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How teachers perceive factors that influence creativity development: Applying a Social Cognitive Theory perspective

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HIGHLIGHTS

- Teachers view personal and behavioral factors as contributors to successful creativity.
- Teachers describe environmental factors as only hindrances to creativity.
- Teachers do not believe creativity is reserved for the eminent.
- Pre-service teachers believe their environments will support them, unlike in-service teachers.

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ABSTRACT

This mixed methods study examined teachers' perceptions of creativity using Social Cognitive Theory factors (e.g., personal, behavioral, and environmental). When describing hindrances to creativity, teachers often discussed macro-environmental factors, yet when explaining or defining creativity, teachers often used personal and behavioral characteristics. Teachers did not seem to hold limited views on who can be creative or that creativity always results in products; however, some teachers' conceptions were too vague to guide the explicit facilitating of creativity. Compared to in-service teachers, pre-service teachers expressed more optimism in their future environmental support and lower self-efficacy for developing creative thinking.

Developing creativity is mutually beneficial for individuals and societies. Fostering students' creativity has the potential to promote healthy psychological functioning (e.g., Rasulzada & Dackert, 2009), learning and long-term knowledge retention (e.g., Elaldi & Batdi, 2016; Gajda, Karwowski, & Beghetto, 2017), and student intrinsic motivation and creative self-efficacy (Beghetto, 2006). National educational systems oscillate from promoting to deemphasizing teachers' efforts to develop creativity, despite a consistent, practical need to prepare students for an ever-changing professional landscape (Craft, 2003b; Hall, 2010; Regnier, 2016; Sternberg, 2015; Wyse & Ferrari, 2015). For example, over 1500 CEOs identified creativity as the top leadership competency for future success (IBM, 2010). Despite the importance, students are not demonstrating creative growth from previous generations, as opposed to the growth they demonstrate on intelligence tests (Kim, 2011). Moreover, teachers are uniquely poised to provide instruction to facilitate that development, but many factors may impede teachers' capacity to develop students' creativity. Using Social Cognitive Theory (SCT) as a theoretical anchor, we explored teachers' perceptions of personal characteristics, behaviors, and environmental factors that may facilitate or inhibit the promotion of creativity in the classroom.

1. Theoretical framework

Members of the creativity field have proposed and adapted

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many definitions for creativity, yet almost universally, researchers agree that creativity includes both “originality and effectiveness” (Runco & Jaegaer, 2012, p. 92). This, however, does not seem to encompass the full construct. Corazza (2016) argued this definition narrowly represents creativity as a static creative achievement, failing to recognize its dynamic nature as an iterative process. Specifically, Corazza suggested that creativity is the “dynamic interplay between inconclusiveness and achievement” (p. 265). As creators work, creativity is not just exhibited in the final unique and useful product, but it also is seen throughout the process.

Corazza was not the first to suggest that originality and effectiveness did not fully encompass creativity. Plucker, Beghetto, and Dow (2004) exposed the field's definitional issues when they reviewed 90 articles and found that only 38% of them provided explicit definitions. Further, those definitions varied wildly; while most included novelty and usefulness, they also included many other concepts. After this synthesis, Plucker and colleagues proposed the following definition to represent and unify multiple perspectives represented in the literature: creativity is “the interaction among aptitude, process, and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context” (p. 90). This definition includes Corazza's more recent request as it indicates a dynamic interaction with the process. Further, the definition encompasses research that examines creativity more as a creative personal attribute (e.g., James & Asmus, 2001) or as specific types of product (e.g., Haught-Tromp, 2017). While scholars may never reach perfect consensus, Plucker's definition encompasses many individuals' ideas, representing the complexity of the construct. Further, this definition seems to be gaining momentum in the field (Batey, 2012; Plucker, Kaufman, & Beghetto, 2015). For these reasons, we selected this definition to anchor our own work, acknowledging, however, the varied perspectives that may be represented in other conceptions.

Interestingly, while the creativity field developed independently of general educational psychology, both fields have arrived at similar points. Specifically, Plucker et al. 's (2004) creativity definition closely aligns with Social Cognitive Theory (SCT), a learning theory that emphasizes the reciprocal relationship and interaction among personal characteristics, behaviors, and environment (Bandura, 1986) while also recognizing the agentic, active role of individuals (Bandura, 2001). When applying this framework to consider teachers' perceptions, the personal characteristics include teachers' perceptions of their own preferences, beliefs, and motivational factors as well as their students. This personal characteristic factor of SCT most closely represents Plucker et al. (2004) “aptitudes”. Second, behaviors include teachers' demonstrations of the creative process (e.g., modeling) resulting in creative products (physical products or ideas). Further, the environment consists of teachers' perceptions of level of support, constraints, and/or requirements embedded within a social context at both micro- and macro-levels.

Bronfenbrenner's Ecological Systems Theory (1979) acknowledged how the child was embedded within multiple systems, and each system played a unique role on the child's development. In this paper, we recognize that teachers' and students' environments includes multiple layers, specifically (a) the microsystem, which is the most immediate environment, the classroom, and (b) the macrosystem, which includes all factors outside the classroom, including social/cultural values and political/economic systems. Interacting with these microsystem and macrosystem factors is the teachers' sense of agency. This agency refers to the teachers' ability to intentionally produce outcomes based on the actions or behaviors they engage in within these environmental systems (Bandura, 2001).

In general, the reciprocal interaction among personal, behavioral, and environmental factors facilitates learning and creativity. Thus, considering how teachers perceive these factors may be particularly important. Further, the roles and responsibilities of teachers in the classroom demonstrate the importance of teachers' sense of agency in acting intentionally and directly to influence student creativity in the classroom. Few creativity studies have examined these SCT components. One exception is Edwards-Schachter et al. (2015) work examining engineering students' perceptions; however, to the authors' knowledge, no studies have examined teachers' perceptions through the SCT framework.

In general, using SCT to explore creativity is beneficial for a number of reasons. As recognition of creativity's value continues to grow, it becomes increasingly important to consider how people learn to become creative within educational environments. Many creativity-specific theories/models exist to explain the creative process in stages (see Sawyer, 2012 for a review), and several new models have been proposed to situate creativity in the learning process (Beghetto, 2016a; Ma & Van Oystaeyen, 2016); however, situating creativity within the existing, broader educational psychology field encourages the mindset that creativity can be learned, that it is not dependent on muses, and that anyone can improve. This SCT framework addresses longstanding misconceptions that persist within the creativity field: creativity is reserved for the eminent, creativity cannot be taught, and ideas simply emerge (e.g., Aljughaiman & Mowrer-Reynolds, 2005; Mullet, Willerson, Lamb, & Kettler, 2016; Plucker et al., 2004; Sawyer, 2012). These misconceptions are directly contrasted by the agentic perspective of SCT, such that SCT proposes an intentional, active role of individuals in producing outcomes (Bandura, 2001). Using a SCT framework, therefore, also highlights the role of teachers' in intentionally producing creative processes and outcomes in the educational environment and modeling that those processes for their students. Beyond promoting the concept that creativity can be learned, this framework illustrates how broader research done using an SCT framework may inspire future explorations in the creativity field. This could lead to new assessment methods, new coding schemes for qualitative work, and new experimental designs.

2. Using SCT factors to organize existing creativity studies

Below, we organize existing creativity research into the SCT framework to illustrate how robust this framework is and to demonstrate how existing work on teachers' perceptions fit within components of this framework. Each of the major SCT components will be explored separately in conjunction with the related, exiting creativity work with the understanding that all three components interact and overlap. Within each section, we also highlight specific concerns related to teachers' perceptions that we considered while analyzing our current data set.

2.1. Personal characteristics

Personal characteristics include a variety of aspects such as one's aptitudes, skills, attitudes, and beliefs (Bandura, 1986). Within the creativity field, several teachers' personal factors have received considerable attention, in particular their beliefs and attitudes regarding creativity (e.g., implicit conceptions of creativity, perceptions of students, and self-efficacy).

2.1.1. Implicit conceptions

Many researchers have expressed concerns that if teachers misperceive creativity, they may be ineffective at promoting it or worse, unknowingly suppress it (e.g., Mullet et al., 2016). Two more recent literature reviews demonstrated that researchers and

teachers often operate under different conceptualizations of creativity (Andiliou & Murphy, 2010; Mullet et al., 2016). Specifically, differences between teachers' and researchers' conceptions emerge among beliefs about (a) teachers' overarching perceptions of the nature of creativity (b) student characteristics and (c) the degree to which creativity can be developed.

Overarching perceptions of creativity. Theorists have expressed concerns that teachers believe creativity is reserved for the eminent, while many researchers have promoted the importance of personal creativity in general and within the classroom (e.g., Craft, 2003a, 2003b; Sternberg, 1985). Building on Craft and Sternberg's seminal works describing the ranges within expressed creativity, Kaufman and Beghetto (2009) proposed the Four-C Model, which conceptualizes creativity on a continuum, including mini-c (micro changes or personal developments in thinking), little-c (everyday innovation), pro-c (professional creative contributions), and Big-C (eminent creators and creations). Despite this conception within the research literature, Beghetto (2010) voiced concerns that teachers may only recognize Big-C creativity.

Additional concerns exist, such as teachers may view creativity as merely a physical product and do not recognize the process involved with creativity (Beghetto, 2010; Runco, 2007). Further, teachers may recognize creativity within products in only certain domains, such as the arts and creative writing fields (Skiba, Tan, Sternberg, & Grigorenko, 2010). These implicit conceptions may influence classroom teachers' ability and desire to facilitate creativity as a process that can be used in a variety of fields to solve different types of problems.

Student characteristics. Beyond those general conceptions, several studies have examined teachers' perceptions of creative students, finding that teachers often conflate creativity with good behavior and/or intelligence (Chan & Chan, 1999; Gralewski & Karwowski, 2013; Westby & Dawson, 1995), and they may not recognize or appreciate original answers within classroom discussions (Beghetto, 2007; 2009).

Developing creativity. Research has yielded mixed findings regarding teachers' beliefs about students' abilities to develop creativity. While some studies demonstrated that most teachers believe all students can develop their creativity (Odena& Welch, 2009; Rubenstein, McCoach, & Siegle, 2013; Turner, 2013), others believed creativity can only be partially developed (Myhill & Wilson, 2013; Vedenpää & Lonka, 2014; Zbainos & Anastasopoulou, 2012), and still other studies indicated that prior to intervention, teachers believe creativity is a fixed characteristic that cannot be developed (Levenson, 2015; Park, Lee, Oliver, & Crammond, 2006).

More recent work has considered this within the context of teachers' creative mindsets (Hass, Katz-Buonincontro, & Reiter-Palmon, 2016; Karwowski, 2014; Paek & Sumners, 2017), inspired by Dweck's (2007) fixed and growth mindsets constructs. Karwowski (2014) developed a specific scale to study fixed and malleable creative mindsets, addressing whether teachers thought creativity was a stable or adaptable construct. Interestingly, the fixed and growth subscales were only moderately negatively correlated, suggesting that both mindsets may exist within the same individual. This may explain some of the general inconsistencies of earlier work, and further inconsistencies may be due to varied measurement methodologies (e.g., quantitative instruments, qualitative interviews) or sample characteristics. Because of this great variation, it remains important to study nuances within teachers' implicit conceptions addressing the malleability of creativity. Beyond students' potential to develop creativity, it is also important to understand if teachers feel like they represent an integral component within that process as would be supported in viewing teachers as agents within a SCT framework. Specifically, Aljughaiman and Mowrer-Reynolds (2005) found that teachers did not believe that it was their responsibility to facilitate creative growth. This finding is also worth further exploration.

2.1.2. Self-efficacy

Along with believing that facilitating creative growth is worthwhile, teachers must also believe that they can do it (Rubenstein et al., 2013). Creative self-efficacy encompasses both teachers' beliefs about their ability to be creative and to facilitate creativity. Self-efficacy is a motivational belief and a key aspect of SCT because people may avoid tasks, fail to persist, or select ineffective strategies if they do not believe that they can be successful on a task (Schunk, Pintrich, & Meece, 2008). Further, self-efficacy is associated with agency in the SCT literature, such that self-efficacy is a determinant of whether an individual perceives a sense of control or ability to influence personal behaviors and surrounding environments (Bandura, 2001). In this context, self-efficacy may be associated with the sense of agency or intentional control that teachers feel over the behaviors they can enact within the classroom, their role in structuring the classroom or school environment, or their direct role in facilitating creativity in students within that environment. Within the creativity literature, self-efficacy has been shown to be important (e.g., Eason, Giannangelo, & Franceschini, 2009; Karwowski, 2011; Lemons, 2010; Tierney & Farmer, 2011). Moreover, Aljughaiman and Mowrer-Reynolds (2005) found within their sample of 36 teachers, most of them believed they fostered creativity, and Paek and Sumners (2017) argued self-efficacy was important enough to use as an outcome variable. Few other studies, however, have examined teachers' creative self-efficacy across both professional and personal settings, however, this is an important endeavor given the contextual nature of self-efficacy.

2.2. Creative behaviors

Teachers support creative development by modeling their own creativity, providing opportunities for creative expression, and conveying social cues about the acceptance and importance of creativity in their classrooms. Teachers' behaviors have received much less attention in the literature than their personal characteristics. Some work has demonstrated, however, that teachers may hold inaccurate beliefs about pedagogical behaviors that facilitate creativity. Lee and Seo (2006) indicated that experienced teachers believed that all pedagogical practices and learning activities promote creative thinking, including rote memorization and teacher-centered activities. This is concerning because experienced teachers may believe that they are developing students' creativity on a daily basis, when they are in fact neglecting it. This relates to a new misconception that college students expressed that, “creativity is everywhere, in everything” (Lemons, 2010). This dilution may prevent deliberate creativity development.

Much of the modeling research examines the effect that sample products have on student creation (i.e., the outcome of teachers giving concrete products as samples before students have the opportunity to develop their own work; Shalley & Perry-Smith, 2001; Yi, Plucker, & Guo, 2015). This research found that providing samples might differentially affect multiple components of creativity (e.g., fluency, flexibility, originality, and usefulness), but little research examines the outcomes of modeling process skills or modeling creativity within teachers' planning or personal lives. Intervention studies suggest that explicitly modeling and teaching of the creative process may be a promising area to inspire creativity development (Ma, 2006; Scott, Leritz, & Mumford, 2004), but that has not been examined within teachers' practices in their natural

environment.

2.3. Environment

SCT also places a strong emphasis on the importance of the environment, and similarly, the current creativity literature also demonstrates that creativity exists within micro- and macro-social contexts. Teachers are embedded within a macro-environment, including administration agendas, governmental policies, and assessment procedures, and further, they also operate within the micro-environment of their individual classrooms. Each of these contexts includes factors that may promote or inhibit teachers' perceptions of their abilities to facilitate creativity, including specific, collective support systems and environmental distractions or restrictions.

Regarding the macro-environment, many researchers and teachers expressed concerns over promoting creativity within an environment designed for standardization (e.g., Beghetto & Plucker, 2006; Dobbins, 2009; Kampylis, Berki, & Saariluoma, 2009). When school districts are driven by fear of student underperformance on standardized assessments, they may attempt to remove classroom variance by mandating scripted, rigid curricula (Sawyer, 2004). Although teaching to an assessment does not inherently reduce creativity development, it is likely that creativity will be marginalized if the assessment does not target or allow for student creativity, which is often the case with current assessments (Beghetto, 2010). Relatedly, teachers typically do not provide students experiences to develop their creative skills even though creative manipulation of content can increase long term retention (Conti, Amabile, & Pollack, 1995). Research indicates that tasks to develop creativity are not emphasized because teachers feel they cannot afford to dedicate time to such tasks if they are to cover all the standards (Craft, 2003a; Longo, 2010; Nicholl & McLellan, 2008). In addition to the cultural milieu, some teachers felt unprepared through their training to develop creative thinkers (Kampylis et al., 2009). While the research highlights the negative influence of standardized assessments, it rarely provides empirical evidence demonstrating successful environmental modifications that enhance creativity and that can operate within a constrictive macro-environment.

An exception is Schacter, Thum, and Zifkin's (2006) work, which demonstrates that some teachers are able to work within the external expectations to facilitate student creativity within the classroom. While the majority of participating teachers did not implement creative teaching strategies, teachers who did use these strategies had students who performed better on achievement tests. This illustrated that macro-level, standardized assessment movements and classroom creativity development does not have to be perceived as mutually exclusive. New research is developing methods to better assess how teachers can facilitate creativity within classroom discourse, which will open the door to specific strategies teachers may employ to work within existing systems (Beghetto, 2016b; Gajda, Beghetto, & Karwowski, 2017; Tanggaard & Beghetto, 2015).

3. Purpose of the study

This paper synthesizes across SCT factors to examine teachers' perceptions of personal, behavioral, and environmental factors, as these perceptions may lead to promotion or restriction of creativity development in the classroom. Previous work has demonstrated that each of these factors is important, but this current study explores all factors together using a mixed methods approach, integrating both quantitative and qualitative data. We ground our work within three research questions: 1) How do teachers define and explain creativity within a SCT framework?; 2) To what extent do SCT factors predict if teachers feel more creative in general than in the classroom (non-transferred creativity)?; and 3) To what extent do teachers' levels of experience relate to their perceptions of creativity? To address these questions, we explore a series of open-ended questions, coded in relation to SCT factors to identify how teachers perceive personal, behavioral, and environmental factors within a broad context, and then, we quantitatively examine the degree to which SCT factors predict teachers' abilities to express personal creativity in the classroom and further, if teachers' experience levels relate to their perceptions of these SCT factors.

4. Methods

4.1. Participants

This paper includes two samples of teachers from the United States: in-service teachers ($n = 359$) and pre-service teachers ($n = 166$). The in-service population included elementary (74%) and secondary (34%) teachers. (Some teachers taught in both settings.) Teachers were recruited through a national conference list serve and through two large districts in Florida and Illinois. The pre-service teachers were all either sophomores or juniors in a Mid-western university with intentions of becoming classroom teachers after graduation. They received extra credit in their educational psychology course for study participation. In general, this sample was selected to accomplish three purposes: (a) provide a large sample size to include many perceptions, (b) include perceptions from a geographically diverse population within the United States to provide different perceptions and (c) provide a wide range of experience levels.

4.2. Materials and procedures

In this mixed methods study, teachers completed an instrument and responded to several open-ended questions. First, teachers completed Teaching for Creativity Scales (TCS; Rubenstein et al., 2013). Specifically, this instrument examined the degree to which teachers believe: (a) they are capable of developing creativity among their students (Self-Efficacy Subscale), (b) students can grow in creativity (Student Potential Subscale), (c) their environment supports their efforts in developing creativity in the classroom (Environmental Encouragement Subscale), and (d) society values creativity (Societal Value Subscale). These items were on a Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree), and higher subscale means indicated higher beliefs of self-efficacy, student potential, environmental support, and societal values. The subscales demonstrated strong reliability with Cronbach's alphas ranging from 0.75 to 0.93 for individual subscales within the current samples. Additional TCS psychometric properties are presented in Table 1.

Several open-ended questions allowed teachers to identify factors they felt were important without direct researcher bias, specifically targeting teachers' definitions of creativity, hindrances to developing student creativity, and explanations for their personal creativity. None of these questions addressed specific SCT factors but allowed teachers the freedom to discuss any of them. The first and third author developed the coding scheme for these questions through reviewing both SCT and creativity literature.

Our qualitative analysis approach is described differently across the literature. Some refer to it as a qualitative deductive analysis approach (Gilgun, 2005, 2009), template coding (King, 1998), or a hybrid process (Fereday & Muir-Cochrane, 2006). In general, we coded the data in stages: (a) deductively using SCT and (b) then, within those codes, inductively. Specifically, we began our coding

Table 1
Descriptions and psychometric properties of TCS subscales.

Subscale	Sample Item[a]	Pre-service Teachers ($n = 166$)		In-service Teachers ($n = 359$)	
		Cronbach's Alpha	Mean (SD)	Cronbach's Alpha	Mean (SD)
Self-Efficacy	I am capable of helping students to become more flexible in their thinking.	0.913	5.689 (0.616)	0.929	5.947 (0.682)
Environmental Encouragement	My administration encourages (or will encourage) me to foster innovative thinking in my students.	0.761	5.336 (0.890)	0.906	4.592 (0.944)
Societal Value	Innovative ideas can move society forward.	0.861	5.746 (0.663)	0.897	6.067 (0.711)
Student Potential	All students can grow in their creative problem solving skills.	0.749	5.999 (0.634)	0.805	5.990 (0.765)

[a] Scale: 1 (strongly disagree) to 7 (strongly agree).

scheme with *a priori* codes. This is a useful approach when existing theories may be used to explain and explore phenomenon. First, we used the three main factors of SCT to deductively code the responses, and teachers' responses were coded in all relevant categories (i.e., responses could be coded under multiple factors to recognize the possibility that all factors may interact). Because responses were coded in multiple categories, the percentages do not sum to 100%. Then, within SCT factors, we further explored the teachers' responses using specific concerns expressed within the creativity literature (e.g., process vs. product) and an inductive approach when existing literature did not seem to fully capture the teachers' responses, especially within the environmental factors. The questions, coding methods, and frequencies are presented in Tables 2–4.

For all open-ended responses, the first and second author independently coded responses, applying the developed coding schemes to establish reproducibility reliability with Cohen's Kappa ranging from substantial 0.66 to almost perfect agreement 0.84 (McHugh, 2012). Only two sets of responses (pre-service explanations and pre-service definitions) fell outside this range; both were in the 0.3 range, which is deemed as fair agreement. The coders further examined the discrepancies. The percentage of agreement for each individual SCT factor ranged from 70% to 100%. This demonstrated that Kappa may underestimate reliability, and percentage of inter-rater agreement may overestimate reliability (McHugh, 2012).

5. Results

All data sources and analyses explored teachers' perceptions of creativity through a SCT framework, yet we approach this from multiple angles to answer multiple questions. In this results section, we consider our three specific research questions (RQ) regarding teachers' perceptions of creativity within the SCT framework.

5.1. RQ 1: How do teachers define and explain creativity within an SCT framework?

The first question is answered through the qualitative analysis across three open-ended questions, addressing multiple scenarios: defining creativity, identifying hindrances to developing students' creativity, and explaining personal creativity. The responses to each of these questions were coded using SCT factors.

5.1.1. Definitions of creativity

Because the ways in which teachers define creativity may influence they ways in which they facilitate creative development, we asked pre-service teachers to respond to the following question: "What is creativity?" (See Table 2 for codes, frequencies, and teachers' sample responses.) Initially, this item was coded for personal, behavioral, and environmental factors. Overwhelmingly, these teachers emphasized general behavioral factors when defining creativity, as 96% discussed actions and/or products. To explore this behavioral factor further, we coded for additional components from Plucker et al. (2004) definition; specifically, we differentiated between processes and products. More teachers discussed the process (87%) than specific product outcomes (53%). Then, we further coded whether participants discussed product novelty and/or usefulness. When they discussed creative products,

Table 2
Coding method, frequency, and scheme for "What is creativity?"

Step 1: Deductive Application of SCT (%)[a]	Step 2: Coding within Factors (%)	Key Response Characteristics (Sample Teacher Reponses)
Personal Factors (57.0%)		Personal characteristics, enjoyment, attitudes, beliefs, values, efficacy, conceptions, or identity ("Creativity is the willingness to explore new possibilities.)
Behavioral Factors (95.8%)		Specific behaviors, thinking processes, making habits, actual products, or strategy use
	Process (86.7%)	Process skills, thinking, making, generating ideas, improvising, thinking outside the box. ("Being able to do things or think about things in a new or different way.")
	Product (53.3%)	Description of outcome ("… use those ideas to construct a finished product")
	Novel (64.8%)	Describes new, unique, original, outside the norm. ("Creativity is an original thought or idea.")
	Useful (20.6%)	Describes usefulness to meet a need, solve a problem, or help people. ("Creativity is the ability to … solve a problem, or understand a situation.")
Environmental Factors (6.1%)		External factors, other individuals' influence, societal norms, materials, resources, outside inspiration
	Supportive (1.8%)	Environmental support ("A person is able to expand on an idea with innovative resources.")
	Beyond the Environment (4.2%)	Environmental cannot provide inspiration or does not provide support. ("The ability to come up with ideas or things without outside input.")

[a] Percentages are percentage of pre-service teacher ($n = 165$) responses that included this code. Responses could be coded in multiple categories.

Table 3
Coding method, frequency, and scheme for "What is the biggest hindrance to teaching students to become creative thinkers?"

Step 1: Deductive Application of SCT (%)[a]	Step 2: Inductive Coding within Factors (%)	Key Response Characteristics (Sample Teacher Reponses)
Personal Factors (27.2%)		Personal characteristics, enjoyment, attitudes, beliefs, values, efficacy, conceptions, or identity
	Teachers (5.1%)	Personal factors of teachers ("Other teachers who are uncomfortable with innovative ideas.")
	Students (23.1%)	Personal factors of students ("Students are averse to the risk taking inherent in creative thinking")
Behavioral Factors (12.2%)		Specific behaviors, thinking processes, making habits, actual products, or strategy use
	Teachers (5.8%)	Behaviors of teachers ("Teachers need to find an approach to that works with students.")
	Students (7.1%)	Behaviors of students ("Students do not seek opportunities to risk original production.")
Environmental Factors (75.6%)		External factors, other individuals' influence, societal norms, materials, resources, outside inspiration
	External Regulation (59.9%)	Specific external regulations, such as time, testing, and standardized curriculum ("Testing. ")
	Lack of Support (9.0%)	Environmental support from key stakeholders, like parents, administration, and other colleagues ("Justifying to parents and administrators that it takes time to develop creativity")
	Students' Concern over Social Response (7.1%)	Students' concern for peer or adult acceptance ("They are inhibited by their peers.")

[a] Percentages are percentage of in-service teacher ($n = 314$) responses that included this code. Responses could be coded in multiple categories.

they more frequently discussed novelty (65%) than usefulness (21%).

The environment, however, was almost entirely absent from definitions of creativity. Only 6% of the respondents included the environment, and of those, most indicated that creativity was in opposition or defiance to the environment. One teacher wrote creativity is "the ability to come up with ideas or things without outside input." Additional conceptions emerged during the inductive analysis stage, including: creativity is simply self-expression (24%), everything/everyone is creative (7%), and there are no constraints on creativity (7%).

5.1.2. Hindrances in developing creative thinkers

Further, teachers have important perspectives regarding factors that inhibit their abilities to accomplish instructional goals. Therefore, we asked in-service teachers ($n = 314$) to respond to the question: "What is the biggest hindrance to teaching students to become creative thinkers?" (See Table 3 for codes, frequencies, and teachers' sample responses.) The majority of teachers (76%) responded with macro-environmental constraints. Within that category, teachers most frequently discussed standardized testing, time constraints, required curriculum, and lack of administrator support: all representing macro-environmental factors. A smaller but notable percentage of teachers mentioned student personal characteristics (23%) or student behavioral factors (7%). Specifically, when teachers cited students as the biggest hindrance, teachers discussed students' fear of social judgment, lack of motivation, and inability to take risks. A teacher reflected, "Students only want a grade, not the academic inquiry experience." Another teacher wrote, "To be a creative thinker is to be a risk taker. That's tough for some high school students to do when amongst their peers. There's so much pressure to not deviate from others' views." A few teachers cited other teachers' personal (5%) or behavioral characteristics (6%). For example, one teacher stated, "Teachers must believe it is possible to teach creativity …" Only two of the 314 teachers discussed themselves or their own personal characteristics as being a hindrance.

5.1.3. Teachers' reflections on their own creativity

The extent to which teachers are and/or perceive themselves to be creative is also an important factor that may influence how they facilitate their students' development of creativity. This demonstrates teachers' self-efficacy as well as how teachers model creativity for their students. We examined teachers' perceptions of their own creativity and how they explained their ratings. First, we asked teachers to rate their own general creativity (i.e., "In general, how

Table 4
Coding method, frequency[a], and scheme for "In general, how creative are you? (Scale 1–10) Why did you give yourself that rating?"

Step 1: Deductive Application of SCT (Pre%; In%)	Step 2: Inductive Coding within Factors (Pre%; In%)	Key Response Characteristics (Sample Teacher Reponses)
Personal Factors (63.0%; 57.7%)		Personal characteristics, enjoyment, attitudes, beliefs, values, efficacy, conceptions, or identity ("I have the potential to be creative in areas that interest me.")
Behavioral Factors (67.3%; 68.1%)		Specific behaviors, thinking processes, making habits, actual products, or strategy use
	Process (43.6%; 51.6%)	Description of process skills ("I can find ideas of others and adapt of adjust to myself.")
	Product (49.7%; 31.9%)	Description of outcome ("I participate in creating projects that I feel are somewhat creative.")
Environmental Factors (24.2%; 25.8%)		External factors, other individuals' influence, societal norms, materials, resources, outside inspiration
	Comparison (8.5%; 10.6%)	Comparison to other people's creativity ("I feel more creative than most in a wide variety of areas.")
	Social Feedback (4.3%; 8.4%)	Description of social response to creativity, like compliments, financial support, or acclaim ("I have been told I am creative.")
	Supportive/Inhibitive Factors (9.7%; 7.1%)	Family support, time, direct instruction ("I wish I could be more creative but due to time constraints, I tend to not put as much effort or energy into it.")

[a] Percentages are percentage of pre-service ($n = 165$) and in-service ($n = 310$) teacher responses that included this code. Responses could be coded in multiple categories.

Table 5
Results from a binary logistic regression analysis predicting teachers' perceptions of non-transferred creativity from their general lives to the classroom.

Model Variables	B	S.E.	Wald	df	Sig.	OR
Student Potential	−0.022	0.209	0.011	1	0.915	0.978
Environmental Encouragement	−0.453	0.160	8.024	1	0.005**	0.636
Teacher Self-Efficacy	−0.653	0.245	7.084	1	0.008**	0.520
Teaching Experience	−0.445	0.182	5.961	1	0.015*	0.641
Constant	6.155	1.597	14.854	1	0.000	470.941

Model Summary: −2 Log likelihood = 307.242, Cox & Snell R square = 0.083, and Nagelkerke R square = 0.130.
*$p < 0.05$, **$p < 0.01$.

creative are you?"), and then to explain their ratings (i.e., "Why did you give yourself that rating?"). See Table 4 for codes, frequencies, and teachers' sample responses. Overall, the general ratings demonstrated that both pre-service and in-service teachers held high views of their own creativity (Pre-service: M = 7.02; SD = 1.43; In-service: M = 7.39; SD = 1.45); only 25% the teachers rated themselves below a 7 on a 10-point scale. Interestingly, their explanations of these ratings provided additional, specific insight on what contributes to personal creativity. In general, teachers explained creativity using personal and behavioral factors. When in-service and pre-service teachers explained positive ratings, they tended to describe personal characteristics (62%, 58%) and/or behaviors (78%, 83%). Only 20% of in-service teachers and 22% of pre-service teachers discussed the environment contributing to their personal creativity. Of these, most teachers discussed that other people had responded positively to their creativity (social encouragement) or that they felt their creativity was higher than those in their environment (social comparisons). For example, one teacher stated, "Co-workers, family members and friends usually comment that my ideas are original and creative and sometime use my ideas to solve problems."

5.2. RQ 2: To what extent do SCT factors predict if teachers feel more creative in general than in the classroom (non-transferred creativity)?

Beyond their general ratings, in-service teachers also reflected upon their creativity as a teacher. Many teachers' general creativity scores aligned perfectly with their professional creativity perceptions. These teachers felt that their profession was where they demonstrated their creativity, as one teacher described, "My work is where most of my energy goes."

However, some teachers felt they were able to be more creative outside of school. To explore this mismatch, we created a difference score by subtracting teachers' general ratings from their classroom ratings of creativity. We classified those teachers with a negative difference score (higher general creativity than creativity in the classroom) as having "non-transferred creativity," which means that for whatever reason they felt more creative in general than they are in the classroom. The distribution of these negative difference scores was not normal and could not be transformed. Therefore, a logistic regression was run to determine the best predictor of teachers' non-transferred creativity. The predictors included TCS subscales that target SCT constructs (i.e., teaching self-efficacy, environmental encouragement, student potential) as well as teaching experience. Because non-transferred creativity was the outcome, the predictor betas were all negative, such that lower scores on the subscales would be more predictive of having non-transferred creativity. The full model was statistically significant (Chi-square = 28.49, df = 4, $p = 0.000$), correctly identifying teachers with non-transferred creativity in the classroom 80% of the time. The results of this model are presented in Table 5.

The best single predictor was teachers' perceptions of their environment, meaning the less supportive the teachers viewed their environment, the more likely they were to feel less creative in the classroom than they did in general. Lower self-efficacy and fewer years of experience were also significant predictors of non-transferred creativity, further demonstrating importance of personal characteristics. However, notably, teachers' perceptions of students' abilities to become more creative did not significantly predict teachers' perceptions of non-transferred creativity.

5.3. RQ 3: To what extent do teachers' levels of experience relate to their perceptions of creativity?

For the final research question, we identified if trends in teachers' beliefs about creativity varied based on experience. Teachers were categorized into four groups based on years in the classroom, which provided additional differentiation beyond the pre-service and in-service classification. (The groups, means, and standard deviations are presented in Table 7.) Because we aimed to explore group differences, teacher experience was utilized as a categorical grouping variable. To explore group differences on these variables, a MANOVA was conducted, followed by descriptive discriminant analyses and pairwise comparisons. Due to violations of the assumptions of homogeneity of variances and multivariate normality, a Nath-Pavur MANOVA with MCD estimators was utilized. The results of the MANOVA suggested that there were general overall differences in creativity beliefs at different levels of experience, Wilks' $\Lambda = 0.74$, $p < 0.001$. Descriptive discriminant analyses were conducted to show which dependent variables contributed to the differences between groups of teachers. Self-efficacy (0.69) contributed most to group differences, with environmental encouragement (−0.46) and societal value (−0.43) contributing to differences as well. Student potential was not shown to contribute to differences between teachers' experience levels. That is, teachers of different levels of experience had different beliefs about creativity, and these differences were largely attributed to beliefs concerning self-efficacy, environmental encouragement, and societal value (see Table 6).

As the MANOVA indicated there were differences, we used the Yuen-Welch comparisons of trimmed means as a follow-up to determine which specific groups expressed the greatest differences. Comparisons were conducted between each combination of groups of teacher experience levels on the dependent variables of self-efficacy, societal value, and environmental encouragement.

Table 6
Univariate comparisons for teacher experience level on specific creativity beliefs.

Dependent variables	*F* value	*p* value
Self-Efficacy	10.013	0.000*
Student Potential	1.192	0.315
Societal Value	9.002	0.000*
Environmental Encouragement	25.078	0.000*

Bonferroni $\alpha = 0.0125$.

Table 7
Differences between teacher experience levels within significant TCS variables.

	Group 1	Group 2	Group 3	Group 4
Self-Efficacy				
Group 1	5.668 (0.622)			
Group 2	$p = 0.72279$	5.695 (0.616)		
Group 3	$p = 0.03486$	$p = 0.1503$	5.866 (0.648)	
Group 4	$p = 0.00000$**	$p = 0.00046$**	$p = 0.0505$	6.032 (0.683)
Societal Value				
Group 1	5.732 (0.693)			
Group 2	$p = 0.4864$	5.962 (0.685)		
Group 3	$p = 0.00177$**	$p = 0.28435$	6.061 (0.668)	
Group 4	$p = 0.00000$**	$p = 0.08307$	$p = 0.69083$	6.089 (0.698)
Environmental Encouragement				
Group 1	5.325 (0.888)			
Group 2	$p = 0.00138$**	4.721 (0.831)		
Group 3	$p = 0.00000$**	$p = 0.33307$	4.611 (0.889)	
Group 4	$p = 0.00000$**	$p = 0.29434$	$p = 0.93711$	4.548 (0.985)

Note: Group 1 = <1 year experience; Group 2 = 1–5 years experience; Group 3 = 6–10 years experience; Group 4= >10 years experience; Means and SD reported on the diagonal.
**sig using $\alpha = 0.0028$.

These variables were chosen based on the previous MANOVA. A total of 18 comparisons were conducted. To control for Type I error inflation, a Bonferroni correction was applied, adjusting the alpha level from 0.05 to 0.0028. Results are presented in Table 7.

Generally, teachers' perceptions were related to their experience levels. Teachers with the most experience had the highest levels of self-efficacy. More specifically, the comparisons suggested that teachers with more than 10 years of experience had higher self-efficacy than teachers with less than a year or one to five years of experience. Further, results demonstrated that teachers with the most teaching experience had higher societal value beliefs for creativity than those with less than a year of experience. Lastly, the comparisons also suggested that teachers with less than a year of experience have higher perceptions of environmental encouragement than teachers of any other experience level. This indicates that pre-service teachers are likely to perceive their future schools will be extremely supportive, whereas in-service teachers perceive their current environmental support much less positively (see Table 7).

6. Discussion

This study makes several contributions to the literature. First, it presents a formalized method for coding qualitative data regarding teachers' perceptions within a SCT perspective. This general educational psychology theory dovetails with the Plucker et al. (2004) definition of creativity and serves to anchor our work. Using SCT demonstrates that creativity could be explored using a more general framework. When creativity research is anchored solely within creativity-specific frameworks, it may be perceived that creativity is too elusive to be contained within a general learning theory. Thus, presenting creativity as a developable process skill that can be considered through general learning theory principles may inspire general educators and researchers to consider how to formally teach and assess it. Further, using SCT to anchor this study opens a broad literature base to explore in future studies. SCT is helpful because it uniquely situates the teacher and teacher's beliefs in an interactive, reciprocal, and agentic context, representative of their classroom roles. Deductively applying SCT illuminated both strengths and gaps; whereas, if a purely inductive approach was used, components that were missing may not be obvious.

With that said, we acknowledge that SCT may not encompass every important variable; there may be creativity specific variables or additional variables that need to be considered within the model, which is why the inductive coding was used to better represent the data. One example within our own study is the complexity of the environment variable, demonstrating the need for additional specification of level and factors. There is considerable difference among the micro- and macro-environmental factors, and the single code of "environment" did not encompass the full picture of varied stakeholders' expectations and specific social comparisons/evaluations that may influence teachers' perceptions of creativity, which may influence their ability to facilitate it. The inductive component of our analysis was able to capture some of that nuance.

6.1. Dichotomy between person/behavioral factors and environmental factors

Beyond a unique conceptual framework, this study also highlights interesting findings that both support and contrast existing work. By synthesizing across the three research questions, we uncovered an interesting dichotomy between teachers' perceptions of factors that promote and those that inhibit creativity. In general, personal and behavioral factors were perceived to contribute to successful creativity, whereas the macro-environment factors were perceived as only a hindrance. Further, the micro-classroom environment was neither discussed as a hindrance nor a support. For example, when teachers explained their own creativity ratings, they often attributed positive ratings to personal characteristics and specific behaviors (either processes or products). In contrast, they neglected aspects within the environment that may facilitate creativity, like opportunities or inspiration. However, when in-service teachers are asked to identify the biggest hindrances for students to become creative, teachers overwhelmingly cited macro-environmental factors, and specifically, external regulations (e.g., standardized testing, curriculum, and administrator expectations). When pre-service teachers defined creativity, they often neglected to mention any environmental influences. This may be due to the phrasing of the question. Their definitions tended to reflect a component of the succinct, initial definition that creativity is novel (Runco & Jaegaer, 2012), yet they rarely mentioned that creative products or ideas should also be useful. Overall, this suggests teachers do not recognize how creative innovation is embedded and evaluated within a social context that can both inspire and inhibit. In future work, the environmental variables should be dissected and explicitly addressed.

While answering the second research question, we found that environmental support was the best predictor of teachers' non-transferred creativity, over teachers' perceptions of themselves and of their students. Further, the findings of the third research question indicated that as teachers' experience level increased, they perceived their environments to be less supportive. In general, across all research questions, the environment was only an adversary to be overcome, exemplified through teachers defining creativity as "solving a problem in a way that hasn't been taught", "creating something not inside a textbook", or "the ability to come up with ideas or things without outside input."

This perspective could have particularly negative consequences for teachers and students. Teachers often have considerable control over the micro-classroom environment, despite potentially restrictive, external expectations. If they believe environments can positively influence and inspire both their own and their students' creativity, they may be more deliberate about their classroom design. Therefore, both teacher preparation programs and in-service professional developments should emphasize teachers' localized, agentic power to direct their micro-classroom environment to support and inspire creativity. Specifically even within a

broader standardized assessment zeitgeist, teachers can still embed and explicitly teach for creativity.

The micro-classroom environment includes both physical surroundings and social support. To consider how to improve this environment, we may find inspiration in other fields. Specifically, the field of industrial-organizational psychology has developed a literature base of effective workplace environmental factors that promote creativity, and this literature could be used to improve classroom environments as well. For example, Hoff and Öberg (2015) described functional (e.g., lighting, tools, resources), psychosocial (e.g., opportunities to receive support, feedback, or privacy) and inspirational supports (e.g., outside inspiration, time, space for brainstorming) that the environment could provide. Within the school context, teachers could provide multiple resources, texts, and outside speakers to help students develop openness to new experiences, which is closely correlated with creativity (Kaufman, 2013). Further, teachers should provide students with opportunities and resources to build off existing ideas and leverage what has been done, rather than trying to create from nothing. This is often in opposition to how teachers currently view creativity.

From a broader psychology perspective, the teachers' environmental perceptions are consistent with the self-serving attributional bias (Mezulis, Abramson, Hyde, & Hankin, 2004). This bias suggests that individuals protect their self-esteem by attributing positive outcomes to internal, controllable factors ("I have creative ideas because I make interesting connections between materials or subjects.") and negative outcomes to external, uncontrollable factors ("When I can't help students become creative, it is because of standardized testing."). Weiner (1985) proposed that in order for attributions to adaptively motivate future behavior, the attributions should be unstable and controllable. Therefore, when teachers see students who are not creative, an adaptive attribution would be to consider what the teacher can change or control. Our current study did not explicitly explore this option; however our collective, indirect findings suggest that this may be an interesting line to pursue in the future.

6.2. Considering implicit conceptions

Beyond the general examination of all factors together, these results also challenge and extend existing theories and provide novel findings regarding teachers' implicit conceptions of creativity. Previous researchers expressed potential limitations with teachers' implicit conceptions limiting creativity to only the eminent creators (Beghetto, 2010), yet this current study found that not to be the case. Specifically, both the in-service and pre-service teacher populations believe students have the potential to grow in their creativity, as evidenced by high means on the Student Potential Subscales. This was the most consistent subscale across experience levels and did not explain any of the variance in teachers' perceived non-transferred creativity. If they are not able to be creative in the classroom, it is not because of their views of students. Further, when 30% of teachers mentioned students as hampering their own creativity, it was not because students did not have an inherent ability, but rather teachers suggested students had a fear of failure or unwillingness to take risks.

As another example of how creativity is not reserved for the eminent, teachers see themselves as creative as evidenced by their high ratings of their creativity in personal settings. Approximately 75% of all teachers in this sample rated themselves a 7 or better on a 10-point scale. These findings align with other researchers who suggest teachers do not have a big-C bias (Craft, 2003b; Cheung & Mok, 2013; Kampylis et al., 2009; Turner, 2013). This, however, stands in contrast to Lemons' (2010) study of college students, in which over half (55%) rated themselves as no better than average in creative ability. Only about 10% of the teachers in this study would have rated themselves in that fashion.

Another traditional concern beyond the "big-C bias" was the "product bias" (Beghetto & Kaufman, 2013; Beghetto, 2010; Runco, 2007), that individuals may limit creativity to the development of products. However, when teachers explained their general creativity rating, both pre-service and in-service teachers justified their ratings using both products and processes. While teachers did mention products, many of them also mentioned processes, such as brainstorming, adapting existing ideas, and fantasizing. This finding replicates earlier studies that also found most individuals view creativity as a process (Cheung & Mok, 2013; Ockuly & Richards, 2013).

While some of the traditional concerns were not present in this sample, new concerning conceptions emerged. As aforementioned, teachers did not mention the role of the environment, even though most researchers and theorists would discuss that creativity takes place within a social context, and the environment plays a role in the expression and evaluation of creativity. Further, teachers did not include factors of usefulness or appropriateness when defining creativity. One other study found similar results 20 years ago, but this finding has not been replicated since (Diakidoy & Kanari, 1999).

This study also highlighted the potential dilution of the term "creative". When teachers think creativity is everywhere, unmeasureable, or un-teachable, this may affect the likelihood they will provide explicit strategies to facilitate creative thinking, such as the Creative Problem Solving Model or reverse brainstorming. Further, open-ended questions, strategies, and projects can help students' develop creativity while still addressing standards (e.g., Medeiros, Partlow, & Mumford, 2014).

7. Suggestions and future directions

This study provides a springboard to guide future inquiries. Specifically, future work may include observational data, teacher lesson plans, and student creativity assessments to allow researchers to determine the relative importance of each factor or perception. The current study's goal, however, was to provide a foundational examination across SCT factors with a large sample, and the next step may be to use a smaller sample to correlate factors with in-class behaviors and student outcomes.

When including additional outcome data, future research in the field needs to address the role of modeling within the classroom, the nature of creative products within the classroom, and longitudinal change in teachers' beliefs about creativity. Generally, research on modeling in creativity is limited and emphasizes products. Future research could more explicitly explore the modeling of creative processes in the classroom, and the SCT framework may be particularly helpful given its emphasis on social learning and the agentic role of teachers in structuring micro-level classroom environments. As previously discussed, the current study suggested that the traditional concern of product focus was not supported, as several teachers referred to processes in their explanations of creativity, so it would be interesting to identify those processes. Recently, researchers have proposed and tested dynamic mixed methods that would allow more nuanced explorations of the creative process in the classroom. Specifically, they have assessed the micro-interactions between teachers and students within the sociocultural context of the classroom (Beghetto, 2016b; Gajda, Beghetto, et al., 2017). The continued exploration of these methods may be particularly informative.

In the current study, a majority of teachers described creative products as materials they had designed for students in their classrooms. However, the method in which products were

described could not be adequately or appropriately judged for quality. Future research could specifically examine educational and instructional creative products (e.g., lesson plans, observations) provided within the classroom context, allowing for more consistent and deliberate evaluation of product quality and novelty using well-designed rubrics and protocols, as well as assessing student outcomes. For example, some teachers made claims that the projects/lessons/units that they developed led to better student products, but the current study did not examine the potential outcomes of teacher products on student product quality, creativity, or overall learning performance. Lastly, the current study examined differences in teacher beliefs cross-sectionally, yet additional longitudinal work could be utilized to conceptualize the nature of those changes within individuals over time.

Overall, this current study proposes and uses SCT to anchor the discussion of teachers' perceptions of factors that may lead to them to promote and inhibit creativity. The finding that teachers often attribute positive outcomes to personal and behavioral factors and negative outcomes to the environment is important for teacher educators, administrators, and teachers themselves. These findings can be used to create a targeted approach to acknowledging teachers' current belief systems and addressing specific incomplete conceptions of creativity. When teachers have more in-depth and operational conceptions of creativity, students are likely to benefit.

References

Aljughaiman, A., & Mowrer-Reynolds, E. (2005). Teachers' conceptions of creativity and creative students. *Journal of Creative Behavior, 39*(1), 17–34.

Andiliou, A., & Murphy, P. K. (2010). Examining variations among researchers' and teachers' conceptualizations of creativity: A review and synthesis of contemporary research. *Educational Research Review, 5*(3), 201–219.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology, 52*, 1–26.

Batey, M. (2012). The measurement of creativity: From definitional consensus to the introduction of a new heuristic framework. *Creativity Research Journal, 24*(1), 55–65.

Beghetto, R. A. (2006). Creative self-efficacy: Correlates in middle and secondary students. *Creativity Research Journal, 18*(4), 447–457.

Beghetto, R. A. (2007). Ideational code-switching: Walking the talk about supporting student creativity in the classroom. *Roeper Review, 29*, 265–270.

Beghetto, R. A. (2009). In search of the unexpected: Finding creativity in the micromoments of the classroom. *Psychology of Aesthetics, Creativity, and the Arts, 3*, 2–5.

Beghetto, R. A. (2010). Creativity in the classroom. In J. C. Kaufman, & R. J. Sternberg (Eds.), *Cambridge handbook of creativity* (pp. 447–463). New York, NY: Cambridge University Press.

Beghetto, R. A. (2016a). Creative learning: A fresh look. *Journal of Cognitive Education and Psychology, 15*, 6–23. https://doi.org/10.1891/1945-8959.15.1.6.

Beghetto, R. A. (2016b). Creative openings in the social interactions of teaching. *Creativity: Theories-Research-Applications, 3*(2), 261–273.

Beghetto, R. A., & Kaufman, J. C. (2013). Fundamentals of creativity. *Educational Leadership, 70*, 10–15.

Beghetto, R. A., & Plucker, J. A. (2006). The relationship among schooling, learning, and creativity: "All roads lead to creativity" or "You can't get there from here?". In J. C. Kaufman, & J. Baer (Eds.), *Creativity and reason in cognitive development* (pp. 316–332). Cambridge: Cambridge University Press.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Chan, D. W., & Chan, L. (1999). Implicit theories of creativity: Teachers' perception of student characteristics in Hong Kong. *Creativity Research Journal, 12*, 185–195.

Cheung, R. H. P., & Mok, M. M. C. (2013). A study of early childhood teachers' conceptions of creativity in Hong Kong. *Educational Psychology, 33*, 119–133.

Conti, R., Amabile, T. M., & Pollack, S. (1995). The positive impact of creative activity: Effects of creative task engagement and motivational focus on college students' learning. *Personality and Social Psychology Bulletin, 10*, 1107–1116.

Corazza, G. E. (2016). Potential originality and effectiveness: The dynamic definition of creativity. *Creativity Research Journal, 28*(3), 258–267.

Craft, A. (2003a). Early years education in England and little c creativity - the third wave? *Korean Journal of Thinking & Problem Solving, 13*(1), 49–57.

Craft, A. (2003b). The limits to creativity in education: Dilemmas for the educator. *British Journal of Educational Studies, 51*(2), 113–127.

Diakidoy, I. A., & Kanari, E. (1999). Student teachers' beliefs about creativity. *British Educational Research Journal, 25*(2), 225–243.

Dobbins, K. (2009). Teacher creativity within the current education system: A case study of the perceptions of primary teachers. *Education, 37*, 95–104.

Dweck, C. (2007). *Mindset: The new psychology of success*. New York: Ballentine Books.

Eason, R., Giannangelo, D. M., & Franceschini, L. A. (2009). A look at creativity in public and private schools. *Thinking Skills and Creativity, 4*, 130–137.

Edwards-Schachter, M., García-Granero, A., Sánchez-Barrioluengo, M., Quesada-Pineda, H., & Amara, N. (2015). Disentangling competences: Interrelationships on creativity, innovation and entrepreneurship. *Thinking Skills And Creativity, 16*, 27–39. https://doi.org/10.1016/j.tsc.2014.11.006.

Elaldi, Ş., & Batdi, V. (2016). Comparing effects of different applications on pre-service teachers: A meta–analysis. *Journal of Education and Training Studies, 4*(7), 70–81.

Fereday, & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods, 5*, 80–92.

Gajda, A., Beghetto, R. A., & Karwowski, M. (2017). Exploring creative learning in the classroom: A multi-method approach. *Thinking Skills and Creativity, 24*, 250–267.

Gajda, A., Karwowski, M., & Beghetto, R. A. (2017). Creativity and academic achievement: A meta-analysis. *Journal of Educational Psychology, 109*(2), 269–299.

Gilgun, Jane F. (2005). Qualitative research and family psychology. *Journal of Family Psychology, 19*(1), 40–50.

Gilgun, Jane F. (2009). Methods for enhancing theory and knowledge about problems, policies, and practice. In Katherine Briar, Joan Orme, Roy Ruckdeschel, & Ian Shaw (Eds.), *The Sage handbook of social work research* (pp. 281–297). Thousand Oaks, CA: Sage.

Gralewski, J., & Karwowski, M. (2013). Polite girls and creative boys? Students' gender moderates accuracy of teachers' ratings of creativity. *Journal of Creative Behavior, 47*, 290–304.

Hall, C. (2010). Creativity in recent educational discourse in England. *World Englishes, 29*(4), 481–492.

Hass, R. W., Katz-Buonincontro, J., & Reiter-Palmon, R. (2016). Disentangling creative mindsets from creative self-efficacy and creative identity: Do people hold fixed and growth theories of creativity? *Psychology of Aesthetics, Creativity, And The Arts, 10*(4), 436–446. https://doi.org/10.1037/aca0000081.

Haught-Tromp, C. (2017). The Green Eggs and Ham hypothesis: How constraints facilitate creativity. *Psychology of Aesthetics, Creativity, and the Arts, 11*, 10–17.

Hoff, E. V., & Öberg, N. K. (2015). The role of the physical work environment for creative employees—a case study of digital artists. *The International Journal of Human Resource Management, 26*(14), 1889–1906.

International Business Machines (IBM). (2010). *Capitalizing on complexity: Insights from the global chief executive officer study*. Retrieved from IBM website https://www-01.ibm.com/common/ssi/cgibin/ssialias?subtype=XB&infotype=PM&appname=GBSE_GB_TI_USEN&htmlfid=GBE03297USEN&attachment=GBE03297USEN.PDF.

James, K., & Asmus, C. (2001). Personality, cognitive skills, and creativity in different life domains. *Creativity Research Journal, 13*, 185–195.

Kampylis, P., Berki, E., & Saariluoma, P. (2009). In-service and prospective teachers' conceptions of creativity. *Thinking Skills and Creativity, 4*(1), 15–29.

Karwowski, M. (2011). It doesn't hurt to ask… But sometimes it hurts to believe: Polish students' creative self-efficacy and its predictors. *Psychology of Aesthetics, Creativity, and the Arts, 5*(2), 154–164.

Karwowski, M. (2014). Creative mindsets: Measurement, correlates, consequences. *Psychology of Aesthetics, Creativity, and the Arts, 8*, 62–70.

Kaufman, S. B. (2013). Opening up openness to experience: A four-factor model and relations to creative achievement in the arts and sciences. *Journal of Creative Behavior, 47*(4), 233–255.

Kaufman, J. C., & Beghetto, R. A. (2009). Beyond big and little: The four C model of creativity. *Review of General Psychology, 13*(1), 1–12.

Kim, K. H. (2011). The creativity crisis: The decrease in creative thinking scores on the Torrance Tests of Creative Thinking. *Creativity Research Journal, 23*(4), 285–295.

King, N. (1998). Template analysis. In G. Symon, & C. Cassell (Eds.), *Qualitative methods and analysis in organizational research: A practical guide* (pp. 118–134). London: Sage.

Lee, E., & Seo, H. A. (2006). Understanding of creativity by Korean elementary teachers in gifted education. *Creativity Research Journal, 18*, 237–242.

Lemons, G. (2010). Bar drinks, rugas, and gay pride parades: Is creative behavior a function of creative self-efficacy? *Creativity Research Journal, 22*, 151–161.

Levenson, E. (2015). Exploring Ava's developing sense for tasks that may occasion mathematical creativity. *Journal of Mathematics Teacher Education, 18*, 1–25.

Longo, C. (2010). Fostering creativity or teaching to the test? Implications of state testing on the delivery of science instruction. *The Clearing House, 83*, 54–57.

Ma, H. H. (2006). A synthetic analysis of the effectiveness of single components and packages in creativity training programs. *Creativity Research Journal, 18*, 435–446.

Ma, M., & Van Oystaeyen, F. (2016). A measurable model of the creative process in the context of a learning process. *Journal of Education and Training Studies, 4*(1), 180–191.

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemical Medicine, 22*(3), 276–282.

Medeiros, K. E., Partlow, P. J., & Mumford, M. D. (2014). Not too much, not too little: The influence of constraints on creative problem solving. *Psychology of*

Aesthetics, Creativity, and the Arts, 8, 198–210.
Mezulis, A., Abramson, L. Y., Hyde, J., & Hankin, B. (2004). Is there a universal positivity bias in attributions? A meta-analytic review of individual, developmental, and cultural differences in the self-serving attributional bias. *Psychological Bulletin, 130*, 711–747.
Mullet, D. R., Willerson, A., Lamb, K. N., & Kettler, T. (2016). Examining teacher perceptions of creativity: A systematic review of the literature. *Thinking Skills and Creativity, 21*, 9–30.
Myhill, D., & Wilson, A. (2013). Playing it safe: Teachers' views of creativity in poetry writing. *Thinking Skills and Creativity, 10*, 101–111.
Nicholl, B., & McLellan, R. (2008). We're all in this game whether we like it or not to get a number of As to Cs: Design and technology teachers' struggles to implement creativity and performativity policies. *British Educational Research Journal, 34*(5), 585–600.
Ockuly, M., & Richards, R. (2013). Loving or fearing creativity? It's all in the definition. *Neuroquantology, 11*(2), 256–262.
Odena, O., & Welch, G. (2009). A generative model of teachers' thinking on musical creativity. *Psychology of Music, 37*(4), 416–442.
Paek, S. H., & Sumners, S. E. (2017). The indirect effect of teachers' creative mindsets on teaching creativity. *The Journal of Creative Behavior*. https://doi.org/10.1002/jocb.180.
Park, S., Lee, S., Oliver, J. S., & Crammond, B. (2006). Changes in Korean science teachers' perception of creativity and science teaching after participating in an overseas professional development program. *Journal of Science Teacher Education, 17*, 37–64.
Plucker, J. A., Beghetto, R. A., & Dow, G. T. (2004). Why isn't creativity more important to educational psychologists? Potentials, pitfalls, and future directions in creativity research. *Educational Psychologist, 39*(2), 83–96.
Plucker, J. A., Kaufman, J. C., & Beghetto, R. A. (2015). *What we know about creativity*. Washington, DC: Partnership for 21st Century Skills.
Rasulzada, F., & Dackert, I. (2009). Organizational creativity and innovation in relation to psychological well-being and organizational factors. *Creativity Research Journal, 21*(2/3), 191–198. https://doi.org/10.1080/10400410902855283.
Regnier, R. (2016). Toward eco-civilization through learning as valuing: A proposal for whitehead based creative inquiry in China's schools. *Interchange: A Quarterly Review of Education, 47*(3), 229–247.
Rubenstein, L. D., McCoach, D. B., & Siegle, D. (2013). Teaching for creativity scales: An insstrument to examine teachers' perceptions of factors that allow for the teaching of creativity. *Creativity Research Journal, 25*, 324–334.
Runco, M. A. (2007). *Creativity theories and themes: Research, development, and practice*. Boston, MA: Elsevier.
Runco, & Jaegaer, G. J. (2012). The standard definition of creativity. *Creativity Research Journal, 24*, 92–96. https://doi.org/10.1080/10400419.2012.650092.
Sawyer, R. K. (2004). Creative teaching: Collaborative discussion as disciplined improvisation. *Educational Researcher, 3*(2), 12–20.
Sawyer, R. K. (2012). *The science of human innovation: Explaining creativity* (2nd ed.). New York, NY: Oxford University Press.
Schacter, J., Thum, Y. M., & Zifkin, D. (2006). How much does creative teaching enhance elementary school students' achievement? *Journal of Creative Behavior, 40*, 47–72.
Schunk, D. H., Pintrich, P. R., & Meece, J. L. (2008). *Motivation in education: Theory, research, and applications* (3rd ed.). Upper Saddle River, NJ: Pearson Education.
Scott, G., Leritz, L. E., & Mumford, M. D. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal, 16*, 361–388.
Shalley, C. E., & Perry-Smith, J. E. (2001). Effects of social-psychological factors on creative performance: The role of informational and controlling expected evaluation and modeling experience. *Organizational Behavior and Human Decision Processes, 84*, 1–22.
Skiba, T., Tan, M., Sternberg, R. J., & Grigorenko, E. L. (2010). Roads not taken, new roads to take: Looking for creativity in the classroom. In R. A. Beghetto, & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom* (pp. 252–269). New York: Cambridge University Press.
Sternberg, R. J. (1985). *Beyond IQ*. New York, NY: Cambridge University Press.
Sternberg, R. J. (2015). Teaching for creativity: The sounds of silence. *Psychology of Aesthetics, Creativity, And The Arts, 9*(2), 115–117. https://doi.org/10.1037/aca0000007.
Tanggaard, L., & Beghetto, R. A. (2015). Ideational pathways: Toward a new approach for studying the life of ideas. *Creativity: Theories-Research-Applications, 2*(2), 129–144.
Tierney, P., & Farmer, S. M. (2011). Creative self-efficacy development and creative performance over time. *Journal of Applied Psychology, 96*, 277–293.
Turner, S. (2013). Teachers' and pupils' perceptions of creativity across different key stages. *Research in Education, 89*, 23–40.
Vedenpää, I., & Lonka, K. (2014). Teachers' and teacher students' conceptions of learning and creativity. *Creative Education, 5*(20), 1821–1833.
Weiner, B. (1985). "Spontaneous" causal thinking. *Psychological Bulletin, 97*, 74–84.
Westby, E. L., & Dawson, V. L. (1995). Creativity: Asset or burden in the classroom? *Creativity Research Journal, 8*, 1–10.
Wyse, D., & Ferrari, A. (2015). Creativity and education: Comparing the National Curricula of the States of the European Union and the United Kingdom. *British Educational Research Journal, 41*(1), 30–47.
Yi, X., Plucker, J. A., & Guo, J. (2015). Modeling influences on divergent thinking and artistic creativity. *Thinking Skills and Creativity, 16*, 62–68.
Zbainos, D., & Anastasopoulou, A. (2012). Creativity in Greek music curricula and pedagogy: An investigation of Greek music teachers' perceptions. *Creative Education, 3*(1), 55–60.