The Importance of Bridging Creativity and Critical Thinking

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We have passed through the age of agriculture, the age of industry and the age of information, and are now said to be entering the age of creativity.

—Cropley 2004

Alberta's program of studies for social studies, kindergarten to Grade 12, defines *critical thinking* as "a process of inquiry, analysis and evaluation resulting in a reasoned judgment [which] promotes the development of democratic citizenship," with skills of critical thinking including "distinguishing fact from opinion; considering the reliability and accuracy of information; determining diverse points of view, perspective and bias; and considering the ethics of decisions and actions" (Alberta Education 2005, 8). The same source defines creative thinking as a process that "occurs when students identify unique connections among ideas and suggest insightful approaches to social studies questions and issues," using this type of thinking to "generate an inventory of possibilities; anticipate outcomes; and combine logical, intuitive and divergent thought" (Alberta Education 2005, 8). The purpose of this article is to inform readers as to the state of creativity and its relationship with critical thinking, and their potential roles in critical studies.

Historically, creativity has been neglected or actively discouraged in educational contexts in an effort to bolster such concepts as critical thinking, which, ironically, may necessitate the development of creativity to develop itself. Therefore, in order to proceed, we should take heed of the definitions and attributes of both creativity and critical thinking, how these constructs develop, and what educational processes might help nurture them further. To formulate an understanding of creativity and critical thinking, we will focus our attention on the psychological approaches that have been undertaken to understand these concepts, since the psychological approaches largely inform the social and educational approaches in these cases. The ultimate purpose is the attainment of a more complete understanding of creativity and critical thinking and how exactly these processes are used in both personal and social human activities.

What Are the Key Research Questions Regarding Creativity and Critical Thinking?

The first and second questions for creativity and critical thinking relate to their definitions and origins in humans: What exactly are creativity and critical thinking? How do these constructs develop? Each field of research brings different approaches toward answering these questions, with different philosophical treatises as bases of explanation. The third question concerns the active natures of creativity and critical thinking: How and when do these activities manifest and what for? Answering this question can help establish not only the uses for creativity and critical thinking but also the conditions under which these activities can develop and thrive. The fourth question is: How can we teach creativity and critical thinking in educational contexts? This question is of pressing importance in education, because society increasingly views creativity as a necessity for a more competitive workforce in the global market, while

critical thinking has classically enjoyed praise and importance—but the apparent success in developing and nourishing it at the educational level has been murky. These questions have found a variety of different answers spanning multiple schools of thought and expertise, including cognitive science, neuroscience, social science, the arts and, of course, education.

It is not surprising that creativity and critical thinking are contested concepts. Consolidating the various definitions and understandings of creativity and critical thinking remains one of the most pressing challenges across the myriad fields that study these constructs. Each field carries its own vocabulary, epistemological protocols and tests, and other important factors when it comes to their fundamental study. Although aspects of creativity and critical thinking from some fields are transferrable to others, this is typically seldom the case and the concepts remain largely isolated within each field. Furthermore, some traditional schools of thought have branded creativity and critical thinking as unrelated activities at best and oppositional cognitive forces at worst, which has frustrated newer contemporary views that these activities should be understood as cooperative and even inseparable. Indeed, it is becoming clear from sociological, educational, psychological and neurological findings, past and contemporary, that creativity and critical thinking are closely intertwined, requiring one another to successfully fulfill their functions.

One field that is believed to focus strongly on critical thinking while omitting creativity is the field of critical studies or critical theory. This field espouses the critical reflection of social and cultural systems, usually with the ultimate goal of addressing imbalances or injustices in our current power structures. In educational contexts, the teaching of critical theory classically focuses on the *critical thinking* aspects of critical studies activities, with scarce mention of creativity. The diminished importance of creativity persists, and arguably worsens, in adult educational circles because of how creativity and imagination are often misunderstood as developmental cognitive activities found in children that are eventually attenuated or lost in adulthood. Such notions are amplified by the aforementioned misconceptions that creativity and critical thinking are cognitive opposites that attenuate one another.

This paper is an attempt to bring creativity into greater relevance for critical studies, particularly as it pertains to education for critical theory and intercultural competence. We will begin by discussing the history and specific misconceptions of creativity, then elaborate on its psychological perspectives and relations with critical thinking. Finally, we will discuss some of the contemporary research on creativity and critical thinking, and avenues for future research we believe would be beneficial for critical theory in educational contexts.

Questions Regarding Creativity

The simple question "What is creativity?" finds its origins in antiquity with Plato's *Ion* (Cropley 2004, 13), and continues to be influential throughout philosophy, religion and the arts well into the modern age (Shaheen 2010, 166). It has been described as the cognitive element that allows for the creation of novelty, particularly in the arts (Cropley 2004, 13). Indeed, creativity has classically been rooted in the realm of visual arts and still today cannot quite break free of its aesthetic shackles (Singer 2011, 22–24). Although prior work in the late 19th and early 20th centuries began to surface with implications of creativity beyond art and aesthetics, the public view that creativity was only for artists truly began to change only in 1957 with the launch of the first artificial satellite, Sputnik 1, by the Soviet Union. This prompted a fundamental rethinking of creativity, seen as something that had been lacking in the American and Western European societies' technological trends, which led to fears they might lose the war of innovation to their Russian rivals (Cropley 2004, 13). The political conclusion was that creativity of a more social kind, rather than classically artistic or aesthetic kind, was needed if Western societies were to survive into the new age (Shaheen 2010, 166).

How creativity develops naturally is another question that lacks a definitive answer, and one that finds its roots in the philosophical treatises and other works of early psychologists such as Sigmund Freud, Jean Piaget, and Lev Vygotsky (Sawyer et al 2003, 30–36). Initially, creativity was seen as something inherent in children and was seldom differentiated from childhood imagination (Gajdamaschko 2006, 36–37). The question was not whether creativity and imagination could develop, but whether these cognitive activities could remain intact into adulthood. This line of thinking originated in the 18th century, being termed the *romantic* view of creativity (Glăveanu 2011, 49), and was inspired by educational romanticism as espoused by Jean-Jaques Rousseau (Hornberg and Reiter-Palmon 2017, 10). This view gave way naturally to

the widely popular *nativist* developmental psychology theories of the time (Vasileva and Balyasnikova 2019, 6), which were traditionally used to explain child prodigies and genius adult creators and rationalized to preclude the nongifted from being capable of creativity (Sternberg and Kaufman 2010, 476). The purpose of these treatises was ultimately to identify and assess gifted individuals so as to allocate the resources required to nourish their creative potential (Moran 2010, 81), doing so with the help of such quantitative measures as the Torrance tests of creative thinking (Makel and Plucker 2010, 52; Zimmerman 2009, 387).

The behaviourist and cultural definitions of creativity would later surface at the opposite end of these philosophical treatises, with these works being initially formulated as responses to the shortcomings and disinterest in romantic and nativist views in explaining creativity in nonprodigy or genius individuals. Historically, the concept of giftedness has been challenged vehemently by Vygotsky, along with more modern scholars such as Maslow (Maslow 1970, in Craft 2003, 114), who suggested that all humans are capable of "a more widespread kind of creativeness." These discourses would begin to change the previous focus on "genius creativity" and giftedness emphasized by Guilford's (1950) "divergent thinking" tests, and the continuation of this focus with Torrance's (1974) experiments and tests for creativity (Craft 2003, 117). This great debate between "nature or nurture" of creativity effectively generated a great schism in creativity research that remains to this day (Hennessey 2010, 355; Glăveanu 2011, 49).

One of the most important questions with regard to creativity is how it manifests as a thought process and productive activity (Craft 2003, 117). Recently, we have begun to see more focus on the individual-level mechanisms governing creativity (Kandler et al 2016, 231). In trait psychology, for instance, there is an increasing trend in the exploration of how the Big Five personality traits—conscientiousness (careful vs careless), agreeableness (compassionate vs callous), neuroticism (sensitive vs resilient), openness to experience (curious vs cautious) and extraversion (outgoing vs solitary) (Sung and Choi 2009, 944–46)—may affect creativity (Sung and Choi 2009, 942), pointing to an emotion-based manifestation (Averill, Chon and Hahn 2001, 174). New-found interest in creativity also led to questions about how we can coax it to manifest itself. For instance, cognitive and trait psychology would dictate that creativity is based on personality traits that formulate the needs, motives and desires for creation, effectively making creativity an unconscious and spontaneous process (Ayman-Nolley 1992, 29l; Gajdamaschko 2006, 36). Meanwhile, cultural psychology views creativity as externally motivated. Csikszentmihalyi's perspective, for instance, posits that creativity flourishes when a creative individual has access to, or control of, his or her field and domain of creativity, with both being sociocultural concepts external to the individual (Csikszentmihalyi 1997, 2–3). Indeed, Csikszentmihalyi's systems model of creativity, which establishes domains as symbolic culture and fields as social systems (Csikszentmihalyi 2014b, 166–67), is proving useful in casting light on the possible connections between creativity and sociocultural activities such as communication. As well, this systems model may provide alternate avenues of epistemology toward creativity as related to empathy and socially oriented problem solving such as those explicitly addressed in social studies (Sosa 2019, 1–3). A particular area of social studies in which the systems model of creativity could be implemented is as an extension of critical theory, acting as a methodological counterpart to the historically investigative nature of critical studies (Bohman 2019).

The educational questions regarding creativity follow from its social and psychological concepts. Before creativity was considered a social good, it was largely treated as an aesthetic or artistic concept that needed to develop naturally, unimpeded by educators, according to early romantic views (Zimmerman 2009, 384). Piaget proposed that creativity could indeed be developed in educational settings by making the environment as conducive as possible for imagination while attenuating rational thought, which he saw as the natural antagonist of pure creativity (Gajdamaschko 2006, 37). Vygotsky would challenge this notion by positing that creativity requires both imagination and rational thought (Gajdamaschko 2006, 37; Ayman-Nolley 1992, 78). Furthermore, Vygotsky advanced the theory that creativity is not only individualistic in development, but also deeply cultural (Sawyer et al 2003, 17–18).

Early developmental psychologists tackling the problem of creativity were primarily interested in describing and explaining creativity in the form of philosophical treaties in essays and manuscripts. Like many theorists of the late 18th and early 19th centuries, these early pioneers of creativity formulated their theories with intent to explore and test them via empirical studies once the empirical tools for qualitative and quantitative study became available. For developmental psychologists Jean Piaget and Sigmund

Freud, their empirical work beyond theoretical treatise is well established (Beilin 1992, 255) but must also be assessed with caution, as empirical work since their early treatises has shown limitations or falsehoods in their claims (Westen 1998, 362). Even more concerning is that much of Vygotsky's work was left unfinished, even at the theoretical level, due to his untimely death, although empirical work using his treatises was, fortunately, continued by other researchers (Vasileva and Balyasnikova 2019).

Epistemological and instrumental limitations of this era also forced the majority of early works by Piaget and Vygotsky to be qualitative in nature (Toulmin 1977), primarily conducted as case studies by Piaget (Beilin 1992, 192–93) and phenomenology by Vygotsky (Robbins 2003, 306). Indeed, much of their work was observational, nonexperimental and reflective in nature. For instance, Piaget's substantial work began as a case study of his own three children's development, from which he produced his first revolutionary reports (Beilin 1992, 192). A plethora of contemporary qualitative and quantitative work inspired by these early treatises has since surfaced.

For Piaget in particular, the treatment of creativity was done via his concept of psychological schema, which is essentially a module of cognitive or intelligent behaviour, described as "a cohesive, repeatable action sequence possessing component actions that are tightly interconnected and governed by a core meaning" (McLeod 2018). According to Piaget, humans develop schemas through processes of "accommodation and assimilation" of new information encountered in the world around them (Ayman-Nolley 1992, 82). Piaget's schema perspective allowed for the natural development of creativity, rather than assuming that it was something humans were naturally endowed with (Ayman-Nolley 1992, 82). Although he stressed the importance of education in the development of creativity (Stoltz et al 2015, 66), his work included development or counter-development, with realistic thought and rational thinking being specific antagonists to imagination and creativity for the growing child; this has left educators with little in the way of actually helping children develop creativity (Gajdamaschko 2006, 36–37). Piaget also acknowledged but could not adequately explain the potential cultural, social and environmental aspects of creativity development through his highly individualized schema perspective (Gajdamaschko 2006, 36–37).

Vygotsky, drawing upon data from Buhler, Wundt and Ribot (Ayman-Nolley 1992, 78), proposed a more systemic or cultural view of psychological development (Glăveanu 2011, 49) in which the various lower and higher psychological functions of human beings would become interwoven as they developed (Vasileva and Balyasnikova 2019, 6). Vygotsky's work was originally published in Russian; much of his unpublished work was later collected into six volumes (Maidansky 2020, 91). The works are primarily philosophical in nature, with treatise and arguments attempting to explain many dilemmas in developmental psychology at the time. However, it is only within the past 50 years or so that Vygotsky's works were translated from Russian to English and that he then found widespread interest among European and American psychologists, educators and other scholars who felt that contemporary developmental psychology was lacking in explanative power in some areas (Maidansky 2020, 90).

An important distinction between Vygotsky and Piaget is that while Piaget treated the development of creativity as a constant linear struggle between imagination and rational thought, Vygotsky emphasized both that creativity and rational thought developed together and that the very nature of their development changed as children grew into adolescents and then further into adults (Ayman-Nolley 1992, 82), although Vygotsky would unfortunately pass away before he could finalize his treatises on adult creativity development. Vygotsky was also keenly interested in the influence of culture on the development of literature and creativity (Glăveanu 2011, 57; Sawyer et al 2003, 1–2), and posited that in the development of creativity as a whole, it was futile to attempt to separate that development from social and cultural interactions (Gajdamaschko 2006, 37), for it is through the process of cultural internalization that humans adapt culturally produced knowledge systems (Lantolf 2001, cited in Shabani 2016, 3).

Approaches to Defining Creativity and Critical Thinking—Implications for Social Studies

Vygotsky posited that creativity developed as a compound of both imagination and realistic thought and, indeed, this approach would become one of the imperative first steps in theoretically linking creativity and critical thinking as codependent processes. Vygotsky argued that in order to use creativity, one needed knowledge, which was primarily accrued

from the internalization of sociocultural information systems such as language, educational knowledge and upbringing (Shabani 2016, 2–3). Greater knowledge would in turn fuel the potential reach of imaginative activities, establishing knowledge platforms from which an individual could conduct more meaningful abstract thought processes toward solving problems related to that knowledge. This epistemological creativity process aligns well with the scientific discovery process, which is understood to require "a prior conceptual framework and the ability to interpret and sometimes reinterpret what has been seen or experienced in abstract terms" (Kirschner 2009, 151). Trained scholars working within their domain are able to process observations by using superior knowledge structures and conceptual frameworks for how those knowledge structures interconnect, enabling them to "encode that information at a deeper, more structural level," which is something that is much more difficult to achieve for novice social studies learners that are lacking in those knowledge structures and conceptual frameworks (Kirschner 2009, 151).

Although empirical work could not be completed to show this at the time, Vygotsky's proposed codevelopment process of imagination and rational thought does find modern support in neuroscience, where creativity is found to be reliant on neuronic activity involving both convergent (focused, rational-like) and divergent (unfocused, imaginative) thought (Gabora 2018, 64–65). Critical thinking could be the essential cognitive glue that connects these divergent and convergent thought processes and realistic systems of knowledge to produce sensible abstract knowledge (Babić, Lacković and Matejić 2019, 845). Through these concepts, it is possible that the individual rationalizes what internalized cultural knowledge platform from which to begin their imaginative thought processes, decides on the boundaries of their divergent thought processes and focal points of their convergent processes, then judges whether the attained abstract information is coherent enough with their perceptions and knowledge of reality to be worth keeping and applying. We could rationalize creativity as the engine of abstract knowledge production, and critical thinking as the navigation system used by individuals to help position and direct themselves in their creative journeys. Indeed, successful education in subjects such as social studies, for instance, depends greatly both on the production of abstract knowledge and on critical thinking to learn both social studies and how to process knowledge associated with the subject, which further requires prior knowledge structures and sound conceptual frameworks to encode observations as sensible information (Kirschner 2009, 146, 150).

More recent psychological work on creativity involves personality trait psychology, which follows a more romantic view of creativity. Trait psychologists have a relatively thorough empirical framework by using the Big Five personality factors model (De Caroli and Sagone 2009, 791; Sung and Choi 2009, 942). This personality model allows for easier categorization of observations as personality effects, along with their quantification. Researchers have found that the Big Five traits can be tied to creative activity and have published several quantitative and qualitative studies with the goal of shining light on this link (Hornberg and Reiter-Palmon 2017; Sung and Choi 2009, 946–47). Personality-based creativity models are also beginning to find links to other important social study concepts such as empathy and social disposition (Dostál, Plháková and Záškodná 2017, 227–28).

Cognitive psychologists have opted to focus on psychological mindedness in tackling creativity, particularly on how open- and close-mindedness affect creativity and innovation. They typically conduct these studies in quantitative approaches, with a notable focus on correlational studies (Ward 2007). Neuroscientists have also become keenly interested in creativity, bringing their own set of powerful quantitative tools such as brain mapping, and using these to conduct correlational studies of creativity with brain functions (Dietrich 2004). Finally, in reaction to all these different fields furthering increasingly different viewpoints of creativity, other psychologists have also advanced work stressing the importance of consolidating the many different definitions of creativity (Gibson 2005; Simonton 2012, 2018).

Critical Thinking, Creativity, Critical Theory and Intercultural Competence

Despite glowing support for critical thinking and its development in educational and critical study contexts, an exact definition of critical thinking is still lacking (Petress 2004; Halonen 1995; Skinner 1971, 373). Broadly, one definition of critical thinking is that it is the cognitive process through which two systems of knowledge are compared. These processes

are often seen as logical, rational and, most important, objective. In this lattermost perceived quality of critical thinking lies a dilemma: How can humans be truly objective in their critical processes? The issue begins with how knowledge is accrued and internalized by humans, which may follow positivist, interpretivist or critical theorist paths of epistemology in individuals (Ryan 2018). Positivist views argue that true knowledge is purely objective and free of bias, while interpretivist views would argue that all internalized knowledge is fundamentally biased due to the beliefs and values of the individuals that inform their interpretations of external information. Critical theory dictates that both individual and greater social power structures play a role in the interpretation of knowledge, and that the individual is inextricably part of those power structures and of the object of inquiry itself. Although historically popular and still widely implemented today in educational curricula, positivist views have been largely superseded in epistemological philosophies and social studies, first by interpretivist and subsequently by critical theory epistemological frameworks (Green 2017).

Understanding critical theory is important because it both establishes the basis of individual internalization of cultural knowledge and hints at the importance of the cultural environment in that internalization process. The individual who is aware of critical theory can better inform themself on how their cultural environment and predisposed biases and knowledge bases may be affecting their interpretations of new knowledge and social issues (Mattessich 2008). A process of internalized criticism or critical thinking may then be undertaken to understand the processes that led to the individual's interpretation of new information, and thus also formulate understandings of the cultural environment and personal biases that induced these interpretations. Perhaps, then, the attainable truth object of such an epistemology is not the exact interpretation of truth but a true understanding of that interpretation.

However, there is also a need to externalize the products of critical theory, which necessitates moving from descriptive form to prescriptive action, an inherently contradictory process (Cohon 2018). This shift requires a certain acceptance that the fruits of critical theory "are only abstract interpretations of the world" (Murray and Ozanne 2006, 52), and once that understanding is established we can begin to adopt a certain critical imagination to produce the critically informed abstractions (Murray and Ozanne 2006, 53–54) necessary to influence the cultural field. Effective critical imagination on both the micro and macro levels (Murray and Ozanne 2006, 53–54) requires, among other things, an awareness of one's own cultural positioning and dispositions. Within a multicultural setting, this awareness becomes one of the facets that comprises intercultural competence, an increasingly desirable and necessary skill set in today's globalized society (Dziedziewicz, Gajda and Karwowski 2014, 32–33).

Intercultural competence is described as "a main resource for successful and effective communication and exchange" that incorporates internal and external outcomes mediated by the attitudes, knowledge and skills of both individuals and organizations (Krajewski 2011, 139–40). Despite its importance, intercultural competence is still in a diminished state of development today (Dziedziewicz, Gajda and Karwowski 2014, 32); even an increasingly diverse society such as Canada, which embraces multiculturalism in policy and belief, still suffers the divisional mindset rhetoric of multicultural relations being "about them" rather than "about us" (Winter 2015, cited in Guo 2017, 266; Vezzali et al 2016, 153), which places more emphasis and importance on the dominating Canadian cultural frameworks (Berry 2013, 673). This could be a consequence of Canadians having still insufficient intercultural skill sets, attitudes and competencies. This lack of inclusivity extends from individuals to government entities and policies, with funding of multiculturalism projects and initiatives being sorely lacking as a result (Guo 2017, 264). It is our belief that enriching intercultural competence, in part through teaching and practising critical thinking skills and critical theory to cultivate within students a sense of inexorable inclusivity in their multicultural environments (Dziedziewicz, Gajda and Karwowski 2014, 33), may be a key to addressing those aforementioned problems.

Intercultural competence is but one example bridging critical thinking (both directly and through critical theory) and creativity (both directly and through critical imagination) to positive multicultural experience; there are many other tangential aspects tying creativity and critical thinking with individual attitudes, beliefs and dispositions that find multiculturalism and cultural diversity favourable. For instance, many of the individual attitudes such as openness (withholding judgment), and curiosity and discovery (tolerating ambiguity and uncertainty), so valued in positive multicultural settings and environments (Kashima and Pillai 2011, 728;

Vezzali et al 2016, 155), are also found to be highly influential in creative and critical thinking activities (Dziedziewicz, Gajda and Karwowski 2014, 34; Sobkowiak 2016, 701). One particular individual attribute that is receiving much focus is one's need for cognitive closure, the cognitive disposition that causes lessened ideational generation and prompts individuals to "seize and freeze" on ideas that are thought to bring rapid closure to a question (Chirumbolo et al 2005, 60; Djikic, Oatley and Moldoveanu 2013, 149).

Individuals high in need (versus low) for cognitive closure will generate simpler structures of interpretation with smaller sets of information, impeding the scope and depth of their critical thinking processes (Djikic, Oatley and Moldoveanu 2013, 149). In addition, they will produce less creatively unique products and fewer ideas in general and outside the norm (Djikic, Oatley and Moldoveanu 2013, 149; Ong and Leung 2013, 287), and will even create pressures stanching group creativity (Chirumbolo et al 2005, 60, 74–77; Vezzali et al 2016, 155). However, even individuals high in need (versus low) for cognitive closure can still perform creative processes relatively well when provided with good procedure and structure to account for their cognitive preferences (Wronska et al 2019; Rietzschel, Slijkhuis and Van Yperen 2014), or can be trained to develop a lower need for cognitive closure through creativity and imagination enrichment interventions (Ong and Leung 2013; Djikic, Oatley and Moldoveanu 2013), which may lead to improvements in intercultural competence. Exposing individuals to multicultural situations has also been shown to influence creativity in positive ways (Goclowska, Damian and Mor 2018; Çelik, Storme and Forthmann 2016; Saad et al 2013), supporting a general idea that environmental, cultural and social pressures and experiences greatly influence individual cognitive processes such as creativity and critical thinking; these studies hint at how these latter processes could influence the former fields. These are but some examples that can clarify the social virtues of developing creativity and critical thinking. As we continue to consider all the possible links between creativity, critical thinking, and diversity and multiculturalism, however, we also become aware of creativity and critical thinking as expansive but essentially fractured fields of research.

Mending the Fields of Creativity and Critical Thinking

A significant issue in research of creativity is that researchers tend to favour certain theoretical perspectives of these concepts while excluding others (MacLaren 2012, 160–61). These factors have led to widespread disagreement over accepted definitions and terminology regarding creativity and its characteristics (Craft 2003, 118), as well as disagreement over best practices and acceptable methodologies for its study (Craft 2003, 118) and its relations with other educational concepts (Dietrich 2004, 1020). For critical thinking, there is a wide gap in functional definition between the classical vision of critical thinking as the ability to evaluate statements and arguments "independent of prior beliefs and opinions that one may hold" (Manalo et al 2013, 121–22) and a more contemporary understanding of it being indivisible from the individual's social context (Danvers 2016, 282–83). Here, too, lies a disagreement that makes the ascertainment of effective educational methods for critical thinking more challenging (Manalo et al 2013, 122). Following the disagreements over creativity and critical thinking, it becomes even more difficult to establish agreements about the nature of relationships between these two important cognitive processes (Glassner and Schwarz 2007, 11).

Educational research, which incorporates the treatises of these warring fields of psychology, also tends to incorporate these epistemological biases (Beghetto 2010, 454–56; Gibson 2005). In addition, creativity continues to be antagonized by ingrained educational misconceptions of the "ideal student," extreme convergent teaching in the form of highly scripted curricula, and a severe assessment and accountability culture that discourages risk taking (Beghetto 2010, 450–54; Peterson 1995, 22, 99–101), sometimes in the hope that qualities such as critical thinking may be enhanced (Padget 2013, 54). Such educational barriers are present not only in children's and adolescents' education, but in undergraduate and graduate education as well (Beresin, Balon and Coverdale 2015; Leung and Chiu 2010). This is why educational creativity and critical thinking research conducted with an open mind and good idea receptiveness, especially one that accepts and connects multiple theoretical perspectives of these two concepts, are so important.

Educational researchers continue to use Vygotsky's work on internalization, the processes in which cultural information is assimilated by the individual

(Emerson 1983, 253–54; Padget 2013, 25–26), which draws attention to the importance of social and cultural environment in the development of children (Vygotsky 1980, 130). How a child can develop past their limits in an educational context is also treated by Vygotsky's zone of proximal development, and is considered to be a prototypical form of scaffolding theory (Sanders and Welk 2005, 203). Educational and social studies further make great use of cognitive approaches in assaying student psychological mindedness to describe creative capacity in terms of open- or closed-mindedness (Chirumbolo et al 2005), situated cognition (Van Dijk et al 2019), cognitive style (Beitel, Ferrer and Cecero 2004) and idea receptiveness (Leung and Chiu 2010).

It is important to consider Vygotsky's internalization process as one that invokes creativity and critical thinking, as it necessitates an interpretation of cultural knowledge or, in other words, a re-creation and criticism of external cultural information into internal accepted knowledge (Sawyer et al 2003, 20), which cultural psychologists believe may be mediated by emotion (Sawyer et al 2003, 32). Likewise, we must also attempt to understand how such knowledge can be externalized as physically productive creativity. Engeström (1987, 1996) posited that internalization could become critical self-reflection followed by externalization as a response to dissonance between cultural norms and the individual attempting to abide by those norms in their cultural activities (Engeström, cited in Moran and John-Steiner 2003, 80). One potential avenue for understanding externalization could be found in Csikszentmihalyi's development of flow theory (Norman 1996, 35). Csikszentmihalyi's work is a blend of philosophical treatises and empirical studies, with a particular emphasis on correlational studies (Whalen 1999, 161–65). His research uses the works of many of his predecessors and current contemporaries, including Vygotsky's zone of proximal development (Csikszentmihalyi 2014a, 58). Csikszentmihalyi's flow state is essentially the state that people can find themselves in when they are entirely engrossed in a task.

Csikszentmihalyi describes the person in flow as being inseparable from their task, being driven by the challenge of accomplishing it, feeling fulfilled and truly happy while in this state (Csikszentmihalyi and Hunter 2003), and losing track of time and basic needs (Norman 1996). Csikszentmihalyi is also notable for his lack of distinction between so-called *Big-C* and *little-c* creativity, the novelty-producing and everyday creativities respectively, making only very scarce mention of these while his prose appears to consider the two to be one and the same (Merrotsy 2013). This unification is important because it gives credence to what may seem to be externally unproductive creativity but which is still essentially productive for the person at an individual level. Studies inspired by flow psychology are relatively novel and tend to use qualitative case studies (Almetev 2019) and a few quantitative correlational studies (Schüler 2007; Bonaluto et al 2016; Csikszentmihalyi and Hunter 2003).

Csikszentmihalyi's theoretical and empirical perspectives find support and inspiration in both romantic and cultural views of creativity. For instance, Csikszentmihalyi's interest in "genius" creativity emphasizes the role of emotional states and personality traits, along with the importance of environment and other external support in maintaining giftedness (Seligman and Csikszentmihalyi 2000, 11). Flow itself requires that the task at hand be slightly more difficult than the skills of the person undertaking it, similar to the way Vygotsky's zone of proximal development (ZPD) theory describes effective learning as someone attempting to understand a concept that is more difficult than the learner's capacities for learning it but who can still understand the concept with a "more knowledgeable other" to help them (Csikszentmihalyi 2014a, 58). Indeed, the concept of Csikszentmihalyi's flow and Vygotsky's ZPD have even been combined into educational practice with success (Basawapatna et al 2013).

Conclusion

Advancing Vygotsky's cultural view of creativity with the incorporation of Csikszentmihalyi's flow theory, taking inspiration from a similar study (Sanders and Welk 2005), may become a crucial avenue toward establishing the exact relationships between creativity and critical thinking. Vygotsky's treatises of creativity establish the scope of the development conditions for creativity along with their generalizability outside of aesthetic and artistic works. Further, Vygotsky also presents us with rationale for the development of creativity requiring a codevelopment of imagination and rational thought, and hints at how critical these processes might be in learning via his concept of internalization. Csikszentmihalyi's flow theory may present a means for teaching externalized creativity with exercises designed to induce flow in learners. Indeed, it may be possible for educators to develop methods that can help learners

internalize knowledge through their ZPD and externalize it by reaching their flow states, furthering their understanding of the psychological, environmental and emotional conditions required for them to achieve and control both processes.

Educators could further enable learners with tools such as critical theory and self-criticism, which could allow them understand how they internalize and externalize information as part of their sociocultural environments, following the need to understand and improve individual intercultural competencies as well as lowering the need for cognitive closure. The overarching processes governing the effectiveness of both internalization and externalization may be creativity and critical thinking. Further, educators must be prepared to consider and incorporate multiple definitions of creativity and critical thinking in order to create an effective educational model for their enrichment in students. This work could contribute to satisfying our growing need for creativity and critical thinking, not only for the sake of innovation as a social good, but also for the sake of socially crucial skill sets such as intercultural competence.

Educational research on creativity and critical thinking is deeply entrenched in psychological work. In response to perceived shortcomings of initial nativist and romantic views of creativity, we have seen other theoretical perspectives, such as Piaget's schematic interpretation and Vygotsky's cultural treatise of creativity, flourish throughout the 20th century. Vygotsky's views have aided in understanding how creativity and critical thinking may be codependent processes. Contemporary blends such as Csikszentmihalyi's incorporative flow theory, which has only begun to bloom as a 21st-century phenomenon, also have some common points with some of Vygotsky's early treatises and may be used to construct a more complete picture of how creativity, critical thinking and sociocultural concepts may be linked. We have also seen cognitive and trait psychology treatises of creativity become increasingly emphasized over the turn of the 20th century. However, I believe it is only through consolidation of all these views that we will reach a full understanding of creativity and critical thinking, and how educators may enrich these in their students. And perhaps with enough concerted effort, we may one day reach an answer to the simple question that has troubled mankind since the age of Plato: What is creativity?

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