"Shouting into a canyon" or "A golden goose Egg": Understanding teachers' emotional experience in distance learning through creative metaphor☆

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ABSTRACT

Distance learning was a unique struggle for teachers, who reported some of the highest levels of stress among any professionals in the U.S. This study investigates teachers' emotional experience and creative development in COVID-19 pandemic distance learning through mixed method analysis of their generated metaphor about distance learning, integrating the circumplex model of affect and conceptual metaphor theory. Results present an overall positive shift in teachers' emotional relationship toward distance learning using complex and creative metaphoric representations. The emotional valence of teachers' metaphors related to metaphor creativity and factors of teacher well-being. Teachers used humor often, mostly when representing unpleasant emotions.

Distance learning during the COVID-19 pandemic was a struggle for students, schools, parents, and teachers alike, and resulted in reduced academic and social-emotional development for students (Cortés-Albornoz et al., 2023). For teachers, the pandemic included both the secondary stress from worrying about their students' (Anderson et al., 2022) and the stress on their personal lives of shifting to an entirely online, at-home format overnight. More than three quarters of surveyed teachers in a 2021 study reported substantial job-related stress—higher than any other profession (Steiner and Woo, 2021). Distance learning was a major disruption to teacher identity, connection to students, and well-being; however, it also provided an opportunity for teachers to break from the constraints of typical classroom instruction and curriculum, which often offers very little room for creativity (Katz-Buonincontro and Anderson, 2020).

This mixed method study illustrates the innovative possibilities within mixed method research and the benefits of integrating qualitative and quantitative data and methods when studying the complex phenomena of creativity and emotions in the life of teachers. Many in the creativity field (Glaveanu et al., 2020) emphasize the importance of further developing a sociocultural approach to studying and understanding creativity. This study contributes to those aims by presenting new opportunities and insights that emerge through the integration of embodied emotional experience and creative metaphor generation to understand the role creative expression and development can play in

coping with challenging circumstances in work and life. During the 2020–2021 school year, the sample of teachers included in this study engaged in an online professional development (PD) experience focused on creativity in education, offering scaffolded exercises for use in their remote classrooms. They engaged in synchronous and asynchronous learning, reflected on their teaching through a variety of modalities, and expressed themselves artistically as they grappled with the challenge of engaging their students in meaningful, creative work through distance learning (Anderson et al., 2022). The program introduced teachers to the use of metaphor as a creative tool for understanding the world and their unique embodied experience of emotions. Teachers learned how metaphors convey the unique meaning each person makes about the world around them and inside them, often through emotional appeal (Lakoff and Johnson, 1980). Teachers generated their own metaphors in a pre- and post-assessment about different topics, including distance learning.

In this study, we investigated what those metaphors reveal about teachers' emotional experience at two different points during the 2020–2021 school year, when they were teaching fully through distance learning while also engaged in the PD experience. We had several aims in this mixed method analysis. First, we aimed to understand if and how the emotional valence and intensity of teachers' metaphors about distance learning shifted across six months of PD during the COVID-19 pandemic using quantitative data analysis. Second, we sought to understand if the positive emotional valence of teachers' metaphor

correlated with the creativity of teachers' metaphor, their creativity anxiety, and their experience of positive and negative affect, including joy and secondary traumatic stress, using quantitative analysis. Third, we aimed to use qualitative analyses to describe more fully the different themes teachers' used to represent distance learning in their metaphors and the different sources of ambiguity that emerged in the emotion-metaphor rating process. This study builds on other mixed method work (Anderson et al., 2023) illustrating how research on the phenomena of metaphoric meaning-making aligns well to the pragmatist approach of mixed method research (Johnson and Onwuegbuzie, 2004).

1. Integrated theoretical framework

It is likely the circumstances of the COVID-19 pandemic may have a lasting effect on the well-being of teachers and development of students (Kang et al., 2020; The Annie E. Casey Foundation, 2024). Even when teachers used thorough self-care strategies, they barely mitigated the stress of distance learning and still struggled to feel connected (Walter and Fox, 2021). However, teachers' creative mindsets, creative self-beliefs, support for creativity from others, and routine creative practices helped them build positive connections, resilience, and joy even while challenged by distance learning (Anderson et al., 2021, 2022). Moreover, other research found that teachers' creative use of metaphor played a role in their creative teaching during the pandemic (Anderson et al., 2023). Though research on teacher creativity, metaphor, and well-being remains limited, Lubart and Getz (1997) proposed that emotions are essential to study to understand how individuals use metaphor for creative representations and problem-solving. To that end, this study creates a novel integration of two complementary theoretical frameworks yet to be combined in research—conceptual metaphor theory (Lakoff and Johnson, 1980) and the circumplex model of affect (Posner et al., 2005; Russell, 1980)—to understand teachers' experience in distance learning.

1.1. Conceptual metaphor theory

Conceptual Metaphor Theory (CMT), developed by Lakoff and Johnson (1980), describes how a conceptual metaphor (e.g., argument represented conceptually as warfare) makes sense of one situation by describing another. An abstract idea, such as an argument, is characterized through familiar ideas about warfare, such as having one's ideas shot down or getting one's points on target. Metaphors are an important way to draw connections between abstract ideas and constructs and communicate meaning through different contexts and modalities (Lakoff and Johnson, 1980). The use of metaphor is often an unconscious process in our regular everyday communication and sense-making (Lakoff, 2014). In this way, metaphor can be an important tool to understand how humans make sense of and manage the challenges they face. For instance, one study sought to understand more fully the diversity of human experiences and perspectives in the COVID-19 pandemic globally based on generated metaphor (Gök and Kara, 2021). Because both metaphors and emotions incorporate embodied, social, cultural, and psychological factors, they are important to study together (Lubart and Getz, 1997).

In new and unforeseen circumstances, metaphor can be a valuable tool to describe the unfamiliar (Stanley et al., 2021). The pandemic created extraordinary changes in day-to-day life, shifting most interactions online (e.g., work, school, social gatherings). Existing vocabulary may not have been adequate to express the unfamiliar nature of these circumstances nor the emotional depth and complexity of the experience. In this way, metaphor can allow people to unlock and express emotions and perspectives that might be difficult to access after traumatic events (Manstead and Fischer, 2000; Stanley et al., 2021). The pandemic was especially traumatic for teachers. They felt the trauma firsthand as adults and at a secondary level by supporting young people (Anderson et al., 2022)—the demographic who were likely the most

adversely affected by the pandemic (Jones et al., 2021; The Annie E. Casey Foundation, 2024). In sum, CMT would suggest that metaphors may be an especially apt and generative analytic tool to understand teachers' experiences and perspectives on distance learning.

1.1.1. Emotional nature of metaphor

To understand the emotional nature of how teachers faced and managed this complex and traumatic experience, analysis of their metaphors can provide important insight by drawing from a person's stream of consciousness (Jensen, 2006) and potentially connecting their personal emotional experience to more universal themes (Gibbs et al., 2002). For instance, the combination of humor and metaphor may offer psychological processing, meaning-making, and emotional coping and expression all at once. *Gallows humor* is a specific form of humor that addresses serious, negative, or dire situations, such as death or divorce, by combining cynicism and levity to lighten an otherwise heavy situation (Chiodo et al., 2020). In some cases, metaphor and humor may originate within the same conceptual mechanisms—for instance, the effort to find humor in death may draw forth unique and light-hearted metaphorical representations (e.g., *to kick the bucket* or *push up daisies*). In this way, it makes sense that teachers might combine metaphor with humor to process the difficulty of the pandemic in a way that may assuage the loss of control and constant uncertainty (Müller, 2015). Indeed, this use of humor may be one of the most advanced and creative approaches to metaphor; it may also make the coding of metaphor by emotion considerably more ambiguous and challenging—a nuance this study will attempt to address.

1.1.2. Creative versus conventional metaphor

Whereas creative metaphor builds new connections between ideas, conventional metaphor relies on familiar representations. For instance, *I am running out of time* or *time keeps slipping away* are conventional and familiar metaphors in American culture that express feeling rushed. More creative metaphors to convey similar meaning could be *time getting sucked down the drain* or *wishing you could put minutes in an ice cube tray to freeze them* (Anderson et al., 2023). These two more novel metaphors could potentially invite a new way of conceptualizing the nature of time. Creative metaphors represent original uses of language and associations between ideas that may be new or remote (Chiappe and Chiappe, 2007). Beaty and Silvia (2013) suggest creative metaphor generation requires executive mechanisms similar to general creative thinking, such as controlling attention while generating ideas (Vartanian, 2009; Zabelina and Robinson, 2010) and switching between semantic categories in memory (Nusbaum and Silvia, 2011). Those executive functions differ from working memory functions and vocabulary knowledge used in conventional metaphors (Chiappe and Chiappe, 2007). Each culture or language group may have their own collection of conventional metaphors (Lakoff and Johnson, 1980), so what is considered conventional or creative will differ. Our research questions attempt to disentangle these issues. For instance, quantitative Research Question 3 will analyze if the negative versus positive emotional valence of teachers' metaphors is related to the judged creativity of those metaphors, and qualitative Research Question 4 will help to understand if themes or strategies, such as humor, are more common alongside negative versus positive emotions in teachers' metaphors.

1.2. Circumplex model of affect

The circumplex model of affect was proposed as an integrative approach to understand emotions through affective neuroscience, cognitive development, and psychopathology (Posner et al., 2005; Russell, 1980). It challenged the theories of basic emotions that suggested every emotion is subserved by a discrete and independent neural system, positing instead that all affective states arise from cognitive interpretation of sensations that resulted from two neurophysiological systems. This dimensional model embraced the ambiguity people feel in

describing the qualities of their emotions and the intercorrelated and overlapping nature of seemingly "discrete" emotions by placing them on a spectrum, much like color, across two dimensions—positive-to-negative valence and low-to-high arousal. This integrative framework proposed the combined cognitive, affective, and physiological interpretation of the experience of an emotion can be mapped on a quadrant based on the level of energy and feeling of pleasantness (Posner et al., 2005).

Bracket (2019) and colleagues at the Yale Center for Emotional Intelligence drew from this circumplex model of affect when developing the *Mood Meter* tool—a visual tool for the practice of identifying emotions. The Mood Meter added color to the quadrants, filled in the quadrants with emotions that match the different levels of the spectrum for valence and arousal, and renamed the dimensions of valence and arousal with the terms pleasantness and energy. For this study, we apply the circumplex model of affect and mood meter tool to code and analyze the emotional qualities of teachers' metaphor about distance learning by placing the primary emotion conveyed by metaphor on a spectrum of pleasantness and energy (Research Questions 1 and 2). Given how CMT emphasizes the role embodiment plays in metaphor generation, the circumplex model of affect presented a strong fit to understand if and to what degree teachers' creativity in metaphor generation relates to the emotional valence of their metaphors and to their embodiment of well-being in their work.

1.3. Research questions

1. What was the frequency of metaphors carrying high-energy and low-energy *unpleasant* emotions and metaphors carrying high-energy and low-energy *pleasant* emotions at Time 1 and Time 2 (Quant)?
2. To what extent did teachers' frequency of metaphor about distance learning with *pleasant* emotions change from Time 1 to Time 2 (Quant)?
3. To what degree did the emotional valence of metaphors correlate with the rated creativity of the metaphors and teachers' general experience of positive and negative affect, joy in teaching, creativity anxiety, tolerance for ambiguity, and secondary traumatic stress in teaching during the COVID-19 pandemic (Quant)?
4. What themes and conceptual categories, including humor, emerged when analyzing the metaphors within each quadrant, and what did those categories reveal about teachers' feelings about and coping with distance learning in the COVID-19 pandemic (Qual)?
5. What were the sources of ambiguity for researchers when coding metaphor for emotion (Qual)?

2. Method

This convergent mixed method study put equal emphasis on the quantitative and qualitative analyses to explore connections and meaning behind teachers' creative metaphor generation about distance learning. Quantitative analyses focused on rating for emotional valence of metaphors, change in valence across time, and correlational relationships across related factors of interest. Qualitative analyses complemented those findings with an in-depth analyses into the themes teachers used in their metaphor, the use of humor, and the sources of ambiguity in understanding metaphor through the lens of discrete emotions. As Fig. 1 illustrates, these analyses and findings were integrated at two different stages, where qualitative findings aimed to expand and exemplify the quantitative results.

2.1. Participants

Participating teachers in this study ($N = 53$) enrolled in a blended arts integration for creative engagement PD experience based on broad dissemination efforts to schools and districts across Oregon and California. The demographics included $n = 2$ teachers identifying as Hispanic and $n = 51$ teachers identifying as white. In the sample, $n = 36$ teachers identified as female, $n = 16$ as male, and $n = 1$ as gender queer. Teachers came from more than 30 schools, every content area, and all levels of K-12. Teachers had an average of 14.25 years of teaching experience. These schools represented mostly rural regions that ranged in size and extent of remoteness and diversity of socioeconomic factors, such as race, ethnicity, and economic privilege.

2.2. Procedures

2.2.1. Recruitment

The recruitment efforts took place during the April–June 2020 period when schools were shut down due to the COVID-19 pandemic. The sample of teachers who selected to participate were likely already interested and invested in creativity and the arts. On one hand the sample was a convenience sample based on who signed up for the PD; on the other hand, it was a purposive sample based on recruitment efforts in socioeconomically marginalized schools. Eligibility to participate in the grant-funded project was based on federal requirements (i.e., at least 20 % of families with school-aged children in the district lived in poverty).

2.2.2. Professional development program

The makeSPACE[1] Foundation Course for Creative Engagement and the virtual Summer Institute provided teachers a research-based understanding of creativity in teaching and learning through reflective, experiential, and arts integrated instruction and application. Teachers learned and applied a variety of teaching techniques to integrate creative and artistic processes into their instruction and curriculum, starting with brief creative routines. Participating teachers consented to participate in all research activities and agreed to complete the online training and attend the Summer Institute to receive payment for their time.

Online Learning Materials. The online makeSPACE Foundation Course included 12 self-directed modules, taking approximately 16 h to complete. Modules included interactive instructional packages with video, narrated slideshows, pop-up interactives, creative exercises, reflective processes, and brief creative assignments. All content was designed, written, and narrated by professional instructional designers with expertise in creativity in education and arts integration. Teachers logged into the online platform and completed the pre-training survey with open-ended and close-ended items prior to starting the course. In the pre- and post-survey, teachers were instructed to generate metaphor in response to eight topics (e.g., *distance learning*). Project partners sent each participant a sketch journal and a small pack of *metaphor cards* to use in the course; each card contained a clip art image of a common object or scene. Teachers were instructed to use those cards to explore ideas from the training through metaphor. Teachers explored new ideas about creativity and reflected on their own personal creative resources (Anderson, 2020) by responding to the question—*How am I creative?*—and creating a metaphoric *creative avatar* collage to upload and share with others.

Teachers engaged in an hour-long module focused on metaphor and implemented metaphor-building routines they learned with students. About halfway through, teachers were prompted to think of a gestural metaphor to express the meaning of different concepts about creativity and posted a video of the gestural metaphor along with a brief written explanation. Exposure to metaphor was extensive, which likely contributed to the increased level of creativity in pre-to post-training metaphors generated found in past research (Anderson et al., 2023).

Virtual Summer Institute. The 2-day virtual Summer Institute was hosted live on Zoom videoconference software and through the learning management system where the Foundation Course was accessed. The sessions included synchronous presentations from facilitators on arts

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[1] Visit https://www.makespaceproject.org/ for more information on the makeSPACE professional development program.
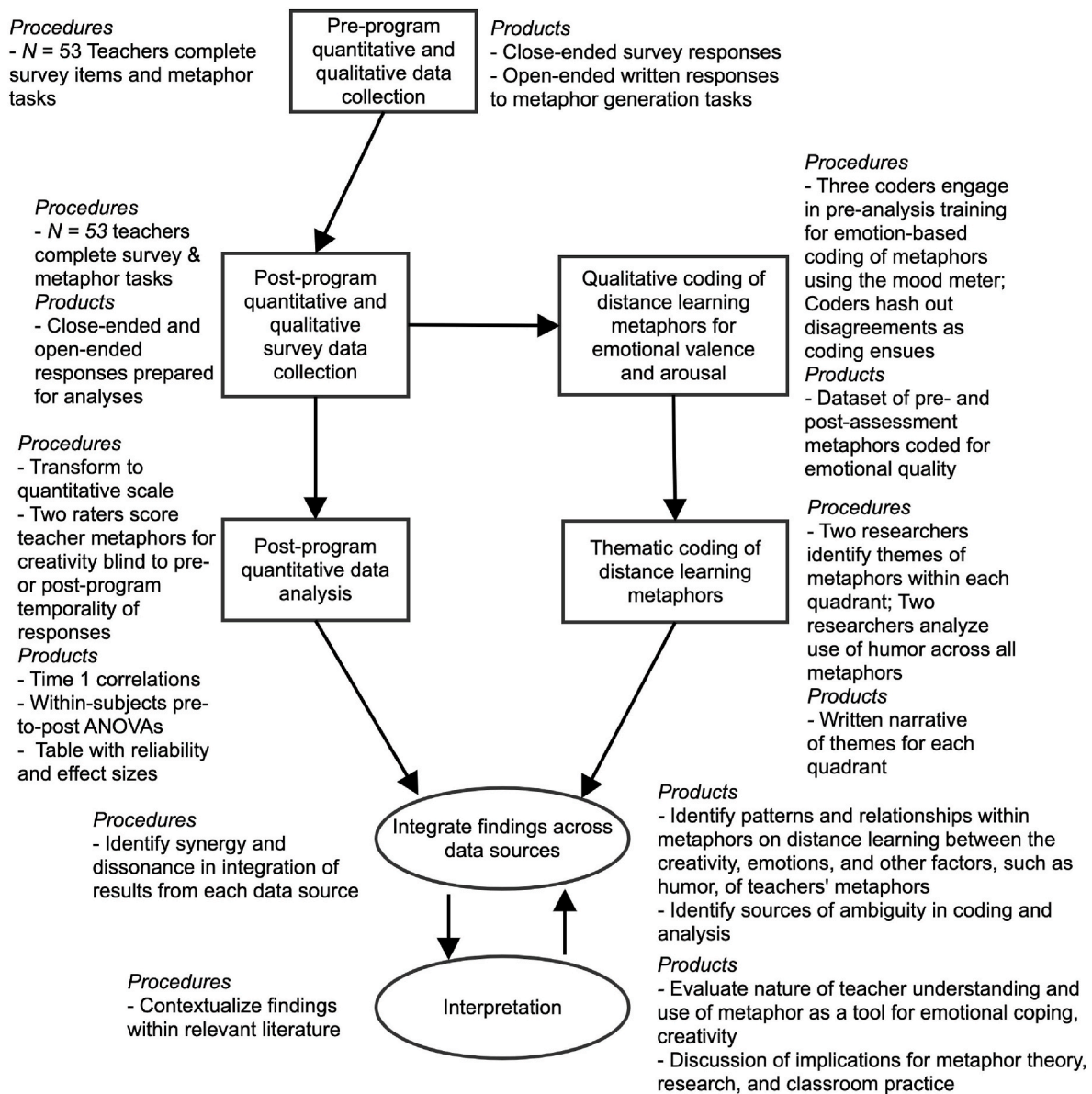
Fig. 1. Mixed method flowchart for study.

integration techniques and pre-recorded presentations that participants watched and reflected on through a discussion forum. All participants had access to those discussion forums and could read and respond to their peers' posts. The synchronous and asynchronous activities were hands-on and integrated different creative routines and arts integration strategies with opportunities to reflect using metaphor.

2.3. Measures and protocol

2.3.1. Metaphor generation skill

In both the pre- and post-program assessment, teachers responded to eight topics in the metaphor generation task. Each topic included a descriptive property to help teachers think about a metaphor that could fit the topic. The property for distance learning was "the consequence of an unforeseen crisis." We used the same assessment approach applied to metaphor research by Beaty and Silvia (2013) and Chiappe and Chiappe (2007). Teachers were encouraged to think beyond that property, to elaborate, and to have fun with it.

Coding metaphors for emotional valence. Three coders used the Mood Meter (Bracket, 2019) as a reference tool for identifying the most

salient metaphors captured by teachers' individual metaphors for distance learning. After coding an initial set of five metaphors, coders met and discussed challenges in coding, such as the subjectivity in interpreting some metaphor. After coding all metaphors from Time 1 and Time 2, we processed each metaphor as a group, documenting disagreements or misalignments. We then transferred the coding to a scoring system in a new data set that rated high-energy unpleasant to equal 1; low-energy unpleasant to equal 2; low-energy pleasant to equal 3; and high-energy pleasant to equal 4. This decision reflected the physiological effect of negative versus positive valence and effect of low versus high arousal of these emotions on individuals. Though different approaches are possible, such as separating out the two dimensions as different sets of scores, we believed our proposed approach was optimal for this exploratory pilot study and would provide a clear and valid path to learn descriptively about teachers' metaphors about distance learning and gauge if and how the emotional quality shifted in both valence and energy across time. We present different types of mixed method data, such as percentages scored in each quadrant and metaphor examples, to illustrate the results. We used scores from all three raters to calculate the intraclass coefficient to understand the reliability of the rating process,

reported in the results. To maintain the conceptual distinction between each quadrant of emotional valence and intensity, we employed a majority rule (rather than a mean rating across the three raters) and selected the quadrant rating that at least two raters agreed on to code each metaphor. If there was disagreement about the energy level of a metaphor, we chose the low-energy quadrant for either unpleasant or pleasant emotions. We believed maintaining this conceptual distinction would be essential for common and consistent interpretation across quantitative and qualitative analyses.

Scoring metaphors for dimensions of creativity. Following the approach from Beaty and Silvia (2013) and Chiappe and Chiappe (2007), two raters scored on five criteria: remoteness, novelty, cleverness, aptness, and creativity. Given the high correlations between these factors ($r > .90$), we only included the *creativity* rating, which was scored based on the subjective perspective of each rater, following the consensual assessment technique (Amabile, 1982; Baer and McKool, 2016). Using a 1–5 point scale (1 = low; 5 = high) for both the pre- and post-program assessment two raters scored metaphors, blind to each other's scoring results, and whether they were rating the pre- or post-assessment. Intraclass coefficients for each metaphor item was at least .71 and the Cronbach's alpha ranged from .69 to .90.

Survey measures of well-being. The Positive and Negative Affect Scale (PANAS; Watson et al., 1988) assessed the general psychological well-being of teachers, with a reliability of α = .84 in a recent study (Anderson et al., 2021).[2] Adjusted prompts fit the teaching context: "*Indicate to what extent you have felt this way generally in your work as a teacher this past year (e.g., interested, distressed, excited, etc).*" We shifted the Secondary Traumatic Stress Scale (STSS) from Bride et al. (2004) to fit the teaching context, asking teachers to reflect on the past term of school; an average score included the subscales of *intrusion, avoidance,* and *arousal.* A sample STSS item was "*It seemed as if I was reliving the trauma(s) experienced by my students.* The STSS items were measured on a 1–5 modified frequency scale where 1 = Never and 5 = Very Often and reached a reliability of α = .94 in a recent study. The Creativity Anxiety Scale contains four items on a 1-to-5 response scale with 1 = Not at all and 5 = Very much (Daker et al., 2019), which reached a reliability of α = .87 in a recent study. Teachers rated how much four different situations would make them feel anxious (sample item: *Having to come up with a unique way of doing something*). Intolerance for ambiguity was assessed with original items modified to the teacher context from Need for Closure scale (Kruglanski et al., 2013) and with two new items (e.g., *I dislike when student's questions or statements could mean many different things;* see Anderson et al., 2021), which reached a reliability of α = .80 in a recent study. We assessed the dispositional state of joy in teaching—retrospective to the 2020 spring term—using the dispositional joy scale with slight adaptations to be directed at teachers (Watkins et al., 2017), which reached a reliability of α = .94 in a recent study. For instance, one sample item was "*Many things about being a teacher bring me delight.*"

2.4. Quantitative analysis

We used within-subjects analysis of variance (Pedhazur and Schmeklin, 1991) to respond to Research Question 1 and bivariate correlation analysis to respond to Research Question 2. Examples of teacher's metaphors that shifted from negative to positive emotional valence are included for illustration purposes. Given the small sample size, we interpreted all findings that met the $p < .10$ threshold for statisticalα significance, and included the within-subject effect size Cohen's *d* and *r* for each statistically significant change detected (Cohen, 1992). We report correlations and statistics in Table 3 and Table 4. As an exploratory study with a small *N,* we chose to interpret findings at the *p*

Table 1

Frequency count for metaphors coded in each quadrant of emotional valence and intensity.

Emotion Quadrants	Time 1 (N = 45)	Time 2 (N = 49)
1 – Low Pleasantness-High Energy	21 (47 %)	18 (37 %)
2 – Low Pleasantness-Low Energy	18 (40 %)	8 (16 %)
3 – High Pleasantness-Low Energy	5 (11 %)	14 (29 %)
4 – High Pleasantness-High Energy	1 (2 %)	9 (18 %)

Table 2

A sample of teacher metaphors about distance learning that changed emotional valence from pre-to post-assessment.

Pre-Assessment Metaphor	Post-Assessment Metaphor
Teacher 1: painting a moldy, cracked wall	Teacher 1: Maybe distance learning is like the swimming and biking I end up doing when I am injured and can't run. I love running the most, and at first (when I have an injury from running too much) I am frustrated and sad. Then I work on my swimming and biking skills, and though I still love running more, I start to enjoy these other activities.
Teacher 2: Poorly planned surprise party	Teacher 2: Raised drawbridge
Teacher 3: A bad marriage	Teacher 3: Home under construction
Teacher 4: Distance learning is like seeing the movie instead of reading the book.	Teacher 4: Spare tire
Teacher 5: Distance learning is a necessary evil like treating cancer with chemo.	Teacher 5: A dessert baked with varying ingredients, skill levels of the baker, temperatures, tools, and preferences of those eating the dessert. outcomes are varied.

$< .10$ alpha level for statistical significance and provide the *r* effect size with a 95 % confidence interval for readers. This choice is in line with recommendations from others who criticize the limitations of a singular focus on statistical significance and rigid adherence to a .05 alpha level (Sullivan and Feinn, 2012). The only missing data issue was the exclusion of eight teacher metaphors at Time 1 and four at Time 2 that could not be coded due to teacher responses that were descriptive about distance learning rather than metaphoric. Those responses were eliminated from the frequency count for Time 1 and Time 2 and for the Time 1 to Time 2 comparative analyses.

2.5. Qualitative analysis

Our qualitative analysis employed a descriptive phenomenological approach to elicit the meaning teachers assigned to the experience of distance learning, using metaphoric representation to conceptualize those meanings (Ersoy, 2016; Gök and Kara, 2021). We followed the metaphor analysis approach suggested by Saban (2008). The first step of coding entries by mood meter emotion quadrant and eliminating entries that were not sufficiently a metaphor had already been completed. As a team, the two authors followed Saban's next two steps of compiling all of the sources used in teachers' metaphors and the different emotions coded (detailed in Tables 5 and 6), and then drew out and described emergent themes within each quadrant in the narrative. We identified several metaphors that exemplified the theme or use of common sources and that represented different levels of pleasantness and energy in each quadrant. To enhance validity, we relied on a common qualitative tool of providing detailed description about the source categories established (Creswell, 2013) and used the Divergent, Open-ended, and Generative (DOG) framework (Anderson et al., 2023) to identify the areas of

Table 3
Bivariate correlations at time 1 between factors of psychological well-being, metaphor creativity, and positive valence of emotion expressed by metaphor on distance learning.

Variables	1	2	3	4	5	6	7	8
1. Metaphor positive emotion	–							
2. Metaphor creativity	−.26*	–						
3. Creative anxiety	−.12	−.07	–					
4. Positive affect	.10	−.12	−.12	–				
5. Negative affect	−.20	.17	.17	−.04	–			
6. Intolerance for ambiguity	−.14	−.12	.24*	−.25*	.17	–		
7. Secondary traumatic stress	−.27*	.18	.22	−.23*	.46**	.39**	–	
8. Dispositional joy	.16	−.25*	−.03	.41**	−.18	.05	−.16	–
Mean	1.69	2.50	2.15	3.75	2.48	2.61	2.51	4.38
Standard deviation	.76	.70	.73	.64	.83	.59	.85	.86

Note. *$p < .10$; **$p < .05$.

Table 4
Bivariate correlations at time 2 between factors of psychological well-being, metaphor creativity, and positive valence of emotion expressed by metaphor on distance learning.

Variables	1	2	3	4	5	6	7	8
1. Metaphor positive emotion	–							
2. Metaphor creativity	−.12	–						
3. Creative anxiety	.16	−.36**	–					
4. Positive affect	.19	−.11	−.18	–				
5. Negative affect	−.28*	.16	.20	−.28**	–			
6. Intolerance for ambiguity	−.11	−.33**	.37**	−.12	.30**			
7. Secondary traumatic stress	−.25*	.21	.17	−.18	.64**	.32**	–	
8. Dispositional joy	.05	−.28**	−.12	.29**	−.03	−.00	−.34**	–
Mean	2.29	2.83	2.23	3.64	2.45	2.56	2.22	4.80
Standard deviation	1.16	2.23	.80	.66	.78	.62	.62	.72

Note. *$p < .10$; **$p < .05$.

ambiguity noted when coding for emotion quadrants and analyzing metaphor sources.[3] We shared detailed descriptions alongside exemplar metaphor in the qualitative narrative using thematic analysis (Creswell, 2013) and organized the sources of metaphor ambiguity. As a group, we identified metaphors that used humor to explore teachers' use of humor in their metaphor.

2.6. Mixed method integration

We used a convergent mixed method research design laid out in Fig. 1 (Creswell and Plano-Clark, 2018) with two main points of integration. First, we coded metaphors into the four quadrants of emotions, which set up both quantitative and qualitative analyses. Next, we explored the emotional and creative qualities of teachers' metaphors about distance learning, change in that emotional valence, and relationships between emotional valence of metaphors and factors of teacher well-being using quantitative analysis. Next, qualitative categorization and thematic analysis of metaphor sources led to the exploration of the variety and breadth of metaphor sources used in each quadrant with attention to how teachers used metaphor for emotional processing and coping. The second point of integration was in the expansion and exemplification of the quantitative results with the qualitative findings illustrated in Fig. 2 and Table 7.

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[3] The DOG Analytic technique prompts researchers to use variance in both quantitative and qualitative analyses, such as coder disagreement, to understand sources of ambiguity, in the coding or assessment of highly subjective constructs, such as creativity and emotion. See Anderson et al., (2023) for a detailed description of this approach.

3. Results

3.1. Quantitative results of pleasantness and energy of metaphors

The intraclass coefficient across all three raters was ICC = .74 at Time 1 and ICC = .85 at Time 2, sufficient for this exploratory analyses. Results indicated metaphors about distance learning were overwhelmingly related to unpleasant emotions that were both high energy (LPHE = 1 [e.g., anger, anxiety, and frustration]) and low energy (LPLE = 2 [e.g., disheartened, drained, and hopeless]) at Time 1 accounting for 86.7 % of all distance learning metaphor (see Table 1). Among the six metaphor that were coded for high pleasantness, five were coded as low energy (HPLE = 3 [e.g., relaxed, content, and grateful]), and one was coded as high energy (HPHE = 4 [e.g., pleased, optimistic, and excited]).

Time 1 to Time 2 represented a period of approximately six months during the 2020–2021 school year when teachers completed the online self-paced PD program, followed by the post-assessment. As can be seen in Table 1, the percentage of metaphors related to unpleasant emotions decreased substantially from 86.7 % to 53.1 % at Time 2. Metaphors representing low-energy pleasant emotions nearly tripled and pleasant, high-energy metaphors increased from one to nine or 2 %–18 % of the sample. Using within-person ANOVA and mean scores from all three raters, pre-to-post comparison with the 43 teachers who produced eligible metaphors for coding at both time points indicated a statistically significant positive change in emotional valence of distance learning metaphor. The mean rating increased from $M = 1.72$ ($SD = .77$) to $M = 2.23$ ($SD = 1.29$) at a medium effect size $d = .52$, $F(1, 42) = 7.30$, $p = .01$. Table 2 provides illustrative examples to show how metaphor for distance learning shifted from low-to-high pleasantness across time for individual teachers. For example, Teacher 3 used "a bad marriage" at Time 1 and "a home under construction" at Time 2 to represent distance learning.

Table 5
Metaphor sources and emotions coded in each quadrant at time 1.

Quadrant	Metaphor Sources	Emotions
Low Pleasantness-High Energy	Car accident swerving to avoid a deer; life-saving tool; step into unknown; asteroid strike; boat in rough waters; fallout; paying taxes; necessary evil like Chemo; talking to monkeys; juggling with too many balls; stock market crash; package you didn't order but can't return; apocalypse; sending toddlers into woods to survive; car accident by driver ignorance; a ship through a storm	Panicked; worried; nervous; stunned; apprehensive; worried; annoyed; troubling; irritated; tense; jittery; angry; nervous; enraged; anxious
Low Pleasantness-Low Energy	Poorly planned party; straw on back of teachers; holding onto things; poor substitute; band-aid in operating room; emotional vampire; seeing the movie instead of reading the book; blind leading the blind; living in a storm cellar; uphill battle; damage control; slavery; bad tattoo after night of drinking; virtually exhausting; pair of broken glasses; across a raging river needing a lifeline; Leonardo DiCaprio in Titanic; not connecting	Disappointed; concerned; disheartened; apathetic; pessimistic; sad; exhausted; hopeless; alienated; tired; spent; despair; glum; exhausting; frustrated; discouraged; hopeless; lonely
High Pleasantness-Low Energy	Monastery; Hallmark movie; The Good Dinosaur; a band-aid and lifeboat; side effect of necessary medication	Serene; comfy; easygoing; grateful; at ease
High Pleasantness-High Energy	Marathon	Focused and energized

Table 6
Metaphor sources and emotions coded in each quadrant at time 2.

Quadrant	Metaphor Sources	Emotions
Low Pleasantness-High Energy	Swerving to avoid animal; deep dark cave; raised drawbridge; global warming; Test without knowing the results for years; People running away; herding cats; a triage unit; dentist pulling teeth in the dark; nightmare after trauma; a series of extreme ups and downs; less-than-good family relationship; chaos; sailing through a storm; Pandora's box; trainwreck you can't stop watching; flaming dumpster bobbing in sea of melting icebergs; falling down a well	Panicked; apprehensive; nervous; anxious; worried; jittery; annoyed; tense; frightened; panicked; shocked; uneasy; tense; worried; troubled; panicked; frightened
Low Pleasantness-Low Energy	Canary in coalmine; making do; blocked punt; kissing your sister; shouting into a canyon; Texas' energy crisis; burned out shell of car; emotional toll from invisible war; daily unforeseen elevator ride	pessimistic apathetic; disheartened; disgusted; lonely; despondent; sullen; exhausted; spent
High Pleasantness-Low Energy	Everyday life; controlled burn; a decent dessert; a lifeline; freeze-dried food; spare tire; best worst-case scenario; a ship at sea; question marks; a lifeboat; taking bus instead of driving; bellyache after Thanksgiving	Thoughtful; content; secure; complacent; grateful; secure; satisfied; easygoing; curious; relaxed; sleepy
High Pleasantness-High Energy	Unexpected letter; golden egg from a goose; home under construction; watching Game of Thrones; teacher as juggler; rollercoaster ride; learning to dance in the rain; community circle; Oregon weather	Excited; hopeful; energized; playful; joyful; happy; lively

3.2. Correlations between emotional valence, creativity, and teacher well-being

We conducted additional exploratory analyses to investigate if the rated creativity of teachers' metaphors about distance learning correlated with the emotional valence of metaphor of distance learning at both Time 1 and Time 2. Correlation results demonstrated a small-to-medium effect size negative correlation between the creativity of teachers' metaphors about distance learning and their positive emotional valence. At Time 1, prior to PD programming, there was a correlation of $r = -.26$, $p = .083$ (95 % C.I.: .52, .04), and at Time 2, the correlation was not statistically significant; only at Time 1 were more pleasant metaphors less creative.

Additionally, positive valence of metaphor emotion correlated negatively with teachers' secondary traumatic stress at $r = -.27$, $p = .075$ at Time 1 (95 % C.I.: $-.52$, .03) and at $r = -.25$, $p = .088$ at Time 2 (95 % C.I.: $-.50$, .04)—both small-to-medium effect sizes. Additionally, metaphor creativity was correlated with teachers' dispositional joy in teaching at $r = -.25$, $p = .074$ at Time 1 (95 % C.I.: $-.49$, .03) and at $r = -.28$, $p = .046$ at Time 2 (95 % C.I.: .51, $-.01$)—both small-to-medium effect sizes. Metaphor creativity was negatively correlated with teachers' creativity anxiety at $r = -.36$, $p = .009$ (95 % C.I.: $-.57$, $-.09$) and intolerance for ambiguity at $r = -.33$, $p = .016$ (95 % C.I.: $-.55$, $-.07$). at Time 2, only—both medium effect sizes. Those results add some convergent validity to emotion-based and creativity ratings. Other correlations between well-being factors, which differed slightly between Time 1 and 2, can be seen in Tables 3 and 4.

3.3. Qualitative data analysis and visualization of the emotional quality of metaphors

In this phase of the study, we categorized the sources teachers used for teachers' metaphors within each mood meter quadrant and used thematic analysis to draw out patterns, identify tools, such as humor, and further map metaphors onto the circumplex model of emotions, using the *mood meter*[4] (see Fig. 2).

3.3.1. Low pleasantness and high energy (LPHE) metaphor

The most unpleasant and highest energy metaphors matched emotions in the upper left quadrant (red) of low pleasantness and high energy depicted in Fig. 2. The examples included in the darkest cell represent the most intense, energetic unpleasant emotions of *panic* and *fear*. A particularly poignant metaphor example—*swerving to avoid a deer and hitting a tree*—represented panic. This source related to others at Time 1 (see Table 5) and Time 2 (see Table 6) in the LPHE quadrant representing something negative, impending, or out of our control, such as chemotherapy or receiving a package you can't return. Those were rated on a spectrum of severity of unpleasant from panicked to annoyed. Other LPHE sources were similarly tragic, risky, or about witnessing something horrible, such as sending toddlers into the woods, a flaming dumpster amongst melting icebergs, pulling teeth in the dark, a

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High Energy — Low Pleasantness		High Pleasantness	
Distance learning is like swerving to avoid a deer on the highway. It seems the right decision at the time but can leave you careening toward a tree. (Panicked) *Sending toddlers into the woods to find food, water, and shelter.* (Frightened)	*distance learning is a lot like global warming - you know something is wrong, can't see it immediately and will eventually come back to hurt us if we don't proactively work to solve it.* (Tense) *Unexpected stock market crash.* (Shocked)	*Distance Learning is a golden egg from a goose: we all wanted and expected a regular egg, but now we have an opportunity to do something wildly different that has the potential to change education for the better (or we can just complain about how we can't eat this egg and pray that things just get back to normal).* (Inspired)	*Like going on a rollercoaster ride.* (Thrilled)
Distance learning is a deep, dark cave. It's scary at first but along the way you are going to see some pretty interesting things. (Apprehensive)	*A raised drawbridge.* (Annoyed) *A bad tattoo after a night of drinking.* (Irritated) *A package you didn't order but can't return.* (Annoyed)	*Home under construction.* (Hopeful) *An unexpected letter.* (Pleasant)	*Learning to dance in the rain.* (playfully) *A teacher is a juggler.* (Focused)
Distance learning is a bad marriage. (Miserable) *Like living in a storm cellar. You have the basics but you cannot live there.* (Alienated) *A bandaid in the operating room.* (Pessimistic)	*Poorly planned surprise party.* (Disappointed) *A poor substitute.* (Sad) *Like seeing the movie instead of reading the book.* (Apathetic)	*DL is like a dessert baked with varying ingredients, skill levels of the baker, temperatures, tools, and preferences of those eating the dessert. Outcomes are varied.* (Satisfied) *Side effect of necessary medication; it is part of the solution, but not always easy to deal with.* (At ease)	*A lifeboat.* (Grateful) *A spare tire.* (Grateful) *Distance learning is taking the bus instead of driving.* (Balanced)
Texas' energy crisis and water shortages. Leaders could have seen it coming and made it less bad, but they didn't so the most vulnerable, neediest people are suffering and some people are making a ton of money off that. (Despondent)	The burned-out shell of a car. (Spent) *Distance learning is a pair of broken glasses.* (disheartened) *An emotional vampire.* (Exhausted)	*Distance learning is the bellyache after thanksgiving gorging.* (Relaxed) *A bandaid for most, but the best solution for others.* (Thoughtful)	*Distance learning is like a community circle.* (Peaceful)

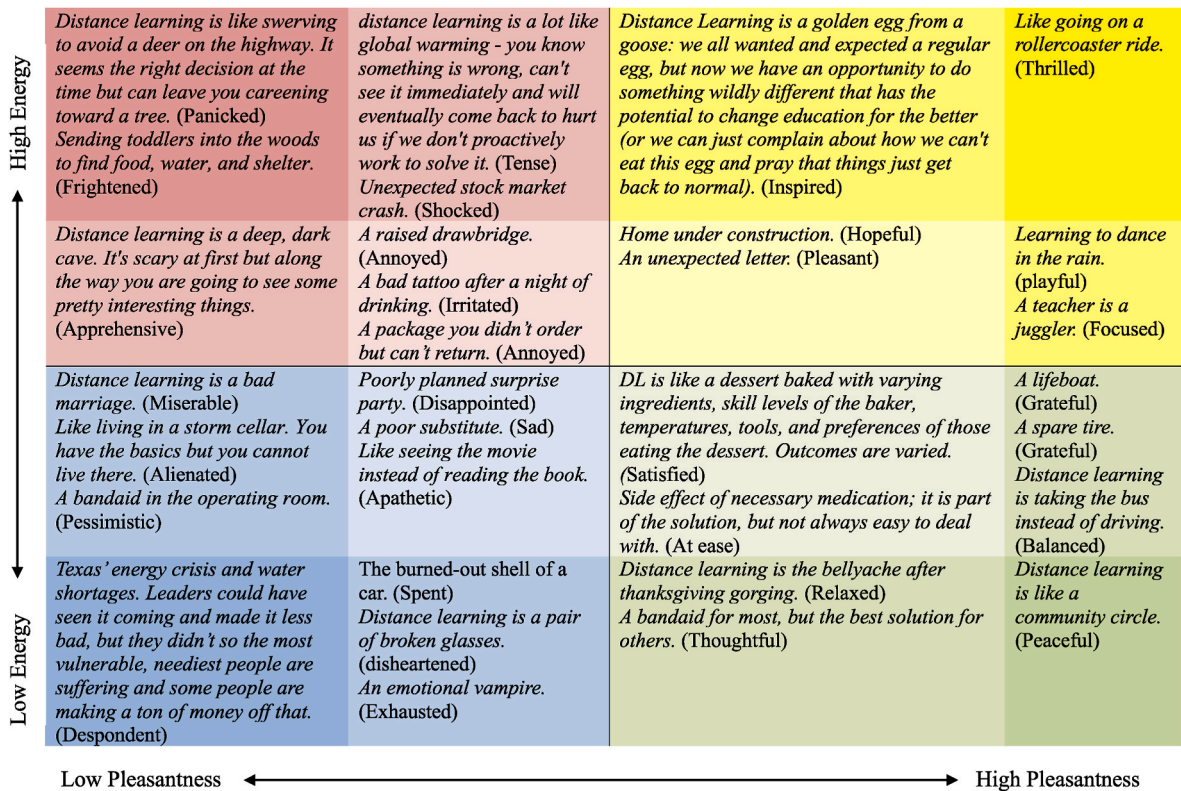Low Pleasantness ← → High Pleasantness

Fig. 2. Exemplification of metaphors in the mood meter schema color-coded by emotion quadrant and intensity. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

trainwreck you can't stop watching, or the stock market crash. The metaphor below from Time 2 was one of the most elaborate and illustrates the complexity and multiplicity of emotions experienced in distance learning. Coders agreed it was also an exemplary use of gallows humor.

> Distance Learning is like going to your favorite concert … and then you realize its actually a Trump rally … but then you realize that you are there to protest … and then you realize that you forgot your sign …. but then you run into your best friend and they have an extra sign …. and then they tell you they have cancer …. but then you remember that you know someone who has an experimental cure …. and then your friend is cured …. but then they take you out to your favorite restaurant to celebrate …. but then you get food poisoning.

According to the quantitative results, the number of metaphors coded to this quadrant decreased from pre-program Time 1 to post-program Time 2.

3.3.2. Low pleasantness and low energy (LPLE) metaphor

The blue lower left quadrant in Fig. 2 represents metaphors that reflected LPLE emotions. The most severe emotions of being despondent, pessimistic, and exhausted included metaphor with sad and miserable imagery of suffering, such as people making money off the suffering of others, the burned-out shell of a car, using a band-aid in the operating room, or slavery. Metaphor sources reflecting exhaustion, loneliness, or being disheartened included a broken pair of glasses, shouting into a canyon, living in a storm cellar, or an emotional vampire. Sources for less severe emotions, such as disappointment and apathy, included seeing the movie instead of reading the book or a poorly planned surprise party. The example below illustrates the complexity of feeling spent by uncertainty and disconnection.

> Distance learning is a raging river. You can see the other side, but you just aren't sure how to get to your students who are on the other side.

You have to try different things to get across to them, but not everything works and sometimes you fall in and feel you are drowning. You hope that a friend is there to throw you a line when that happens.

Metaphors situated in this quadrant decreased substantially from Time 1 to Time 2.

3.3.3. High pleasantness and low energy (HPLE) metaphor

HPLE metaphor sources reflected diverse emotions from feeling at ease to grateful or satisfied. Thematically, some metaphors contained ambiguity in the pleasantness of the metaphor, such as distance learning being a spare tire, a lifeline, a bellyache after thanksgiving, a controlled burn (i.e., wildfire prevention), and freeze-dried food. Coders found they reflected a sense of relief within a difficult experience, summed up in the descriptive response of distance learning being "a best worst-case scenario." Other sources were relaxed, such as taking the bus instead of driving, everyday life, a Hallmark movie, and having a decent dessert. One source conveyed serenity: "Distance learning is a monastery retreat where interested learners discover the time, space, and quiet to be meditative, reflective, and creative without the constant drone of instructors, instructions, and expectations." Metaphors coded in this quadrant increased from Time 1 to 2.

3.3.4. High pleasantness and high energy (HPHE) metaphor

HPHE metaphors were somewhat rare. In fact, at Time 1, the only metaphor coded in this quadrant represented distance learning as a *marathon*. This source was ambiguous to coders because it included the satisfaction of a major challenge as well as the potential for exhaustion. At Time 2, HPHE sources included feeling hopeful, playful, and lively. Some reflected enjoyment, and others reflected working intentionally to find opportunity and hope in the challenge of distance learning (see Fig. 2). Sources included the goose and the golden egg (representing unexpected good fortune), an unexpected letter, a home under

Table 7
Integrated summary of mixed method findings.

Quantitative Findings	Qualitative Findings	Mixed Method Integration
• Decrease from 87 % to 53 % for unpleasant metaphors • Increase from 13 % to 47 % for pleasant metaphors	• Teacher samples in Table 2 illustrate the more hopeful perspectives depicted in Post-training metaphor • The breadth of pleasant emotions conveyed in metaphor at Time 2, such as playful, excited, and happy, broadened	**Expansion:** Teachers created more metaphor at Time 2 that conveyed pleasant emotions, and also broadened the variety of pleasant emotions from five to 17. **Exemplification:** Individual teachers' metaphors transitioned from a tragic and sad nature to more hopeful, such as Teacher 3 in Table 2 ("A bad marriage" to "Home under construction.")
• Unpleasant metaphor were more creative ($r = -.26$) at T1 • Unpleasant metaphors related to higher teacher stress and lower joy at T1 and T2	• High-energy unpleasant emotions depicted panic and fear; example source: a car accident • Low-energy unpleasant metaphors reflected misery and suffering; example source: living in a storm cellar • Low-energy pleasant metaphors often represented relief within difficulty; example source: freeze-dried food • High-energy pleasant metaphors were often hopeful and exciting; example source: Oregon weather	**Explanation:** The nature of fear, panic, misery, and suffering of others in the unpleasant emotional metaphor clarify how teachers used this creative metaphor exercise to express their negative experience. **Expansion:** The three most common themes included water, bodily health, and disaster of all types. **Exemplification:** The sample metaphor in the narrative about a raging river with students on the other side out of reach exemplifies how teachers used unpleasant metaphor to express the secondary traumatic stress they experienced.
• Unpleasant metaphor used humor more often than pleasant metaphor	• Uses of *gallows humor* touched on general and universal experiences (e.g., "paying taxes") and some were rather dark in their emotional quality, such as "a bad tattoo after a night of drinking." • Some humor was self-deprecating. • The rare instances of humor in pleasant metaphor were ambiguous (e.g., "bellyache after a thanksgiving gorging")	**Explanation:** The DOG analysis identified that humor was a source of variance in the emotional coding for researchers, where metaphors that used humor often conveyed a multitude of potential emotional interpretations. **Expansion:** Humor appeared to serve as a coping tool and catalyst for creativity. The source of creativity for some teachers appeared to be in their use of humor to bring levity, and, perhaps, emotional distance from the difficulty of distance learning.

Note. T1 = Time 1; T2 = Time 2.

construction, and learning to dance in the rain. Others reflected the energetic experience of a rollercoaster or Oregon weather (exciting but unpredictable). Another focused on the playfulness of being a juggler, and another reflected the happiness and connectedness of being in a community circle.

3.3.5. Common themes across quadrants

Eleven metaphor used water as the source—particularly moving, cold, rough, and unwelcoming waters. Eight metaphors referenced healthcare or rescue with sources ranging from triage units, operating rooms, band-aids, pulling teeth, lifelines, and other elements reflecting mixed emotions of relief, hopelessness, and suffering. Ten metaphors reflected disaster or crisis, with sources including car accidents, energy

crises, global warming, a storm, a trainwreck, an invisible war, a burned-out car, falling down a well, and melting icebergs.

3.3.6. The dynamic use of gallows humor

Humor most often conveyed emotions in the low pleasantness quadrants. Gallows humor drew from general or universal experiences that were tragic or self-inflicted, such as distance learning being "a poorly planned party", "a bad marriage", or "a bad tattoo after a night of drinking." Others used humor that drew on cultural references, and ranged from having levity, such as distance learning being "the Hallmark channel," to being dark and humorous, such as "distance learning is a band aid in an operating room." Some used humor in a more light-hearted and self-deprecating way, such as the idea that "distance learning is like learning to juggle with two balls, and then someone keeps throwing more balls, all different sizes, at you and expects you to keep going without dropping any." The rare mix of humor with more pleasant emotions also included ambiguity, such as "the bellyache after Thanksgiving gorging" or "distance learning is Oregon weather … In a single day it can hail and rain and just when you feel like all hope is lost the sun comes out and you look up and see a rainbow. It is unpredictable though many people get paid to try." In sum, gallows humor was a common metaphoric tool for teachers when representing less pleasant emotions about distance learning in their metaphor, likely as a means of coping with the challenge and to convey the complex mixture of emotions underlying the experience.

3.4. Divergent, open-ended, and generative (DOG) sources of ambiguity

This DOG analysis sought to identify the sources of ambiguity and divergence for raters in teachers' creative metaphor. Teachers' use of humor was also a primary driver of ambiguity for metaphor coding. High levels of ambiguity resulted in all three researchers selecting a different quadrant for several metaphors. Coders discussed these examples, and, in each case, at least two out of the three coders found agreement on the best-fitting quadrant and emotion label. It became apparent that metaphors with an elaborate narrative or short and undeveloped metaphors contained the most ambiguous emotional resonance. Shorter and less descriptive metaphors were more open-ended and allowed the reader to often diverge on different meanings and generate a variety of interpretations based on their personal experience. In the metaphor, "distance learning is shouting into a canyon," one coder interpreted the act of shouting into a canyon as joyful, another felt loneliness, and the third coder responded with uneasiness. Each coder added missing context to solidify their interpretation. One imagined being lost and shouting for help and another imagined being on a hike and reaching the grand view of a mountain canyon. In this way, metaphors are often generative, can invite elaboration of stories within stories, and can clarify, enhance, and personalize meaning, simultaneously.

Another metaphor that received mixed results was "distance learning is the broomstick that you use to reach out to save the ice-skater who fell through the pond ice." Different focal points for coders resulted in differing emotional resonance. One focused on *reaching out to save the ice skater*, as an energized and exciting (pleasant) experience. Another focused on *falling through the pond ice*, reflecting fear and terror (unpleasant). These results present key issues for researchers to address in analyzing metaphor for emotions, such as determining the focal point and the role that personal experience, worldview, and disposition (e.g., optimism versus pessimism) will play to shape interpretations. Thorough inquiry into these divergences is crucial because one potential value of creative metaphors is their ability to emote different meaning and feeling for different people.

3.5. Mixed method integration

The integration and summary of key results are presented in Table 7

to illustrate the expansion, explanation, and exemplification of quantitative findings through the qualitative analyses and also discussed in the sections below.

4. Mixed method discussion

The discussion below relates findings from mixed method results for each research question to past research and future implications and directions.

4.1. Understanding shifts in teachers' emotional experience through metaphor

More emotionally unpleasant metaphors were consistently correlated with higher secondary traumatic stress at both time points, meaning unpleasant metaphor accurately reflected the stress teachers experienced in the pandemic, which was higher compared to other professionals (Steiner and Woo, 2021). Teachers increased the frequency of pleasant metaphors from Time 1 to 2, even with the same negatively framed property in the prompt—*the consequence of an unforeseen crisis*. The transition from tragic and sad metaphor to more hopeful and playful metaphor across the period of training in creative teaching reflected past research showing teachers' secondary traumatic stress lessened through creative approaches they took to connect with students (Anderson et al., 2022). Relatedly, teachers who felt less joy in teaching generated more creative metaphor at both time points, and, at Time 1, more unpleasant metaphor were also rated as more creative. It seems likely that when teachers used this metaphor exercise to vent and cope, they may have had greater motivation to be generative and creative, suggesting that metaphor making, as a process, may provide emotional release and creative expression, simultaneously, as others have noted (Lubart and Getz, 1997).

Past research (Anderson et al., 2023) with this sample found that the mean creativity of teachers' metaphors increased from Time 1 to Time 2, when averaging all eight metaphor items. The change in mean rating for distance learning metaphor creativity reflects that general trend. To this end, the fact that both intolerance for ambiguity and creativity anxiety were both negatively correlated with the creativity of teachers' distance learning metaphor at Time 2, only, suggests that as teachers developed their creative resources in the PD program, these two interrelated affective factors related to teachers' creative attitudes, self-beliefs and thinking (Anderson et al., 2022) became more pronounced in their role on teachers' creative generation of metaphor for distance learning. There was no correlation between those two factors and the emotional valence of metaphors, indicating their connections to metaphor creativity did not depend on the pleasantness or unpleasantness of the metaphors generated. This finding is important because these affective components were specific to uncertainty in creativity, which was different for teachers than the uncertainty presented by distance learning. Qualitative analyses and results in Tables 5 and 6 convey the tragic, scary, and miserable nature of the uncertainty presented by distance learning. The transition to a more pleasant affect toward distance learning at Time 2 did not relate to a shift in teachers' creativity-focused anxiety and tolerance for ambiguity. In this way, it is important to note that different types of ambiguity and uncertainty play different roles on teachers' emotional resilience and creative engagement.

4.2. Themes of teachers' distance learning metaphor

As expected from a CMT perspective (Lakoff and Johnson, 1980), teachers drew on culturally rooted ideas about unpredictable disruptions in their metaphors, such as health-related trauma, survival situations, and catastrophic events. Since metaphorical thinking is likely one of the most sophisticated and relevant creative thinking skills (Beaty and Silvia, 2013), it is not surprising that creative metaphors about distance learning often broke from those common themes to produce more novel and remote associations, such as distance learning as a monastery, a golden egg from a goose, or painting over a moldy, cracked wall. When teachers relied on conventional or generic metaphors, they often expressed cultural biases. One teachers' metaphor for distance learning—*the blind leading the blind*—reflects a common idiom people use to describe a situation where someone lacking knowledge or skills tries (unsuccessfully) to guide others. In this case, the teacher used an idiom that relies on an ableist bias against people with blindness. Five other metaphors were about being lost at sea or on a ship in a storm with even more referencing water, more generally, reflecting the mystery and threat the ocean and flowing rivers presents to many. Additionally, all aspects of our health—physical, emotional, intellectual, and spiritual—are interconnected, so metaphors referencing health revealed teacher's feelings of responsibility around their student's well-being and their own, reinforced in the correlation between well-being factors and pleasantness of metaphor. CMT poses the question for future research on which themes may be culturally specific and which, such as the body and water, may be more universal to humanity (Lakoff and Johnson, 1980).

4.3. Humor as a source of metaphoric creativity and coping

Gallows humor may explain, in part, why teachers were more capable or motivated to generate creative metaphors that were emotionally unpleasant (Chiodo et al., 2020), because humor can integrate both cynicism and levity to relieve the heaviness of circumstances. Some metaphors were both dark and entertaining. For instance, the metaphor that "distance Learning is the bad tattoo after a night of drinking" speaks to a common theme of finding yourself in a commitment, with little control and agency, and without knowing exactly how you found yourself there. It evokes regret that is both sober and light-hearted and reflects both shame and self-deprecation, leaving the reader to wonder why they got that bad tattoo and what kind of tattoo they received. Other elements of humor were both disturbingly graphic and deeply absurd. For instance, "distance learning is a dentist pulling teeth from multiple people in the dark, hoping that the right thing happens at the right time." This metaphor reflected the uncomfortable truths about the grand experiment of distance learning on healthy development of children, and the unprecedented demands of emotional labor on teachers. By Time 2, humor was used with more levity, such as distance learning being "freeze dried food," drawing on the disappointment of eating food that has very little substance but at least tastes somewhat real.

The emotional labor of surface acting and reassuring students while feeling sad and despondent themselves was a heavy load for teachers to carry across the pandemic (Auger and Formentin, 2021). This kind of emotional labor that many teachers do regularly in a school setting correlates with adaptive styles of humor, such as affiliative and self-enhancing humor (Liao et al., 2020). Teachers' use of gallows humor, such as the examples above, illustrate this connection well, where the teacher is using humor in the metaphor to open up and connect through the vulnerability and humility of distance learning. Gallows humor was a creative, emotionally evocative, and motivating metaphoric tool for teachers to express the emotional labor demanded of them, cope with the challenge, and relate the vulnerability of the experience with levity. As maybe the first study to explore humor in metaphor as a coping strategy for teachers, this study provides replicable methods for others. Future research is needed to explore how metaphor can reveal further how teachers think about, manage, and use creativity and humor to cope in the ever-changing and ever-challenging conditions of their work.

4.4. Lessons from analyzing metaphor for emotion

The circumplex model of affect operationalized in the *Mood Meter* tool proved to be a relevant, practical, and insightful conceptual

framework for understanding the emotional nature of generated metaphors in the education context (Bracket, 2019; Posner et al., 2005; Russell, 1980). Our analysis suggests that three (or more) coders will be better than two to draw out a variety of different interpretations about the possible meanings of generated metaphors, included cultural biases, following the DOG analytic approach (Anderson et al., 2023). Results from this current study illustrate the importance of studying ambiguity in the effort to code metaphor for emotion, which, similarly to creativity, has both personal and cultural roots for individuals. Cultural differences across the three raters also dictated interpretative differences. Positionality of raters differed on gender (two female, one male), education level (one PhD, two B.A.s), ethnicity (one Hispanic, two white), and age (two above 40, and one below 25). That diversity provided some reassurance that cultural nuances of metaphors were recognized. Matching the cultural diversity of raters to the cultures of the sample may be an important step toward validity of ratings.

Many possibilities for the classroom exist. For instance, teachers could analyze the emotional valence, creativity, accuracy, and elaboration of students' metaphors about abstract concepts they are learning in science, such as elements on the periodic chart. This process could gauge students' emotional investment with the periodic elements they are learning about, while also giving them an opportunity for sensemaking where a teacher can identify misconceptions through students' novel associations. This direction could be an interdisciplinary inquiry into the spectrum of human emotions and their meaning in relation to the unique characteristics of different periodic elements (Amin et al., 2015; Anderson et al., 2022). Metaphors, in both linguistic and enacted, gestural forms, provide a promising pathway to bring non-human and abstract ideas to life for students and support greater understanding and retention (Gallagher and Lindgren, 2015).

4.5. Limitations

The researchers were not classroom teachers during the pandemic, so our coding and analyses lack that closeness with the teacher experience. Raters positionality reflected similar cultural backgrounds and gender profile to the teacher sample, but none of the raters lived in rural Oregon or California, presenting a limitation. At the time of the analysis, member checking was not possible due to the program ending and the loss of contact with most teachers. Other data sources about the teachers' experience were available in the PD course; however, we sought to understand how teachers' experience shifted from the beginning of the program to six months later, so we isolated our focus to those two time points. As an exploratory mixed method study, we also felt that the scope and length could become unwieldy with more data and that future studies with additional data might arise from this initial inquiry. The homogeneity of the sample, on one hand, limits generalizability beyond similar characteristics, such as rurality; however, this homogeneity also allowed the analysis and representation of the many different emotions experienced and creative and diverse metaphors generated even within a mostly homogenous sample.

5. Conclusion

This mixed method study illustrates how metaphor can reveal different types of psychological processing for teachers during stressful experiences and offer opportunities for emotional coping and creative expression. Teachers shifted toward more emotionally pleasant metaphors after engaging with the creative training and acclimating to the reality of distance learning. Making metaphors seemed to unlock the unpleasant emotions that might otherwise remain neglected for teachers, providing a pathway to expression and coping through novel and, often, humorous associations. That use of humor may be affiliative and cathartic, where using metaphor to process experiences may support teachers' capacity find agency when they feel a loss of control. This exploratory study paves the road for future research on the potential role of metaphor generation in helping educators confront, cope with, and creatively approach challenges, from day-to-day struggles to unforeseen crises.

CRediT authorship contribution statement

Ross C. Anderson: Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Mari Livie:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

The authors have no competing interests.

Data availability

The data that has been used is confidential.

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