

# Success is a puzzle

## Sorting out the pieces with metaphor analysis



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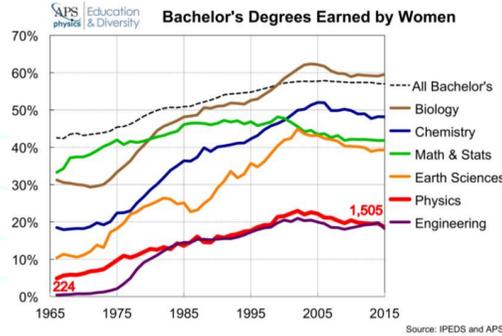
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**Too Long; Didn't Read:** Metaphor analysis was used to characterize women's views of success in physics. Analysis revealed a relationship between process and product as well as external agents playing a role.

### Purpose

Women are underrepresented in physics in part due to perceptions of physics as a masculine field.<sup>1</sup>

We investigate how women conceptualize success in physics to support them in attaining success.



### Methods

Explored conceptualizations with metaphor analysis.

Metaphors can give insight into the structure of thought and the culture surrounding a person.<sup>2</sup>

Metaphors elicited during semi-structured interviews with a prompt to complete the thought "Success in physics is like..."



### Participants

Interviewed 11 women of various backgrounds, and selected 2 for their common emphasis on the continuous nature of success.

Participants are undergraduate (physics) and graduate (planetary science) students at a large, public university in the southeastern United States. One participant began her education in Europe, while the other began in a Midwestern US state.

### Analysis

#### Metaphors

##### Renaë

Source domain	Target domain
<i>R: So, success in physics in grad school feels like <u>running into a door</u>.</i>	success in physics is confronting difficulties
<i>knowing that <u>at the end the door will be opened for you</u>.</i>	students will be allowed to graduate
<i>but you have to <u>keep running into it</u>. (E)</i>	it is a continuous process
<i>... Like, the <u>faster and harder you run into the door</u>. (E)</i>	a greater effort
<i>the <u>sooner it might open for you</u></i>	may lead to graduating sooner
<i>... <u>It's gonna hurt</u> but, <u>at the end it will open</u> because</i>	difficulties will be distressing
<i>your professors will be like "Oh, <u>obviously you've run into this enough times now</u>". (E)</i>	professors will acknowledge demonstrated effort
<i><u>so you can pass</u>".</i>	and allow graduation
<i>Int: ... What do you think it's gonna look when the door opens?</i>	
<i>R: Um, I'm hoping that <u>it's not just a room full of more doors</u></i>	hopes there is no more difficulties
<i>and <u>I get to choose which one I get to run into next</u>.</i>	wants to have control over which difficulty to confront
<i>... I'm hoping it's just like, <u>I get outside and I can just like go climb a tree or fly a kite</u>.</i>	hopes to have the freedom to do whatever type of research she wants

#### Procedure

- Broke down responses into analyzable metaphorical expressions
- Interpreted metaphors in terms of concepts being explained\*
- Coded expressions for their:
  - Ontology – suggesting a process (action/activity) or a product (object/event/person/experience)<sup>3</sup>
  - Orientation – conveying a positive or negative view<sup>3</sup>
  - Attribution – common factors attributed to causing success<sup>4</sup>
- Identified common themes within and across participants
  - \*Participants provided interpretations during coding process

Ontology	Orientation	Attribution	
Process	Positive	Ability: A	Task Ease: T
Product	Negative	Effort: E	Luck: L

#### Samaria

Source domain	Target domain
<i>S: [success in physics] ...it's like <u>dragging a pail</u></i>	success in physics is learning/researching
<i>and <u>getting some water out of a well</u>.</i>	to gain knowledge
<i>But just like <u>using like a cup</u>. You know like a standard cup(A) and just using that to get a little bit of water</i>	a person can only learn so much at a time
<i>and you just <u>keep trying to get more water</u>(E) and trying</i>	people gain more knowledge
<i><u>to get all the water from the well</u>(E)</i>	goal of gaining all knowledge
<i>but you can't obviously 'cause you're just using the cup.(A)</i>	it is an impossible task due to limits of learning

### Findings

- Metaphorical expressions revealed a relationship between a product and the process leading up to it.
  - "dragging a pail and getting some water" - Samaria
- Orientation of success was not always positive; Samaria did not convey orientation and Renaë had negative views of the process.
- Participants suggested attributions to effort and ability.
- Common attributions of success did not account for external agents playing a role.
  - "the door will be opened for you" – Renaë

### Implications

Instructors and researchers should recognize and appreciate the processes leading up to traditional products (e.g., high grades and degree attainment).

Researchers should explore the interaction of affect and attributions in order to mitigate negative emotions.

External agents (e.g., professors) should recognize their role in others' success and help facilitate that success.

[1] C. Hill, C. Corbett, and A. St. Rose, *Why so Few? Women in Science, Technology, Engineering, and Mathematics* (AAUW, Washington, D.C, 2010).  
 [2] G. Lakoff and M. Johnson, *Metaphors We Live By* (University of Chicago Press, Chicago, 2003).  
 [3] E. J. Paulson and S. L. Armstrong, *Journal of Adolescent & Adult Literacy* **54**, 494 (2011).  
 [4] B. Weiner, *Psychological Review* **92**, 548 (1985).

