or "don't like" a particular formulation, and then letting this emotional response (or that of others) lead them forward. Obviously, affective state influences cognitive performance in any number of measures, but as our ultimate goal is to create a powerful cognitive device, we want to measure its effectiveness with cognitive measures.

3. For a cognitive device to work, ordering matters – or does it? In the view of the conceptual metaphor, career of metaphor, and structure-mapping approaches to metaphor, a metaphor does not have a temporal arrangement, outside of the presentation of an A term before a B term. Otherwise, its structure arrives a gestalt. In a theoretical context, questions of ordering may not matter much, but in the applied context in which we work, it matters a great deal. Examples of this are the simplifying models themselves, which are textual notations on nonlinear cognitive processes; as texts, they are necessarily linear. What is the optimal sequence of items?

4. A cognitive device is going to work in an unpredictable space. Another reason to test is that we cannot necessarily predict what a metaphor's effectiveness will be. As mentioned above, simplifying models are typically written in such a way that certain entailments are made explicit, in order to cue the reader or listener as to the comparison's direction. What we do not always know when we write the simplifying model is whether we have made visible the most salient entailments. Nor do we know for certain which entailments will inspire other matches. Nor can we necessarily predict whether the matchings will block other matchings. For these reasons, we may anticipate some x amount of fit between the domains, but the actual usefulness of the simplifying is x - y , where y is the influence of real-world cognition.

In the following section, I describe the procedures by which FrameWorks' simplifying models are tested.

How They are Tested

Just as an electronic device is turned up, frozen, dropped, hooked to other devices, and put through other trials in order to evaluate the performance of its design and manufacture, candidate simplifying models are tested in multiple formats where we are able to track their ability to change people's thinking and talking. The testing begins with On-the-Street Interviews, which are followed by experimental surveys that test the candidate models on measures of issue understanding, metaphor application, and metaphor-to-concept fit (or aptness).²⁹ Finally, we take the most promising simplifying model candidates into a final phase of qualitative testing, Persistence Trials, that mimics the game of telephone, to see how well the simplifying models hold up in social interaction as they are used and shared by individuals. At each stage, we use our findings to winnow our selections as well as refine the simplifying models that remain.

The three phases of testing and evaluating the metaphors are described below.

Phase 1. On-the Street Interviews. An initial list of categories and metaphors are brought to on-the-street interviews, which are videotaped and analyzed. Participants who are recruited sign consent forms and are compensated with a \$10 gift card for an interview lasting 10 to 15 minutes. Generally, six to eight people per candidate simplifying model are interviewed. On the basis of these interviews, models that do not appear to be working are discarded; models that people can repeat, re-use, and extend are kept. The linguist then adds sibling metaphors to categories that worked in these interviews, building a list of three to four categories, with two to three metaphors in each category. The simplifying models are written up as paragraphs of text no longer than 150 words, which are regularized for overall length, sentence structure, and discourse structure. Sometimes the area of inquiry is introduced; sometimes the two domains are explicitly joined ("*Children's ability to focus and pay attention is like air traffic control at a busy airport*"). Often a piece of information about the source is provided ("*Some planes have to land and others have to take off at the same time, but there's only so much room on the ground and in the air*"), in order to cue the alignment process. In the case of this metaphor, the mechanism is named ("*The mechanism that acts as air traffic control is called executive function*") and defined in terms of the source ("*It regulates the flow of information and the focus on tasks, creates*

²⁹ The form that these aptness measures take is evolving. Initially, participants were asked to rate "whether or not the idea matched important parts of the problem" on a seven-point Likert scale. We are now exploring other avenues, involving open-ended free association questions, to determine this.

mental priorities and avoids collisions, and keeps the system flexible and on time”). The paragraph usually closes with a prescriptive statement (*“In children, this mechanism needs to be actively geared up as early as possible”*) or a re-presentation of the main metaphor (*“Children's ability to focus and pay attention is like air traffic control”*).

Phase 2. Experimental Survey. Using the set of iterations, a large-scale experimental survey is designed to test the efficacy of the metaphors. The survey is conducted online with nearly 2,000 participants who are drawn from a national online panel. Their data are matched on the basis of age, race, education, and political party identification to ensure that the sample is nationally representative. The experimental survey measures the efficacy of the metaphors to help people think about the target domain of the specific project. Questions with multiple-choice answers are designed to test the understanding of the metaphor, the ability to apply the metaphor, and the ability to explain the metaphor. Depending on the project, questions may also ask how people might behave differently, an attempt to measure a shift in a self-conception of political agency. On the basis of the results of the quantitative experiments, two of the top-scoring metaphors are brought into a qualitative phase of research, which is held in several U.S. cities.

Phase 3. Qualitative Research. The qualitative phase of research is termed “Persistence Trials,” as we are evaluating the models' ability to “persist” in discourse and, based on an analysis of patterns in this discourse, to “persist” in thinking. Participants for Persistence Trials are recruited on the basis of their involvement in their communities, and to assure variation in gender, race/ethnicity, education level, occupation, community involvement, and self-reported political affiliation. The Persistence Trials are a modified game of telephone. The moderator gives the paragraph-long iteration of the metaphor to two initial participants (Generation 1) and also reads the metaphor aloud. After 15 to 20 minutes of discussion with the moderator, Generation 1 is informed that they are to teach the metaphor to another group of two participants (Generation 2). Generation 1 is given five minutes to design a way of presenting the metaphor, after which they have five minutes to present the metaphor to Generation 2. Generation 2 then has 5 to 10 minutes to ask Generation 1 questions about the presentation. During this time, the interviewer allows dialogue to unfold naturally between the two groups but periodically probes for additional information on ideas that emerge. Generation 1 then leaves the room, and the interviewer asks Generation 2 an additional set of questions designed to elicit their understanding of the metaphor and ability to apply the concept. This questioning lasts for approximately 10 minutes, at which point Generation 2 is informed that they are to teach the metaphor to

Generation 3. Generation 2 has 5 minutes to plan their presentation, after which Generation 3 enters the room and the two groups go through the same steps and questions as described above.

A Persistence Trial ends when Generation 1 returns to the room, where they are allowed to debrief with Generation 3 on the direction the metaphor has taken. The interviewer then reads the original paragraph-long iteration and asks questions about its transmissibility. All informants sign written consent and release forms prior to participating in the sessions, and interviews are video- and audio-recorded by professional videographers. After the sessions, recordings are transcribed and analyzed. The series of metaphor transfers is designed to give researchers opportunities to see how participants react to, use, and talk about the metaphor. Analysis of transcripts and recordings demonstrates how well the model and its constituent parts hold up as they are passed among participants, how participants modify the model, and the directions the conversations take when participants are presumably using the model in mind. The design of the sessions also generates several types of interactions (e.g., guided by the moderator, alone with each other, talking to another generation of participants, etc.).

Criteria

On the basis of our theoretical perspectives on metaphors and cultural models, FrameWorks has built a robust, reliable protocol for determining what an effective simplifying model looks like and how it behaves. The testing process described above helps us to generate evidence that a simplifying model:

- (1) improves people's understanding of how a given phenomenon works;
- (2) creates more robust, detailed, and coherent discussions of a given target concept;
- (3) is able to be applied to thinking about how to solve or improve a situation;
- (4) inoculates against existing dominant but unproductive default patterns of thinking that people normally apply to understand the issue;
- (5) is highly communicable, moving and spreading easily among individuals without major breakdowns or mutations; and finally,
- (6) is self-correcting (that is, when simplifying models have started to break down in social transmission, the central model and its most salient entailments are "resurrected" without any priming from a moderator).

CONCLUSION

At FrameWorks we test simplifying models (and the metaphors around which they are constructed) because they are devices: built objects designed for a specific instrumental purpose. We need to ascertain how they function, not solely in a one-off circumstance like a conversation or a meeting, but repeatedly and across different venues and in different contexts.

Furthermore, the nature of metaphors themselves requires that they be empirically evaluated. The connections between two domains can be robust but are not isomorphic, and there can be numerous entailments of a metaphor – though it is difficult to predict which entailments people will expect to see as the most salient, and impossible to see which ones they will find on their own. Finally, such devices will work in the brains of people who are influenced by factors that make their responses less neat and uniform than one might expect. To deal with a clumsy metaphor in a poem, the writer needs to create another, or the reader can simply move on. But the stakes are much higher for an explanatory metaphor that is meant to reshape people's thinking toward a social policy agenda.

Future Directions

This paper is one of the future directions for FrameWorks' approach to metaphor in strategic communications: helping clients and others in the community of framers to understand what we are up to and why we make the recommendations we do, and what they stand to gain from our perspective. It is crucial for them to know that FrameWorks is unique because it is the only organization that can provide empirical results on how its products and recommendations work across a wide range of settings. These results come from methods that naturally extend from a theoretically motivated understanding of the linguistic, cultural, and cognitive phenomena involved in public agenda-setting.

FrameWorkers will also draw from those understandings in order to find the most effective ways of teaching re-framing methods to the community of framers. What are the affective and social factors that inhibit the adoption of new simplifying models and other communications recommendations, and how can methods of framing be adapted to those circumstances? How can we best promote adoption of a new way of thinking about an issue or

problem, given resistance to new ways? We also continue to refine our theoretical understandings of our research methods, looking for how to make the research process more productive, time-efficient, and budget conscious.

FURTHER READING

ENDNOTES