

Teaching Current Directions in Psychological Science

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Aimed at integrating cutting-edge psychological science into the classroom, Teaching Current Directions in Psychological Science offers advice and how-to guidance about teaching a particular area of research or topic in psychological science that has been the focus of an article in the APS journal *Current Directions in Psychological Science*. *Current Directions* is a peer-reviewed bimonthly journal featuring reviews by leading experts covering all of scientific psychology and its applications and allowing readers to stay apprised of important developments across subfields beyond their areas of expertise. Its articles are written to be accessible to nonexperts, making them ideally suited for use in the classroom.

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[Unpacking Creativity: Semantic Distance Is the Difference](#)

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Unpacking Creativity: Semantic Distance Is the Difference

By C. Nathan DeWall

[Green, A. E. \(2016\). Creativity, within reason: The neurocognition of creative relational thinking. *Current Directions in Psychological Science*, 25, 28–35. doi:10.1177/0963721415618485](#)

We live in the age of creativity. Over the past century, creativity has helped fuel scientific and technological breakthroughs that cured diseases, added years to our lives, and connected the world in a wide web of information. Most of our daily activities depend on the past two generations' creative insights. Yet many people feel baffled when asked how to define and measure creativity.

"I know it when I see it" won't satisfy psychological scientists such as Adam Green (2016) who wish to identify the neural correlates of creativity. Scientists need a precise, robust, and reliable metric that can separate the mundane from the creative. According to Green, the solution is semantic distance.

Semantic distance refers to the relative gaps between the meaning of a word, phrase, or idea, and how we try to relate to that concept. This distance yields a precise measurement of how far we've gone, and thus, how much creativity we have used.

Green argues that analogies provide a gateway to semantic distance and creativity. In an analogy, people

compare two things. The greater the semantic distance between the two things, the more creative the response. For example, the physicist Niels Bohr creatively described the atom as a solar system, in which electrons revolve around the nucleus. The structure of an atom may seem worlds apart from the structure of our solar system, but Bohr used both reasoning ability and creativity to see the connection.

Psychological scientists also use their reasoning abilities for creative analogies. What do the smallpox vaccine and persuasion have in common? On the surface, nothing. Yet psychological researchers drew on a concept from the field of immunology — inoculation — to understand why some people (and not others) change their attitudes.

Inoculation involves exposing people to a weak form of a disease to increase the body's ability to fight off the disease. Just as the smallpox vaccine inoculates people against the disease, prior exposure to weak counterarguments causes people to resist later attempts at changing their views (McGuire, 1961). By seeing connections between immunology and psychology, scientists have now applied the concept of inoculation to advertising (Kim, 2013), expert witness testimony (Zlemke & Brodsky, 2015), and elite athletic performance (Sarkar, Fletcher, & Brown, 2015).

Green and his colleagues have shown how semantic distance maps on to brain activity (Green et al., 2006). When people form analogies, they rely heavily on the frontopolar cortex — an area of the brain's left hemisphere that is much larger in humans than in great apes (Semendeferi, Schenker, & Damasio, 2002). Brain scans reveal a close link between activity in the frontopolar cortex and semantic distance (Green, Kraemer, Fugelsang, Gray, & Dunbar, 2012). Other research has shown that damaging this brain area reduces creativity (de Souza et al., 2010).

It's difficult to engage students to act creatively. Fear of failure can creep in, causing students to remain quiet or to play it safe. Instructors should encourage students not to worry about getting the correct answer. Let the ideas flow and see what happens. To bring Green's semantic-distance research into the classroom, instructors can use one or both of the following activities.

Activity 1

The first activity shows students the relationship between creativity and reasoning. Ask students to nominate the three most creative people over the past century. Define "creative" as people who have made novel and useful contributions (Mayer, 1999). Next, have the students select one or more of their creative nominees and explain why they're so creative. How much do these creative people form connections between seemingly separate concepts? How much do they think carefully about how to find solutions to problems that have stumped others?

Instructors can then ask students how their responses may contradict common stereotypes about creative people. Popular psychology suggests that reasoning and creativity are distinct. Psychological science suggests that reasoning and creativity are connected. Might this scientific perspective on creativity help students appreciate the similarity between different career paths? Are expert painters that different from exceptional computer programmers?

Activity 2

The second activity gives students a practical demonstration of a key component of creativity: semantic distance. Instructors should first review Green's (2016) description of semantic distance.

This activity borrows heavily from the work of Prabhakaran, Green, and Gray (2014). In that study, participants saw one word and were instructed to say a related word. The more semantic distance between the two words, the more people rated the responses as creative. Like a correlation, the range of semantic distance is -1 to $+1$. (Perfect antonyms are represented by -1 , whereas $+1$ means the two concepts are perfect synonyms.)

Instructors can tell students that they will see a main word and two related words. On a PowerPoint slide, show students the following words:

Main Word	Option 1	Option 2
Taxi Cab	_____	Yellow _____
Oath Take	_____	Sworn _____
Lamp Light	_____	Shade _____
Hole Dig	_____	Black _____
Amazon Jungle	_____	Prime _____

Ask students to complete two tasks. First, they should estimate the semantic distance between the main word and each related word (i.e., Options 1 and 2). Their answers should be between -1 and $+1$, similar to a correlation (positive or negative values of .1, .3, and .5 indicating small, medium, and large similarity or dissimilarity, respectively). Just ask students to give it their best guess; don't worry about getting the exact number. Second, have students rate the amount of creativity it took to connect the main word to each related word (1 = not much creativity to 5 = a lot of creativity).

The big reveal comes when instructors show students the actual semantic distance between the main word and related options. Like a correlation, lower numbers mean less relation between the main word and the related word. In this case, lower numbers mean greater semantic distance.

Here are the numbers:

Main Word	Option 1	Option 2
Taxi	Cab (.57)	Yellow (.11)
Oath	Take (.22)	Sworn (.63)
Lamp Light	(.61)	Shade (.18)

Hole Dig (.51) Black (.13)

Amazon Jungle (.65) Prime (.02)

In my class, I underlined the words that had the greatest semantic distance from the main word. (For fun, students and instructors might visit lsa.colorado.edu to compute the semantic distance between words. Remember to read the instructions first!) How do these numbers relate to your estimates of semantic distance and your creativity ratings? What did you notice with the last example, Amazon and its relation to the word “prime”? It’s a highly creative combination. How might companies benefit from using semantic distance to make creative advertisements and names of products?

Psychologists didn’t need a degree in glaciology to know that the subject offered the key to describing Freud’s conception of the human mind. All they needed to know was that, like the unconscious, the majority of an iceberg lurks outside our conscious line of sight. Freudian theory got a lot wrong, but this creative analogy continues to influence psychology. In many ways, it is human nature to think in analogies and to find connections where none seem to exist. Whether our analogies are creative depends in part on how much semantic distance lies between the concepts our mind tries to connect. The good news is that everyone is endowed with creative abilities. We only have to take a few extra steps beyond our comfort zone to find the otherwise hidden connections.

The Ritual Animal

By David G. Myers

[Watson-Jones, R. E., & Legare, C. H. \(2016\). The social functions of group rituals. *Current Directions in Psychological Science*, 25, 42–46. doi:10.1177/0963721415618486](#)

Evolutionary, anthropological, and psychological science concur: We humans are the ritual animal. Rachel Watson-Jones and Cristine Legare (2016) propose that social-group rituals serve adaptive functions. Rituals — “socially stipulated, group conventions” — create social cohesion and promote shared beliefs.

The Abundant Reality of Social Rituals

To introduce the facts and the functions of rituals, instructors might first invite students (perhaps in small groups) to brainstorm social rituals that they practice or observe. Mention that these may include group behaviors not labelled as rituals. Possible examples:

Political rituals:

- Speaking the Pledge of Allegiance at the beginning of a school day
- Singing the national anthem before a sporting event
- Congressional or parliamentary rules of address and debate
- Inaugurations

Sports rituals:

- Teams entering the field or arena to cheering fans
- Team warm-up routines
- Volleyball, basketball, or baseball team member introductions
- Huddles
- Within-game breaks, such as baseball's 7th-inning stretch
- Players' postgame greetings and hand slaps
- Sportsmanship behaviors

Social rituals:

- Birthdays
- Weddings
- New Year's celebrations
- Funerals
- Club meeting formats, from Rotary clubs to Greek life
- Induction ceremonies
- Eating rituals

Religious rituals:

- Eating the Passover meal
- Taking communion (the Eucharist)
- Speaking confessions and creedal affirmations
- Baptism
- Group singing

The Functions of Social Rituals

So, instructors could ask, what are the shared purposes of these varied social rituals? If we were deprived of them, what would be lost? Watson-Jones and Legare offer several rationales, which perhaps students could anticipate:

- Identifying group members: Dress, etiquette, and actions mark group membership and the accompanying shared beliefs and values.
- Demonstrating in-group commitment: Well-practiced or costly social rituals signal commitment and promote trust and affiliation.
- Facilitating cooperation: Social rituals support exchanges with and generosity to nonkin.
- Increasing cohesion: Social rituals, such as synchronous movement and singing, increase connection and trust, perhaps especially in times of stress.

To these I venture a fifth: Social rituals not only express commitment, they deepen it. Attitudes and beliefs follow behavior. Much as we internalize new role behaviors — becoming the roles we enact — so also ritual behaviors shape our consciousness. Celebrating Passover helps family members know and remember who they are. The early Christian ritual of washing one another's feet strengthened the idea

of humility. Worship participation shapes religious identity.

“To attain faith,” advised Blaise Pascal (Pensees), “follow the way by which [the committed] began; by acting as if they believed, taking the holy water, having masses said, etc. Even this will naturally make you believe.” Tevye (from *Fiddler on the Roof*) echoed the sentiment: “Because of our traditions every one of us knows who he is and what God expects him to do ... Without our traditions our lives would be as shaky as a fiddler on the roof.”

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