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The Gardener and the Coach: How Metaphor Use Shapes Impression Formation

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Abstract

Using the classroom context as a case study, we investigated whether a novel linguistic cue—the use of self-referential metaphors—shapes person perception in metaphor-congruent ways. Across three experiments, current and former college students ($N = 1{,}630$) read an email from a hypothetical professor that conveyed one of two common metaphors for the teacher-student relationship (coach/athletes vs. gardener/plants). They then reported their impressions of the professor, the course, and student expectations. Participants expected professors using coach metaphors to be more rigorous but less supportive than those using gardener metaphors, irrespective of the professor's gender. However, impressions evoked by the use of gardener metaphors did not significantly differ from a non-metaphorical message baseline. These findings indicate that metaphor use can shape our impressions of others independently of gender, but that some metaphors may confirm prior beliefs or expectations. These findings have significant implications for educators and person perception researchers.

Keywords

metaphors, person perception, impression formation, teaching, gender

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One of the fundamental challenges we face in everyday life is managing encounters with new people about whom we know very little. Our impressions and expectations are guided by nonverbal cues, like physical appearance (e.g., Hassin & Trope, 2000) and expressive behavior (e.g., Ambady & Rosenthal, 1992), which we use to draw inferences about social identities (e.g., Bülthoff et al., 2021) and traits (e.g., Todorov et al., 2008). Linguistic cues offer another rich source of information. These include paraverbal features of language—such as tone, accent, and fluency—which can sometimes contribute to biased impressions (Hansen et al., 2017) but also provide useful information about how an encounter is likely to unfold (Camp et al., 2021).

Critically, people make social inferences based not only on *how* others communicate but also the *content* of their communications (Flusberg, Holmes, et al., 2024). For example, Gaucher et al. (2011) observed that job advertisements for male-dominated careers (e.g., mechanic, engineer) tended to include more words associated with masculine stereotypes, such as "independent" and "assertive," compared to job advertisements for female-dominated careers (e.g., nurse, teacher). Follow-up experiments revealed that women expressed less interest in a job when the ad employed more masculine-stereotypical wording, even when the advertised occupation was not male-dominated, because women inferred that more men worked in the organization and expected that they wouldn't feel a sense of belonging there.

One common linguistic device that may shape judgments, both of policies and people, is metaphor. Metaphors serve many communicative and cognitive functions (Thibodeau et al., 2019). For example, they are more emotionally engaging than comparable literal language (Citron & Goldberg, 2014; Mon et al., 2021) and can make a message feel easier to understand (Burgers et al., 2015). Metaphors also help people communicate and reason about complex issues like climate change, the economy, and vaccinations by evoking common knowledge of familiar source domains like wars, food, and clothing (Flusberg et al., 2018; Flusberg, Mackey, et al., 2024; Flusberg & Thibodeau, 2023; Perkins et al., 2022). Thus, metaphorically framed appeals can be especially persuasive (Flusberg et al., 2020; Sopory & Dillard, 2002; Thibodeau et al., 2017; for review, see Flusberg, Holmes, et al., 2024; Flusberg, Mackey, et al., 2024; Thibodeau et al., 2019).

Do people draw inferences about a speaker based on their use of metaphor? Some research suggests they do, and that speakers who use metaphors are viewed as more credible (e.g., Bowers & Osborn, 1966; Reinsch, 1974). However, other studies have found that metaphor use has little impact on speaker judgments and can even backfire and reduce perceived source credibility (McCroskey & Combs, 1969; Osborn & Ehninger, 1962; Ottati & Renstrom, 2010). A meta-analysis concluded that there is little evidence that the persuasive power of metaphor is driven by more positive evaluations of a speaker (Sopory & Dillard, 2002).

In the present study, we adopt a novel approach to assessing whether metaphor use affects impression formation: by investigating whether the *content* of a metaphorical message matters. Do people draw consistent inferences about someone—and the most effective ways to interact with them—based on the specific metaphor they use

and its associated attributes? We aimed to address this question using metaphors for teaching and learning, which are ubiquitous in the field of education (Martínez et al., 2001; Munby & Russell, 1990; Patchen & Crawford, 2011; Phillips, 1996; Saban, 2006). For example, teachers may be described as *gardeners* who *plant the seeds* of knowledge, *coaches* who *train* and *motivate* their pupils, *tour guides* who *survey* the field, or *sculptors* who *mold* young minds.

Recently, several studies investigated people's preferences for such metaphors and whether they are associated with unique mental models of teaching and learning (Flusberg & Hard, 2019; Hard et al., 2021; Patchen & Crawford, 2011; Wong et al., 2022). These studies suggest different metaphors reliably evoke a distinct, coherent cluster of attributes for both teachers and students. The most popular metaphor that teachers are *gardeners*, entails that teachers are nurturing but not authoritative, students are relatively passive, and that teachers, not students, hold the responsibility for and power over student learning. In contrast, the next most popular metaphor, that teachers are *coaches*, evokes a very different profile: that teachers are authority figures and community-builders, students are collaborative, motivated, and self-disciplined, and that students, rather than teachers, are primarily responsible for their own learning.

While this body of work provides evidence that various teaching metaphors reliably call to mind unique mental models, it does not address whether people form different impressions of someone who uses one metaphor and not another. In other words, do people draw reliable social inferences about someone who endorses a particular metaphor for teaching and learning? Further, do those inferences shape expectations about their course offerings or how students are expected to engage with them in that space? We addressed these questions across three experiments, focusing on the two most popular metaphors for the teacher-student relationship: the *coach* and the *gardener* (Hard et al., 2021). Current and former college students read an email from a professor welcoming them to a new course. The participants indicated their expectations about the professor, the course, and how they, as students, would likely behave in the classroom. This design allowed us to examine whether and to what extent metaphor use shapes impression formation, leading people to draw social inferences congruent with the established entailments of a particular teaching metaphor.

Study 1

Study 1 tested (1) whether gardener and coach metaphors evoked different expectations about a hypothetical professor, course, and student behavior, and (2) whether including *any* teaching-related metaphorical language in a welcome email shaped student impressions differently from non-metaphorical language. Based on prior research and data from a pilot study, we hypothesized that (1) compared to professors using gardener metaphors, professors using coach metaphors would be viewed as less caring, stricter, less likely to offer extensions, and more likely to teach challenging and effort-intensive courses, and (2) that professors using *any* metaphor would be viewed as more caring, stricter, and more likely to teach challenging and effort-intensive courses and requires active participation, compared to those using no metaphors.

Lastly, we explored whether metaphors influenced perceptions of professor masculinity and femininity. Given the gendered connotations associated with coaches and gardeners, we expected coach professors to be seen as more masculine and gardener professors as more feminine. Materials, data, and preregistrations for this and subsequent studies are available on the Open Science Framework: https://osf.io/xp5m7/?view_only=da9659c2df4d489bb01c0a2bf3566635

Method

Participants. Using G*Power, we determined a preregistered target sample size of ~500 participants for an 80% chance of detecting an effect size f of .14 based on pilot data (Faul et al., 2009). Participants were 503 current or recent U.S. college students, aged 18–30 ($M = 25.4$, $SD = 3.50$), recruited through the online data collection platform

Table 1. Demographic Characteristics for All Studies.

Demographic Characteristic	Study 1	Study 2	Study 3
Gender			
Women	45.7%	69.3%	48.7%
Men	50.7%	28.4%	43.2%
Trans/nonbinary/genderfluid/other	3.6%	2.3%	8%
Race/ethnicity			
White	51.9%	39.5%	52.6%
Asian/Asian American	17.1%	26.7%	11.7%
Black/African American	13.3%	11.5%	11.5%
Hispanic/Latinx	8%	6.5%	7.2%
Native American	1%	0%	0.8%
Hawaiian/Pacific Islander	0.2%	0%	0%
Middle Eastern	0%	0%	0.8%
Multiracial	8.6%	15.7%	11.7%
Class year			
First-year		44.4%	
Second-year		35.1%	
Junior		13%	
Senior		7.5%	
International status		10.5%	
First-generation status		20.9%	
Enrollment status			
Graduated college	53.6%		51.4%
Within last four years	84.7%		87.2%
Currently enrolled	36.9%		36.1%
Previously enrolled but not graduated	9.4%		9.9%

CloudResearch Connect during Summer 2023 (Hartman et al., 2023). We recruited this age range to match typical college students. See Table 1 for sample characteristics.

Design and Procedure. Participants were randomly assigned to one of three conditions. All participants read an email from "Professor Brown" that they were told was sent the night before the first day of class in Course 101. In the email, Brown describes their approach to teaching using either (a) *gardener* metaphors, (b) *coach* metaphors, or (c) literal language (see Figure 1 for stimuli text). Following the email, participants shared their impressions of and expectations about the professor and course using measures adapted from previous work (Hard et al., 2021; Wong et al., 2022). All measures were presented in randomized blocks, followed by a demographics survey. Participants were paid $1.70 to complete the study. All procedures were approved by the institutional review board of Duke University.

Measures. **Expected Professor and Course Attributes.** Professor Brown's warmth and competence were measured using 12 items used in previous research (Fiske, 2018). Participants were asked to what extent each of 12 characteristics described Professor Brown, using a 5-point scale ranging from 1 (*not at all*) to 5 (*a great deal*). The ratings for warmth ("warm," "trustworthy," "friendly," "honest," "likable," "sincere"; $\alpha = .90$) and competence characteristics ("competent," "intelligent," "skilled," "efficient," "assertive," "confident"; $\alpha = .86$) were averaged to create an index for each respective dimension and demonstrated good reliability.

Participants also completed six single-item measures, indicating how "challenging" and "interesting" they thought Brown's course would be, how "effective" they thought Brown's teaching would be, how "available" they thought Brown would be in the event they had questions or problems, and how "strict" and "caring" they thought

Dear students,

I am your instructor for Course 101. I wanted to take a moment to share my approach to teaching this course with you. As your instructor, it's important for me to help you learn and accomplish your goals in this class and beyond. This semester, I want to [gardener: **cultivate** your knowledge and skills and **provide a fertile environment** to intellectually **grow in**. I want you all to **blossom and thrive** in this course.] / [coach: **coach you** through **training** your knowledge and skills and take you through an **effective mental workout** to get **intellectually stronger**. I want you all to **strive and achieve victory** in this course.] / [no-metaphor: **teach you knowledge and skills that will help you succeed**.]

Our first day of class is tomorrow - welcome to the class!

Sincerely,
Professor Brown

Figure 1. Study 1 emails with metaphorical language bolded.

Brown would be. All items were measured on a 5-point scale ranging from 1 (*not at all*) to 5 (*a great deal*).

Participants then indicated anticipated instructor support and course requirements, with four single-item measures asking how much effort they thought would be required to succeed in Professor Brown's course as well as how likely Brown would be to offer useful feedback on exams and assignments, offer extensions in the event of illness or personal hardship, and send course reminders to the class. All four items were measured on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*).

Expected Student Behavior. Participants judged their anticipated involvement in the course as students, reporting how likely the class was to involve active participation, how likely they would be to continue in the course, and how likely they were to discuss academic and non-academic topics with Professor Brown during office hours. Sample statements include, "After reading this email, how likely would you be to CONTINUE in Brown's course (rather than drop the course)?" Except for the items previously noted, all ratings were on a 5-point Likert scale ranging from 1 ("Not at all" or "Never") to 5 ("Extremely" or "Always").

Expected Professor Demographics. Participants rated how *masculine* and *feminine* they perceived Professor Brown to be using two 11-point Likert scales ranging from 0 (*not at all masculine/feminine*) to 10 (*extremely masculine/feminine*). These measures were exploratory and were not pre-registered.

Covariates. Participants provided demographic information, including age, gender, race/ethnicity, educational attainment, social class, and primary area of study in college. Full measures for all covariates can be found on OSF.

Results

We conducted univariate ANOVAs for each outcome variable. Analyses using expected professor attributes, course attributes, and student behavior variables were preregistered, but analyses using expected professor demographics were exploratory. For this and all subsequent studies, we probed significant effects using post-hoc pairwise comparisons, using Holm-Bonferroni adjustments to control for multiple family-wise comparisons. Means and standard deviations for outcome variables are reported by condition in the Supplemental Materials. All significant Study 1 results are displayed in Tables 2 and 3, which report univariate ANOVAs and post-hoc comparisons, respectively.

Expected Professor and Course Attributes. Univariate ANOVAs revealed significant effects of metaphor condition on students' expectations for how warm, strict, and caring the professor would be, how challenging the course would be, how much effort the course would require, and how likely the professor would be to offer extensions. Metaphor condition did not affect ratings of Professor Brown's competence, effectiveness, or availability, how interesting their course would be, or their likelihood of offering feedback or course reminders.

Table 2. Significant Univariate ANOVA Results for Studies 1, 2, and 3.

Outcome Variable	Study	*F*	*p*	η^2p
Expected Professor/Course Attributes				
Warm	1	8.13	<.001	.032
	2	20.87	<.001	.040
	3	6.74	.001	.023
Competent	2	14.61	<.001	.028
	3	3.82	.022	.013
Challenging	1	18.17	<.001	.071
	2	32.04	<.001	.060
	3	11.21	<.001	.038
Strict	1	12.37	<.001	.049
	2	28.53	<.001	.054
	3	16.21	<.001	.053
Caring	1	8.35	<.001	.034
	2	31.19	<.001	.059
	3	3.83	.022	.013
Interesting	3	4.61	.010	.053
Effort required	1	20.92	<.001	.080
	2	26.69	<.001	.051
	3	11.48	<.001	.038
Offer extensions	1	18.22	<.001	.071
	2	27.08	<.001	.051
	3	7.77	<.001	.026
Offer course reminders	2	14.34	<.001	.028
Expected Student Behavior				
Continue in course	1	3.42	.033	.014
	3			
Discuss non-academic topics	1	4.91	.008	.020
	2	8.60	.004	.017
	3	5.66	.004	.019
Being active	3	6.35	.002	.022
Expected Professor Demographics				
Masculinity	1	13.72	<.001	.054
Femininity	1	16.95	<.001	.068

Note. C = coach metaphor condition, G = gardener metaphor condition, N = no-metaphor condition.

Post-hoc comparisons primarily revealed significant differences between the coach condition and the other two conditions (see Figures 2(a) and (b)). A professor using coach metaphors was expected to teach a more challenging and effortful course, be less likely to offer extensions, and be stricter and less caring than professors using gardener metaphors or no metaphors. A professor using gardener metaphors was expected to be warmer than professors using coach and no metaphors.

Table 3. Significant Post-hoc Comparisons for Studies 1, 2, and 3.

Outcome Variable		Study 1			Study 2			Study 3		
	Comparison	*t*	*p*	*d*	*t*	*p*	*d*	*t*	*p*	*d*
Expected Professor/Course Attributes										
Warm	C vs. G	3.92	<.001	0.35	4.57	<.001	0.40	3.55	.001	0.29
	G vs. N	2.78	.016	0.25						
Competent	C vs. G				3.82	<.001	0.34	2.56	.028	0.21
Challenging	C vs. G	5.00	<.001	0.45	5.66	<.001	0.50	3.27	.003	0.27
	C vs. N	5.38	<.001	0.48				4.61	<.001	0.38
Strict	C vs. G	4.28	<.001	0.38	5.34	<.001	0.47	5.44	<.001	0.45
	C vs. N	4.30	<.001	0.38				4.19	<.001	0.34
Caring	C vs. G	3.80	<.001	0.34	5.59	<.001	0.49	2.77	.016	0.23
	C vs. N	3.16	.005	0.28						
Interesting	C vs. N							2.43	.041	0.20
	G vs. N							2.79	.015	0.23
Effort required	C vs. G	4.69	<.001	0.42	5.17	<.001	0.45	4.35	<.001	0.37
	C vs. N	6.17	<.001	0.55				3.93	<.001	0.32
Offer extensions	C vs. G	5.97	<.001	0.54	5.20	<.001	0.46	3.94	<.001	0.32
	C vs. N	3.67	.001	0.33						
Course reminders	C vs. G				3.79	<.001	0.33			
Expected Student Behavior										
Continue in course	C vs. G	2.44	.040	0.22						
Discuss non-academic topics	C vs. G	2.89	.011	0.26	3.00	.003	0.26	3.28	.003	0.27
	C vs. N	2.46	.038	0.22						
Being active	C vs. N							3.10	.006	0.25
	G vs. N							3.07	.006	0.25

(continued)

Table 3. (continued)

Outcome Variable	Comparison	Study 1			Study 2			Study 3		
		t	*p*	*d*	*t*	*p*	*d*	*t*	*p*	*d*
Expected Professor Demographics										
Masculinity	C vs. G	5.19	<.001	0.47						
	C vs. N	3.16	.005	0.28						
Femininity	C vs. G	5.82	<.001	0.53						
	G vs. N	2.63	.024	0.24						
	C vs. N	3.09	.006	0.28						

Note. C = coach metaphor condition, G = gardener metaphor condition, N = no-metaphor condition.

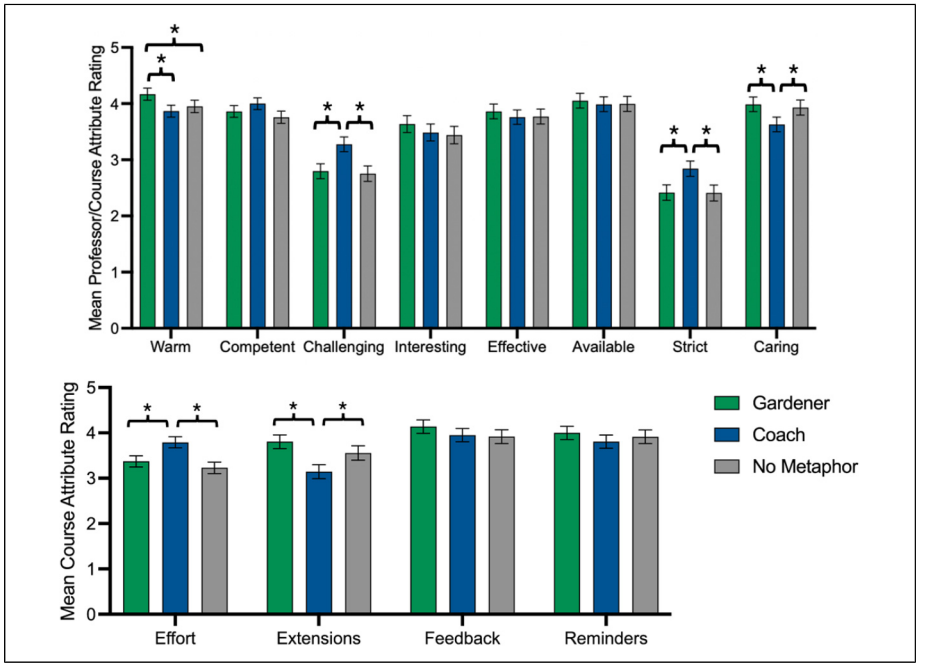

Figure 2(a and b). Mean professor and course attribute ratings across metaphor conditions for Study 1. *$p < .05$. Error bars indicate 95% confidence interval.

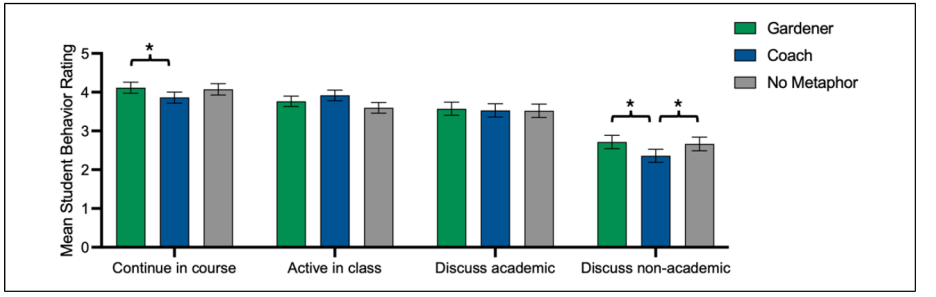

Figure 3. Mean student behavior ratings across metaphor conditions for study 1. *$p < .05$. Error bars indicate 95% confidence interval.

Expected Student Behavior. Analyses revealed significant effects of metaphor condition on likelihood of continuing in the course and discussing non-academic topics. Metaphor conditions did not affect ratings of students' expected active participation or their likelihood to discuss academic topics with the professor. Post-hoc comparisons revealed that participants reported being more likely to continue in the course taught by

a professor using gardener metaphors than one using coach metaphors, with no significant differences for a professor using no metaphors (see Figure 3). Participants also indicated being less likely to discuss non-academic topics with a professor using coach metaphors than gardener or no metaphors.

Expected Professor Demographics. Exploratory univariate ANOVAs revealed significant effects of metaphor on expected professor masculinity and femininity. Post-hoc comparisons revealed that participants expected a professor using coach metaphors to be significantly more masculine and less feminine than one using gardener or no metaphors. A professor using gardener metaphors was perceived as more feminine than one using no metaphors. As depicted in Figure 4, participants generally expected professors to be more masculine than feminine, but this pattern was exaggerated when using coach metaphors and attenuated when using gardener metaphors.

Because we found initial evidence that students formed different gender expectations as a function of teaching metaphor, we performed exploratory correlational analyses to examine whether professor masculinity and femininity ratings were associated with other expectations about the professor, course, and student attributes and behavior. To remove the potential confounding influence of metaphor condition, we conducted bivariate correlations only using data from the no-metaphor condition ($n = 161$). Analyses revealed that professors perceived as more masculine were also expected to be more competent ($r = .22$, $p = .005$), stricter ($r = .25$, $p = .001$), and to teach more challenging ($r = .19$, $p = .018$), interesting ($r = .17$, $p = .030$), and effortful ($r = .17$, $p = .029$) courses. Thus, we found that the impressions students formed of professors using coach and gardener metaphors were very similar to those formed of professors perceived as more masculine and feminine, respectively.

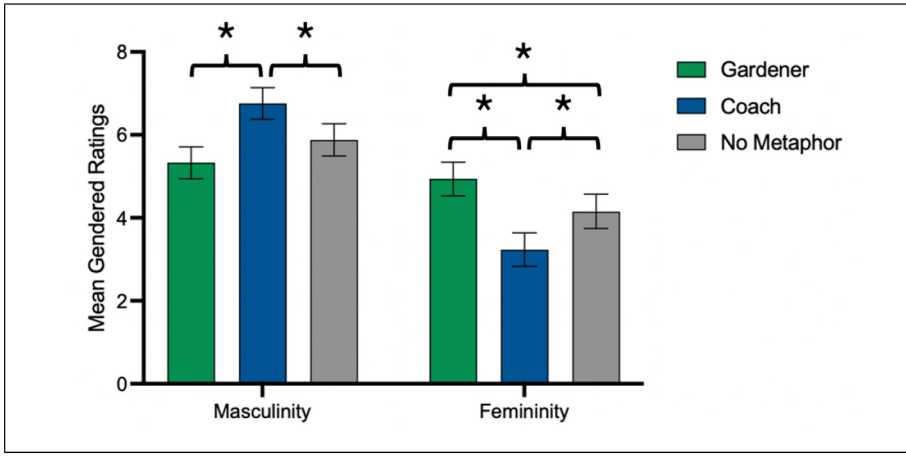

Figure 4. Mean masculinity and femininity scores across metaphor conditions for study 1. *$p < .05$. Error bars indicate 95% confidence interval.

Discussion

Study 1 found that two popular metaphors for the teacher-student relationship evoked distinct metaphor-consistent expectations about a hypothetical professor, course, and student behavior. A professor using coach metaphors was viewed as more masculine, less feminine, more challenging, stricter, less warm and caring, requiring more student effort, and less likely to offer extensions than one using gardener metaphors. Students also anticipated being less likely to continue in the course and discuss non-academic topics with a professor who endorsed coach, rather than gardener, metaphors. These findings suggest that coach metaphors evoke perceptions of rigor but less support and approachability. Contrary to our predictions, professors using non-metaphorical language were viewed similarly to those using gardener metaphors, suggesting that attributes linked to gardener metaphors may align with typical professor characteristics.

Exploratory analyses revealed that coach metaphors elicited expectations of masculinity, and gardener metaphors evoked expectations of androgyny. This was also reflected in the attributes associated with each metaphor: coaches as agentic and "tough," like stereotypical men, and gardeners as communal and supportive, like stereotypical women (Eagly et al., 2020). This suggests metaphors shape expectations about both professor attributes and gender, though it is unclear whether the effects are driven by the metaphor itself or by the associated gender perceptions. Study 2 addressed this question by manipulating professor gender alongside metaphor.

Study 2

Study 1 indicated that, absent other social information, teaching metaphors influence students' impressions. Study 2 examined whether a salient social identity, gender, moderates metaphor effects on student expectations. We examined gender for two reasons. First, metaphors may activate inferences about gender, as expectations of masculinity align with "coaches" and femininity with "gardeners." This may heighten the effect of metaphor when it aligns with gender (e.g., male coach). Second, gender bias in evaluations of female professors, especially in male-dominated departments, is a well-documented problem (Aragón et al., 2023; Boring et al., 2016; Fan et al., 2019; MacNell et al., 2015). Therefore, we examined whether professor gender shaped student impressions and whether metaphors influenced student impressions differently based on professor gender.

Method

Participants. Participants were 522 undergraduate students, aged 18–24 ($M = 19.04$, $SD = 1.10$), at a selective private university in the southern United States during Fall 2022. We aimed for a comparable number of participants as in Study 1, constrained by the number of participants we could recruit in one semester. See Table 1 for sample characteristics.

Design and Procedure. Participants were randomly assigned to one of four experimental conditions in a 2 (metaphor: gardener, coach) × 2 (gender: woman, man) factorial design. The design, stimuli, and measures were identical to those in Study 1, except that we removed the no-metaphor condition and added a professor gender manipulation. Professor gender was indicated by the email signature: "Professor Rachel Brown (she/her/hers)" vs. "Professor Richard Brown (he/him/his)." Participants completed the same DVs and some of the same covariates described in Study 1, along with several new covariates: they indicated whether they had previously taken the university's Introductory Psychology course, which covers the cognitive effects of metaphors, as well as their international student status and class year.

Results

We conducted 2 (metaphor: coach, gardener) × 2 (gender: male, female) ANOVAs for each outcome variable. See Tables 2 and 3 for significant ANOVA and post-hoc comparison results, respectively, and Supplemental Materials for means and standard deviations. We found no significant direct or moderating effects of professor gender on student expectations but replicated many metaphor effects from Study 1.

Expected Professor and Course Attributes. Metaphor condition significantly affected students' expectations about how warm, competent, strict, and caring the professor would be, as well as how challenging and effortful the course would be, and the likelihood of the professor offering extensions and sending course reminders. Metaphor condition did not affect ratings of Professor Brown's effectiveness or availability, how interesting their course would be, or their likelihood of offering feedback.

Post-hoc comparisons revealed that a professor using coach metaphors was expected to be more competent, stricter, less caring, and less warm than one using gardener metaphors (see Figures 5(a) and (b)). Participants also expected that the course would be more challenging and effortful and Brown would be less likely to offer extensions and send course reminders when they used coach metaphors than gardener metaphors.

Expected Student Behavior. Metaphor condition significantly affected the likelihood of discussing non-academic topics with the professor. Metaphor condition did not affect students' expected active participation, or their likelihood of continuing in the course or discussing academic topics with the professor. Post-hoc comparisons revealed that participants reported being less likely to discuss non-academic topics with a professor using coach metaphors than one using gardener metaphors (see Figure 6).

Discussion

Study 2 replicated most of the findings in Study 1. We did not replicate the metaphor effects on likelihood to continue in the course, but there were two novel metaphor-

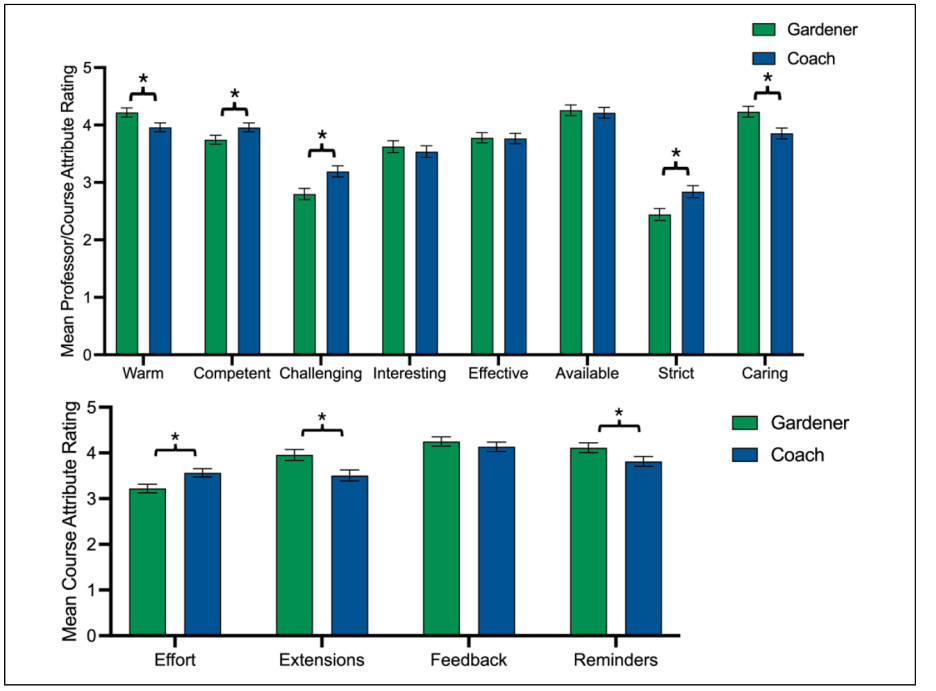

Figure 5(a and b). Mean professor and course attribute ratings across metaphor conditions for Study 2. *$p < .05$. Error bars indicate 95% confidence interval.

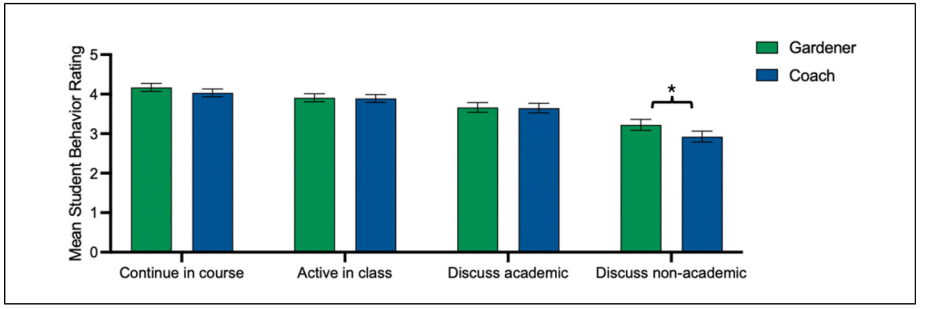

Figure 6. Mean student behavior ratings across metaphor conditions for study 2. *$p < .05$. Error bars indicate 95% confidence interval.

congruent effects: professors using coach metaphors were expected to be more competent and less likely to offer course reminders than those using gardener metaphors. Across both experiments, coach metaphors consistently led students to infer that a professor would be more rigorous and less supportive while one using gardener metaphors

was expected to be more nurturing but less challenging. This pattern held regardless of the professor's gender, which did not affect student expectations or moderate the metaphor effects, suggesting that a metaphor's entailments for teaching and learning may be more impactful for shaping student expectations than a professor's gender. Alternatively, the gender manipulation in Study 2 may have been too subtle, or our participants, drawn from a single selective university, may not be representative of how students in general respond to professor gender. We explored these possibilities in Study 3.

Study 3

In Study 3, we replicated Study 2 using a broader, national sample and a preregistered study design. We also reintroduced the no-metaphor condition from Study 1 as a baseline condition and enhanced the gender manipulation using photographs.

Method

Participants. Using G*Power, we determined a preregistered target sample size of about 600 participants for an 80% chance of detecting an effect size *f* of .13 with an interaction term (Faul et al., 2009). Participants were 605 current or recent U.S. college students, aged 18–30 ($M = 25.11$, $SD = 3.31$), recruited through CloudResearch Connect during Summer 2023 using the same criteria as Study 1. See Table 1 for sample characteristics.

Design and Procedure. Participants were randomly assigned to one of six experimental conditions in a 3 (metaphor: gardener, coach, none) × 2 (gender: woman, man) factorial design. Participants read the same emails as in Study 2. Study 3 differed in that a no-metaphor condition was reintroduced and the gender manipulation was made more salient by including a photograph of either a male or female professor drawn from the 10k US Adult Faces Database (Bainbridge et al., 2013), matched on perceived age, attractiveness, eye and face direction, friendliness, and unusualness (see Figure 7). Following the email, participants completed the same dependent variables as in Studies 1 and 2 and the same covariates as in Study 1. This study design and analyses were preregistered using AsPredicted.org.

Figure 7. Gender manipulation stimuli used in Study 3.

Results and Discussion

We conducted 3 (metaphor: coach, gardener, no metaphor)×2 (gender: male, female) ANOVAs for each outcome variable. The results largely replicated what we observed in Studies 1 and 2. Consistent with Study 2, we found no significant direct or moderating effects of professor gender on any student expectation ($ps > .05$). However, we did replicate the effects of metaphor condition on most of our central DVs. See univariate ANOVA and post-hoc results in Tables 2 and 3, and Supplemental Materials for means and standard deviations.

Expected Professor and Course Attributes. Metaphor condition significantly affected student expectations about how warm, competent, strict, and caring the professor would be, as well as how challenging, interesting, and effortful the course would be and the likelihood of the professor offering extensions. There were no significant effects on ratings of Professor Brown's effectiveness or availability, or their likelihood of offering feedback or course reminders.

Post-hoc comparisons revealed that a professor using coach metaphors was expected to be stricter than both professors using gardener metaphors and no metaphors (see Figures 8(a) and (b)). Participants also expected a course to be more

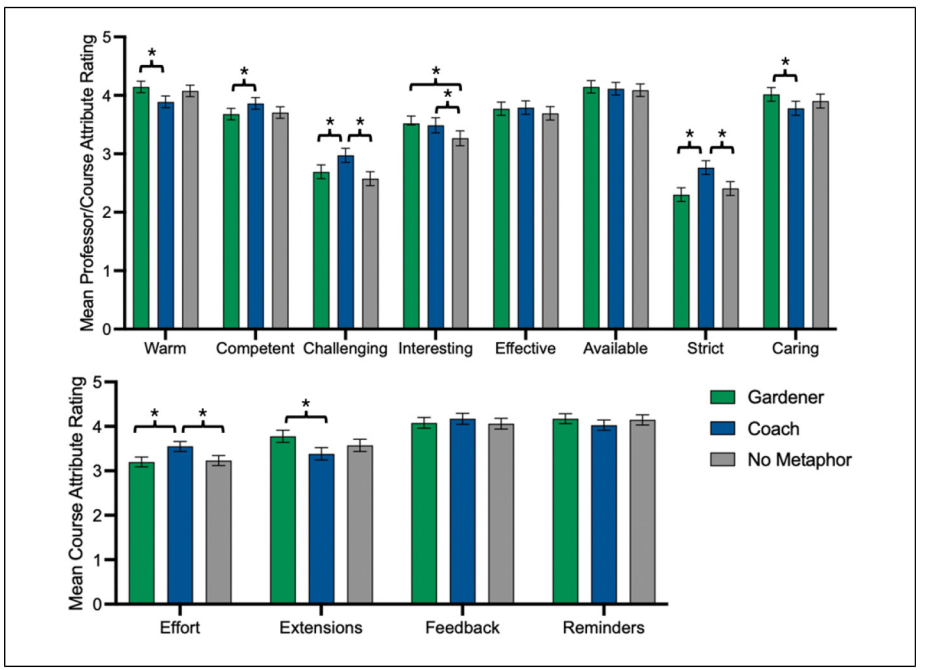

Figure 8(a and b). Mean professor and course attribute ratings across metaphor conditions for Study 3. *$p < .05$. Error bars indicate 95% confidence interval.

challenging and effortful when taught by a professor using coach—compared to gardener and no—metaphors. A professor using coach metaphors was viewed as more competent, less warm, less caring, and less likely to offer extensions than one using gardener metaphors, but not than one using no metaphors ($ps > .05$). Finally, a professor who used no metaphors was perceived as less interesting than one who used either coach or gardener metaphors.

Expected Student Behavior. Metaphor condition significantly affected the likelihood of discussing non-academic topics with the professor and active participation, but did not affect the likelihood of continuing in the course or discussing academic topics with the professor. Post-hoc comparisons revealed that participants expected less active participation in a class taught by a professor using no metaphors than by one using any metaphors (see Figure 9). Participants also indicated being less likely to discuss non-academic topics with a professor using coach metaphors than one using gardener metaphors but not than one using no metaphors.

General Discussion

We found that metaphors consistently shape impression formation in metaphor-congruent ways. Across three studies, two popular teaching metaphors—*coach* and *gardener*—influenced students' expectations about professors, courses, and student behavior. Coach metaphors conveyed more rigorous but less supportive experiences, whereas gardener metaphors suggested warmth but reduced challenge. These findings align with prior work showing that coach metaphors evoke authority figures requiring active students, whereas gardener metaphors suggest nurturing teachers and passive students (Hard et al., 2021; Wong et al., 2022). Our studies demonstrate these associations extend to a more naturalistic communicative context, shaping first impressions that may endure and influence students' educational experiences (Buchert et al., 2008).

Interestingly, students' impressions of professors using gardener metaphors were largely indistinguishable from those using no metaphors. Possibly, students already

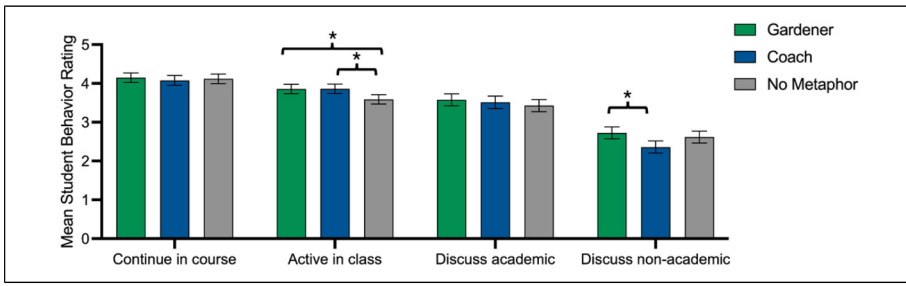

Figure 9. Mean student behavior ratings across metaphor conditions for study 3. *$p < .05$. Error bars indicate 95% confidence interval.

associate professors with warmth and other gardener qualities. Alternatively, sending a welcome email may itself signal a supportive, nurturing teacher. Future studies should examine the effects of metaphor use via other mediums, like syllabi or class introductions, to test these possibilities.

Study 1 also revealed that teaching metaphors influenced perceptions of gender expression: coach metaphors were linked to masculinity, while gardener metaphors evoked androgyny. Additionally, impressions of professors using coach and gardener metaphors aligned with attributes associated with men and women, respectively (Eagly et al., 2020). Given these associations, we manipulated professor gender in Studies 2 and 3 to test whether gender expectations were driving and/or moderating our effects, but this was not the case. Prior work has found that characteristics of the perceiver can more strongly shape impressions than target characteristics (Xie et al., 2019) so future work should explore whether student gender plays a greater role than professor gender in shaping expectations or moderating metaphor effects. Nevertheless, this finding suggests that metaphor use, rather than gender, was more influential in shaping student expectations.

Limitations and Future Directions

These studies provide evidence that teaching metaphors shape student expectations, but several limitations warrant future research. First, the findings may not generalize to real-world classrooms. Our studies explored metaphors' effects on student expectations about hypothetical professors, not real ones. Additionally, these studies examined metaphorical language in a particular context (i.e., introductory emails before the first day of class in the U.S.). While metaphor shaped initial expectations, it is unclear how these expectations evolve as students build rapport with professors, how students' experience with English figurative language affects the strength of these effects, or how these metaphors might resonate differently within cultures with different views on teaching or different languages. Future research should replicate these effects in real classrooms across cultures and explore their durability.

Although professor gender did not moderate metaphor effects, other identities may (e.g., race). We used White faces in Study 3 to mirror the demographics of most U.S. faculty (National Center for Education Statistics, 2024). However, non-White faculty, particularly women, often face harsher judgment by students (Fan et al., 2019; Kreitzer & Sweet-Cushman, 2022; Reid, 2010). Future research should examine whether these identities moderate metaphor effects on student expectations.

Finally, we only examined metaphor effects in the educational domain. We chose this context because student perceptions of professor attributes and beliefs can impact academic outcomes (e.g., Canning et al., 2022; Muenks et al., 2020) and exacerbate extant inequities (Turetsky et al., 2021). However, metaphors may shape person perception in other contexts too. For example, people often describe romantic relationships using metaphors like *a journey of discovery* and *an uncontrollable force* (Baxter, 1992). People may form distinct impressions of potential romantic partners based on which metaphors they endorse. Additionally, people liken managers in the workplace

to *buddies*, *saints*, and *bullies*, with potential implications for how employees view and respond to leadership figures (Alvesson & Spicer, 2011). Future work should examine whether metaphor shapes impression formation in these and other domains.

Implications and Conclusions

We find that common metaphors for the teacher-student relationship evoke distinct, consistent expectations about professors, their courses, and students' roles. These findings can help guide educators in establishing classroom norms and expectations early in the semester and set the stage for future research on the impact of metaphor in other person perception domains.

Consent to Participate

Electronic written informed consent was provided by all participants in this research.

Data Availability Statement

All materials, data, and analysis scripts for this research can be found on the Open Science Framework: https://osf.io/xp5m7/?view_only=da9659c2df4d489bb01c0a2bf3566635

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Considerations

All procedures for this study were approved by the institutional review board of Duke University.

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Supplemental Material

Supplemental material for this article is available online.

References

Alvesson, M., & Spicer, A. (2011). *Metaphors we lead by: Understanding leadership in the real world*. Routledge. https://doi.org/10.4324/9780203840122

Ambady, N., & Rosenthal, R. (1992). Thin slices of expressive behavior as predictors of interpersonal consequences: A meta-analysis. *Psychological Bulletin*, *111*(2), 256–274. https://doi.org/10.1037/0033-2909.111.2.256

Aragón, O. R., Pietri, E. S., & Powell, B. A. (2023). Gender bias in teaching evaluations: The causal role of department gender composition. *Proceedings of the National Academy of Sciences*, *120*(4), e2118466120. https://doi.org/10.1073/pnas.2118466120

Bainbridge, W. A., Isola, P., & Oliva, A. (2013). The intrinsic memorability of face photographs. *Journal of Experimental Psychology: General*, *142*(4), 1323–1334. https://doi.org/10.1037/a0033872

Baxter, L. A. (1992). Root metaphors in accounts of developing romantic relationships. *Journal of Social and Personal Relationships*, *9*(2), 253–275. https://doi.org/10.1177/0265407592092006

Boring, A., Ottoboni, K., & Stark, P. B. (2016). Student evaluations of teaching (mostly) do not measure teaching effectiveness. *ScienceOpen Research*. https://doi.org/10.14293/S2199-1006.1.SOR-EDU.AETBZC.v1

Bowers, J. W., & Osborn, M. M. (1966). Attitudinal effects of selected types of concluding metaphors in persuasive speeches. *Speech Monographs*, *33*, 147–155. https://doi.org/10.1080/03637756609375490

Buchert, S., Laws, E. L., Apperson, J. M., & Bregman, N. J. (2008). First impressions and professor reputation: Influence on student evaluations of instruction. *Social Psychology of Education*, *11*, 397–408. https://doi.org/10.1007/s11218-008-9055-1

Bülthoff, I., Jung, W., Armann, R. G. M., & Wallraven, C. (2021). Predominance of eye and surface information for face race categorization. *Scientific Reports*, *11*(1), 1927. https://doi.org/10.1038/s41598-021-81476-1

Burgers, C., Konijn, E. A., Steen, G. J., & Iepsma, M. A. (2015). Making ads less complex, yet more creative and persuasive: The effects of conventional metaphors and irony in print advertising. *International Journal of Advertising*, *34*(3), 515–532. https://doi.org/10.1080/02650487.2014.996200

Camp, N. P., Voigt, R., Jurafsky, D., & Eberhardt, J. L. (2021). The thin blue waveform: Racial disparities in officer prosody undermine institutional trust in the police. *Journal of Personality and Social Psychology*, *121*(6), 1157–1171. https://doi.org/10.1037/pspa0000270

Canning, E. A., Ozier, E., Williams, H. E., AlRasheed, R., & Murphy, M. C. (2022). Professors who signal a fixed mindset about ability undermine women's performance in STEM. *Social Psychological and Personality Science*, *13*(5), 927–937. https://doi.org/10.1177/19485506211030398

Citron, F. M., & Goldberg, A. E. (2014). Metaphorical sentences are more emotionally engaging than their literal counterparts. *Journal of Cognitive Neuroscience*, *26*(11), 2585–2595. https://doi.org/10.1162/jocn_a_00654

Eagly, A. H., Nater, C., Miller, D. I., Kaufmann, M., & Sczesny, S. (2020). Gender stereotypes have changed: A cross-temporal meta-analysis of U.S. Public opinion polls from 1946 to 2018. *American Psychologist*, *75*(3), 301–315. https://doi.org/10.1037/amp0000494

Fan, Y., Shepherd, L. J., Slavich, E., Waters, D., Stone, M., Abel, R., & Johnston, E. L. (2019). Gender and cultural bias in student evaluations: Why representation matters. *PLoS One*, *14*(2), e0209749. https://doi.org/10.1371/journal.pone.0209749

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

Fiske, S. T. (2018). Stereotype content: Warmth and competence endure. *Current Directions in Psychological Science*, *27*(2), 67–73. https://doi.org/10.1177/0963721417738825

Flusberg, S. J., & Hard, B. M. (2019). Metaphors we teach by: A method for mapping metaphorical lay theories. In A. K. Goel, C. M. Siefert, & C. Freksa (Eds.), *Proceedings of the 41st annual meeting of the cognitive science society* (pp. 316–322). Cognitive Science Society.

Flusberg, S. J., Holmes, K. J., Thibodeau, P. H., Nabi, R. L., & Matlock, T. (2024a). The psychology of framing: How everyday language shapes the way we think, feel, and act. *Psychological Science in the Public Interest*, *25*(3), 105–161. https://doi.org/10.1177/15291006241246966

Flusberg, S. J., Lauria, M., Balko, S., & Thibodeau, P. H. (2020). Effects of communication modality and speaker identity on metaphor framing. *Metaphor and Symbol*, *35*(2), 136–152. https://doi.org/10.1080/10926488.2020.1767336

Flusberg, S. J., Mackey, A., & Semino, E. (2024b). Seatbelts and raincoats, or banks and castles: Investigating the impact of vaccine metaphors. *PLoS ONE*, *19*(1), e0294739. https://doi.org/10.1371/journal.pone.0294739

Flusberg, S. J., Matlock, T., & Thibodeau, P. H. (2018). War metaphors in public discourse. *Metaphor and Symbol*, *33*(1), 1–18. https://doi.org/10.1080/10926488.2018.1407992

Flusberg, S. J., & Thibodeau, P. H. (2023). Why is mother earth on life support? Metaphors in environmental discourse. *TopiCS in Cognitive Science*, *15*(3), 522–545. https://doi.org/10.1111/tops.12651

Gaucher, D., Friesen, J., & Kay, A. C. (2011). Evidence that gendered wording in job advertisements exists and sustains gender inequality. *Journal of Personality and Social Psychology*, *101*(1), 109–128. https://doi.org/10.1037/a0022530

Hansen, K., Rakić, T., & Steffens, M. C. (2017). Competent and warm? How mismatching appearance and accent influence first impressions. *Experimental Psychology*, *64*(1), 27–36. https://doi.org/10.1027/1618-3169/a000348

Hard, B. M., Liang, N., Wong, M., & Flusberg, S. J. (2021). Metaphors we teach by: Uncovering the structure of metaphorical lay theories of teaching. *Metaphor and the Social World*, *11*(1), 46–70. https://doi.org/10.1075/msw.19021.har

Hartman, R., Moss, A. J., Jaffe, S. N., Rosenzweig, C., Robinson, J., & Litman, L. (2023). *Introducing Connect by CloudResearch: Advancing online participant recruitment in the digital age.* PsyArXiv. https://doi.org/10.31234/osf.io/ksgyr

Hassin, R., & Trope, Y. (2000). Facing faces: Studies on the cognitive aspects of physiognomy. *Journal of Personality and Social Psychology*, *78*(5), 837–852. https://doi.org/10.1037/0022-3514.78.5.837

Kreitzer, R. J., & Sweet-Cushman, J. (2022). Evaluating student evaluations of teaching: A review of measurement and equity bias in SETs and recommendations for ethical reform. *Journal of Academic Ethics*, *20*, 73–84. https://doi.org/10.1007/s10805-021-09400-w

MacNell, L., Driscoll, A., & Hunt, A. N. (2015). What's in a name: Exposing gender bias in student ratings of teaching. *Innovative Higher Education*, *40*, 291–303. https://doi.org/10.1007/s10755-014-9313-4

Martínez, M. A., Sauleda, N., & Huber, G. L. (2001). Metaphors as blueprints of thinking about teaching and learning. *Teaching and Teacher Education*, *17*(8), 965–977. https://doi.org/10.1016/S0742-051X(01)00043-9

McCroskey, J. C., & Combs, W. H. (1969). The effects and the use of analogy on attitude change and source credibility. *Journal of Communication*, *19*, 333–339. https://doi.org/10.1111/j.1460-2466.1969.tb00856.x

Mon, S. K., Nencheva, M., Citron, F. M., Lew-Williams, C., & Goldberg, A. E. (2021). Conventional metaphors elicit greater real-time engagement than literal paraphrases or concrete sentences. *Journal of Memory and Language*, *121*, 104285. https://doi.org/10.1016/j.jml.2021.104285

Muenks, K., Canning, E. A., LaCosse, J., Green, D. J., Zirkel, S., Garcia, J. A., & Murphy, M. C. (2020). Does my professor think my ability can change? Students' perceptions of STEM professors' mindset belief predict their psychological vulnerability, engagement, and performance in class. *Journal of Experimental Psychology: General*, *149*(11), 2119–2144. https://doi.org/10.1037/xge0000763

Munby, H., & Russell, T. (1990). Metaphor in the study of teachers' professional knowledge. *Theory Into Practice*, *29*(2), 116–121. https://doi.org/10.1080/00405849009543441

National Center for Education Statistics. (2024). Characteristics of postsecondary faculty. *Condition of Education.* U.S. Department of Education, Institute of Education Sciences. Retrieved May 30, 2024, from https://nces.ed.gov/programs/coe/indicator/csc

Osborn, M. M., & Ehninger, D. (1962). The metaphor in public address. *Speech Monographs*, *29*, 223–234. https://doi.org/10.1080/03637756209375346

Ottati, V. C., & Renstrom, R. A. (2010). Metaphor and persuasive communication: A multifunctional approach. *Social and Personality Psychology Compass*, *4*(9), 783–794. https://doi.org/10.1111/j.1751-9004.2010.00292.x

Patchen, T., & Crawford, T. (2011). From gardeners to tour guides: The epistemological struggle revealed in teacher-generated metaphors of teaching. *Journal of Teacher Education*, *62*(3), 286–298. https://doi.org/10.1177/0022487110396716

Perkins, K. M., Toskos Dils, A., & Flusberg, S. J. (2022). The perceived threat of demographic shifts depend on how you think the economy works. *Group Processes & Intergroup Relations*, *25*(1), 227–246. https://doi.org/10.1177/1368430220951621

Phillips, D. C. (1996). Philosophical perspectives. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 1019–1105). Simon & Schuster Macmillan.

Reid, L. D. (2010). The role of perceived race and gender in the evaluation of college teaching on RateMyProfessors.com. *Journal of Diversity in Higher Education*, *3*(3), 137–152. https://doi.org/10.1037/a0019865

Reinsch, N. L. (1974). Figurative language and source credibility: A preliminary investigation and reconceptualization. *Human Communication Research*, *1*, 75–80. https://doi.org/10.1111/j.1468-2958.1974.tb00255.x

Saban, A. (2006). Functions of metaphor in teaching and teacher education: A review essay. *Teaching Education*, *17*(4), 299–315. https://doi.org/10.1080/10476210601017386

Sopory, P., & Dillard, J. P. (2002). The persuasive effects of metaphor: A meta-analysis. *Human Communication Research*, *28*(3), 382–419. https://doi.org/10.1111/j.1468-2958.2002.tb00813.x

Thibodeau, P. H., Crow, L., & Flusberg, S. J. (2017). The metaphor police: A case study of the role of metaphor in explanation. *Psychonomic Bulletin & Review*, *24*, 1375–1386. https://doi.org/10.3758/s13423-016-1192-5

Thibodeau, P. H., Matlock, T., & Flusberg, S. J. (2019). The role of metaphor in communication and thought. *Language and Linguistics Compass*, *13*(5), 1–18. https://doi.org/10.1111/lnc3.12327

Todorov, A., Baron, S. G., & Oosterhof, N. N. (2008). Evaluating face trustworthiness: A model based approach. *Social Cognitive and Affective Neuroscience*, *3*(2), 119–127. https://doi.org/10.1093/scan-nsn009

Turetsky, K. M., Sinclair, S., Starck, J. G., & Shelton, J. N. (2021). Beyond students: How teacher psychology shapes educational inequity. *Trends in Cognitive Science*, *25*(8), 697–709. https://doi.org/10.1016/j.tics.2021.04.006

Wong, M., Flusberg, S. J., & Hard, B. M. (2022). Uncovering the structure of metaphorical lay theories II: What do different teaching metaphors imply about students? *Metaphor and the Social World*, *12*(2), 292–317. https://doi.org/10.1075/msw.21008.har

Xie, S. Y., Flake, J. K., & Hehman, E. (2019). Perceiver and target characteristics contribute to impression formation differently across race and gender. *Journal of Personality and Social Psychology*, *117*(2), 364–385. https://doi.org/10.1037/pspi0000160

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