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Redefining Creativity — Analyzing Definitions, Collocations, and Consequences

ABSTRACT

How holistically is human creativity defined, investigated, and understood? Until recently, most scientific research on creativity has focused on its positive side. However, creativity might not only be a desirable resource but also be a potential threat. In order to redefine creativity we need to analyze and understand definitions, collocations, and consequences of creativity. In this paper, we reviewed 42 explicit definitions and 120 collocations. The thematic analysis of our data reveals that the vast majority of creativity definitions do not emphasize the positive/negative aspects of the concept. Neither are the negative aspects of creativity emphasized in its numerous collocations. Thus, we propose a comprehensive definition of creativity and a three-dimensional analytical framework for investigating its consequences, positive and/or negative. Finally, we highlight the need to move to a new era of *conscientious creativity*, in which all humans are considered able and wise enough to *create something ethical and constructive* for everyone in society.

INTRODUCTION

Can a human being with a creative idea be a fatal combination? This crucial question we attempt to answer in this paper. Nowadays, everyone seems to admire creativity, which is believed to hold the solution to all problems present and future. We can witness this vast interest in creativity in various contexts, such as education, in which creative thinking is considered a key skill for future citizens (e.g. Craft, Gardner, & Claxton, 2008), or in organizations, where corporations strive to dominate international markets through creative ideas and products (e.g. Baucus, Norton, Baucus, & Human, 2008).

The noun *creativity* is not only a relatively new and fashionable but also confusing, even misunderstood, term, which appeared for the first time in printed form in 1875 ("creativity", 2009). It derives from the Latin *creatus* (past

participle of *creare*), which means "to make, produce", and is related to *crescere* (= arise, grow). According to Piirto (2004), creativity as a scientific term has its roots in psychology, more specifically in Guilford's (1950) renowned presidential address to the American Psychological Association and in Stein's (1953) classic article. However, what constitutes creativity has not been defined or featured in a clear and unambiguous way (Ferrari, Cachia, & Punie, 2009). The semantic content rather emerges from the various ways and multiple contexts in which the term has been used and evoked throughout history. Moreover, the nature and definition of creativity vary across cultures (Starko, 2005) and seem to be value- and culture-specific (Craft, 2005).

The term *creativity* and its cognates are used mainly in a positive manner, although it also has some pejorative collocations such as *creative accounting* (Sternberg, 2010). Conversely, we are interested in a holistic understanding of the complex phenomenon of human creativity arguing that what should matter is not only the quality of a creative idea but also its effects on society in the short and long term. In other words, the purpose of this paper is to redefine creativity by not only examining the most important explicit definitions and used collocations but also analyzing and understanding the consequences of human creativity, both positive and negative. This, holistic approach, has been absent from previous studies that focused only on specific negative aspects of creativity, such as deviance (e.g. Plucker & Runco, 1999), mental illness (e.g. Eisenman, 1997), or drug use by creative individuals (e.g. Plucker & Dana, 1999).

More specifically, in this study we focus on the missing or marginalized elements of 42 explicit definitions and 120 collocations of human creativity, and the agreements and disagreements surrounding them. Our data analysis provides four key components of creativity definitions and five categories of creativity collocations. In this paper, we also present (a) a new definition of creativity; (b) a three-dimensional analytical framework for investigating the consequences of human creativity; and (c) an account of the need to move to a new era of creativity.

NEED TO REDEFINE CREATIVITY

The time period from the middle of the 20th century up to today constitutes the *democratic era* of scientific research on human creativity[1]; anyone is considered able to create from anything (e.g. NACCCE, 1999). The focus on creativity gradually moved from *eminent*, *Big C Creativity* to *everyday*, *little c creativity* (Craft, 2001). Several scholars (e.g. Cropley, Kaufman, Cropley, & Runco, 2010) have pointed out that during this time period the field has been dominated by the positive, *bright side of creativity* (Arndt, Greenberg, Pyszczynski, Solomon, & Schimel, 1999); the other side, the dark one (McLaren, 1999), has in essence been overlooked.

[1] We consider as a starting point of the scientific study of human creativity the presidential address of Joy Paul Guilford (1950) to the American Psychological Association.

Recently, however, interest in the negative aspects of creativity has been increasing (Banaji & Burn, 2006; Clark & James, 1999; Craft et al., 2008; Cropley, Kaufman, & Cropley, 2008; Kampylis, 2010; Runco, 2007), and the assumption that creativity is always a positive thing has been thrown into question. Two main issues can be identified in this promising branch of creativity research:

(a) the *mad genius/mental health issue*, through examination of the potential connection between mental illness and creativity (e.g. Kaufman, 2009);

(b) the *intention/interest issue*, through investigation of the intentional use of human creativity not only for constructive but also for destructive ends (e.g. Cropley et al., 2008).

Cecile Neber (1988) placed specific emphasis on the *dark side* of artistic creativity through the examination of blocks, unfinished works, and the urge to destroy. A decade ago, McLaren (1999) also investigated the *dark side of creativity*, underlining that our *creative impulse* is often placed in the service of unethical pursuits. According to Runco (2004), the dark side of creativity may be overlooked because morality implies a type of conformity whereas creativity is mainly connected to non-conformity and individualism (see also Runco & Nemiro, 2003). Runco and Nemiro argued that creative efforts must be evaluated in terms of their potential effects, in terms of their background, and in terms of their intentionality. Recently, Martin (2006) made a clear argument for *moral creativity*, which aims at creative products that are not only purposefully generated and new but also morally valuable.

In the organizational context, Baucus et al. (2008) emphasized the "... surprising lack of attention to ethical issues and questions within the creativity literature" (p. 98). They identified four serious ethical issues concerning creativity: (a) breaking rules and standard operating procedures; (b) challenging authority and avoiding tradition; (c) creating conflict, competition, and stress; and (d) taking risks. Baucus et al. asserted that organizations allowing or enabling employees to break the rules might be more creative. By breaking the rules, organizations may recognize that the rules themselves have become "frozen" habits that place limits on creative behavior. Paradoxically, on the one hand organizations set rules, and on the other hand they encourage employees to break them. This ambiguity allows employees to decide on key ethical issues for themselves, with questions including: (a) Which rules can be broken? (b) Under what circumstances? (c) How far can it be taken? (d) Who gets to make or break the rules?

In the educational context, Bowers (1995) pointed out that education overemphasizes the fostering of individual creativity without concern for its consequences to others or the environment, and he supported the need for a creative education aimed at establishing an ecologically sustainable culture. More recently, Claxton, Craft, and Gardner (2008) expressed concerns regarding creativity by explicitly emphasizing "... the need for creativity to be exercised responsibly, to have some

moral underpinning." They pointed out that many researchers are worried about certain forms of creativity that are ". . . self-indulgent, egotistical, driven by materialism and wasteful of both mental and material resources." They concluded by stating: ". . . creativity that is unbridled by any concern for its moral responsibilities of social or ecological consequences is, we seem to agree, potentially dangerous" (p. 169). In addition, Sternberg (2010) argues that our world suffers from, among other things, global warming because of the dark side of creativity and intelligence; therefore, we should always assess and encourage wisdom in combination with assessing and teaching knowledge and creativity.

The majority of creativity researchers, according to Cropley et al. (2008), have focused on *benevolent creativity* by assuming that creativity leads to ethical and constructive purposes. However, the other side of the coin, which Cropley et al. call *malevolent creativity*, also exists. It is deliberately planned to damage others and is often related to crime, competition, and "terrorism". The same authors also argue that successful counter-"terrorism", and any anti-criminal work, requires a thorough understanding of human creativity. Malevolent and benevolent creativity are, according to Cropley et al. (2008) and Kaufman (2009), governed by the same essential principles and differ only in their intended purposes and the consequences of the creative products.

There is theoretical and practical value in distinguishing constructive/positive and destructive/negative aspects of creativity to the extent that various external factors trigger positive or negative creativity, or that various *internal dynamics* are involved in their operation. For example, James, Clark, and Cropanzano (1999) asserted that the internal dynamics of positive and negative creativity are somewhat different. In addition, they assumed that the emotional and outcome-centered components are the key determinants of whether creative outcomes will be positive or negative.

Creativity is not only a desirable resource that should be set free, but also a threatening potential that may actually be harmful if applied for destructive ends. Therefore, the question is not only concerned with what creative potential the individual has but also what his/her intentions, plans, and values are. Yet, all these factors depend primarily on how each person conceptualizes, defines, and understands creativity.

Several researchers have pointed out discrepancies between the numerous definitions of creativity and the disagreements among scholars from various disciplines about the concept itself (e.g. Cropley, 1999). Therefore, it is very difficult to examine the consequences of human creativity when it is not clear what we mean when using with this fuzzy, yet overused, term. Nevertheless, conceptual ambiguities can be resolved, or at least minimized, by *conceptual analysis* (Saariluoma, 1997, p. 27) and by the formation of more comprehensive definitions.

One way to try to overcome the problem of defining multifaceted concepts such as creativity is to conduct reviews and construct classifications of the proposed definitions in order to identify agreements, disagreements, and missing or

marginalized elements. Before conducting a review of creativity definitions, we searched the relevant literature for related studies. Table 1 lists some key studies on creativity definitions.

TABLE 1. Reviews of creativity definitions.

Researcher(s)	Year of publication	Definitions reviewed	Main outcome(s)
Morgan	1953	25	Meta-analysis: the most common element of the examined definitions was novelty.
Taylor	1959	>100	Content analysis resulted in five distinctive developmental levels of creativity that involve diverse psychological and cognitive processes: expressive, technical, inventive, innovative, and emergentive creativity.
Repucci	1960/1988	60	Classification: 1. Gestalt or perception 2. End product or innovation 3. Aesthetic or expressive 4. Psychoanalytic or dynamic, 5. Solution thinking 6. Varia.
Rhodes	1961	40 (+16 definitions of imagination)	Classification: The 4 Ps of creativity: Person, Process, Product, and Press
Welsch	1980	22	Synthesis of reviewed definitions: "Creativity is the process of generating unique products by transformation of existing products. These products, tangible and intangible, must be unique only to the creator, and must meet the criteria of purpose and value established by the creator" (p. 97)
Parkhurst	1999	unspecified	A general definition is a prerequisite for any attempt to foster students' creative thinking.Synthesis of reviewed definitions: "The ability or quality displayed when solving hitherto unsolved problems, when developing novel solutions to problems others have solved differently, or when developing original and novel (at least to the originator) products."

Researcher(s)	Year of publication	Definitions reviewed	Main outcome(s)
Cropley	1999	unspecified	He emphasized that, ". . . in addition to being effective and relevant, creativity has an ethical element".
Plucker, Beghetto & Dow	2004	34 (explicit) 37 (implicit)	Content analysis in 90 creativity studies: only 34 (38%) provided an explicit definition. Synthesis of reviewed definitions: ". . . 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*"
Robinson	2008	unspecified	There are no substantive changes in creativity definitions in dictionaries over the past 6 decades.
Ferrari, Cachia, & Punie	2009	unspecified	A working definition of creativity and innovation in the context of education.

All of the previous attempts to collect and classify the definitions of creativity (see Table 1) are useful, but they mainly emphasize the common elements found in the definitions examined. In other words, these attempts stress the overlaps and intersections of definitions but do not place an emphasis on potential missing elements such as the positive and negative aspects of creativity. For this reason, we conducted our own literature review.

METHOD

We carried out a literature review in order to locate, contrast, classify, and analyze explicit definitions of creativity in three different sets of digital and digitized documents:

1. Our personal collection of creativity research literature, consisting of the following: 1,090 journal articles and conference papers, 128 books, and 76 official documents and reports.
2. Open-access databases such as *Google Scholar* (http://scholar.google.com), *Google Books* (http://books.google.com), *ERIC* (www.eric.ed.gov), and the *Directory of Open Access Journals* (www.doaj.org).

3. Academic databases such as *APA PsycNET* (http://psycnet.apa.org), *EBSCOhost* (http://www.ebscohost.com), *Emerald* (http://info.emeraldinsight.com), InformaWorld (www.informaworld.com), *JSTOR* (www.jstor.org), *ProQuest Digital Dissertations* (http://proquest.umi.com/pqdweb?RQT=302&cfc=1) *Sage Journals Online* (http://online.sagepub.com), *Science Direct* (www.sciencedirect.com), *SpringerLink* (www.springerlink.com), and *Wiley InterScience* (www3.interscience.wiley.com) through the Jyväskylä University Library (www.jyu.fi). Throughout these databases we investigated, among other documents, prior issues of journals that regularly publish articles on creativity research, such as *Creativity Research Journal*, *Journal of Creative Behavior*, *Psychology of Aesthetics, Creativity and the Arts*, and *Thinking Skills and Creativity journal*.

We searched the aforementioned sets of digital and digitized documents using the following keywords and phrases, as well as various combinations of them: "creativity", "creative", "thinking", "definition", "creativity is", "creativity is defined", and "define creativity as". Thereafter, we searched the same sets of digital documents in order to determine the most common creativity collocations used by creativity scholars.

Throughout the data-gathering procedure, we collected 42 explicit definitions (see below, Table 2) and 120 collocations of creativity (see Table 3). Sources of the definitions are provided in the reference list, marked with an asterisk.

DATA CODING, ANALYSIS AND LIMITATIONS

The collected creativity definitions and collocations were stored in two separate electronic files. These files were coded and analyzed through the computer-assisted qualitative data analysis software *NVivo* (version 7.0). We used *thematic analysis* to examine the creativity definitions and collocations that we collected through the data-gathering procedure, because it has been recognized as an efficient and flexible way of coding qualitative information (Boyatzis, 1998). Braun and Clarke (2006) define thematic analysis as ". . . a method for identifying, analyzing and reporting patterns (themes) within data" (p. 79) and advocate it as a useful, accessible, and theoretically flexible method for qualitative research. They also point out that thematic analysis is widely used, although it is rarely acknowledged.

Before focusing on the results, it is useful to point out the main limitations of this study. First, in the limited space of a journal paper we cannot present all creativity definitions and collocations but those we consider as the most important for the purposes of this study. Second, we considered only those documents made available in the English language, and consequently, we did not have access to definitions provided in other languages and cultural contexts. Finally,

as with any literature review, the present study depends on our interpretation of the data, used here in a de-contextualized way.

RESULTS

CREATIVITY DEFINITIONS

Several researchers (Banaji & Burn, 2006; Cropley, 1999; Kampylis, 2010; Kampylis, Berki, & Saariluoma, 2009; Mumford, 2003; Parkhurst, 1999; Plucker, Beghetto, & Dow, 2004) have focused on the remarkable breadth and number of creativity definitions. This alone constitutes a real problem and a big challenge for the field of creativity research. The proposed definitions appear to be too broad or too narrow to sufficiently enhance our understanding and guide the interests of creativity researchers and the concerns of practitioners. For example, one-dimensional approaches to creativity tend to view a part of creativity as the whole phenomenon. The notion of *metonymy*, namely letting one aspect or part of something stand for the whole of it, underlies our use of stereotypes and, thus, seems to play a significant role in our subsequent cognitive processing (e.g. Bechter & Abrahamsen, 1990, p. 237). This often results in what the present authors consider to be a narrow conceptualization of creativity, contributing to forming the perception that creativity is not as encompassing as it truly is.

Some scholars have attempted to eliminate the vagueness surrounding the concept of creativity by coining more focused terms such as *lateral thinking* (De Bono, 1996). Others, such as Sternberg and Lubart (1999), have pointed to concrete obstacles created by the current definitions and argue that the lack of criteria for creativity seems to render the phenomenon either elusive or trivial. According to Abinun (1984), the term creativity is neither trivial nor unrestrained, because it has clear limitations and restrictions. However, it is also possible to take the view that the concept of creativity has a large and unclear boundary along with a clear center.

The analysis and comparison of the collected definitions (Table 2) reveals that creativity researchers and theorists have approached what could be termed an agreement, since the majority of their definitions intersect at the following key components[2] for understanding creativity:

1. Creativity is a key ability of *individual(s)*.
2. Creativity presumes an *intentional activity* (process).
3. The creative process occurs *in a specific context* (environment).
4. The creative process entails the generation of *product(s)* (tangible or intangible). Creative product(s) must be *novel* (original, un*conventiona*l) and *appropriate* (valuable, useful) to some extent, *at le*ast for the creative individual*(s)*.

[2] These key components are commonly referred to the literature as the 4 Ps of creativity: person, process, press, and product (Richards, 1999; see also Rhodes, 1961).

TABLE 2. Forty-two explicit definitions of the term *creativity*.

Author(s)	Year	Definition
Guilford	1950	". . . refers to the abilities that are most characteristic of creative people. Creative abilities determine whether the individual has the power to exhibit creative behavior to a noteworthy degree." (p. 444).
Stein	1953	". . . that process which results in a novel work that is accepted as tenable or useful or satisfying by a group at some point in time". (p. 311).
Rogers	1954	". . . is the emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and the materials, events, people, or circumstances of his life on the other." (p. 250).
Rhodes	1961	". . . is a noun naming the phenomenon in which a person communicates a new concept (which is the product). Mental activity (or mental process) is implicit in the definition, and of course no one could conceive of a person living or operating in a vacuum, so the term press is also implicit." (p. 305).
Mednick	1962	". . . the forming of associative elements into new combinations which either meet specified requirements or are in some way useful. The more mutually remote the elements of the new combination, the more creative the process or solution." (p. 221).
Bruner	1962	". . . an act that produces effective surprise." (p. 18).
Koestler	1964	"The creative act is not an act of creation in the sense of the Old Testament. It does not create something out of nothing: it uncovers, selects, re-shuffles, combines and synthesizes already existing facts, ideas, faculties and skills." (p. 120).
Torrance	1966	". . . a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficult; searching for solutions, making guesses or formulating hypotheses about the deficiencies, testing and retesting these hypotheses and possibly modifying and retesting them, and finally communicating the results." (p. 8).

Author(s)	Year	Definition
May	1975	". . . the process of bringing something new into being." (p. 39).
Welsch	1980	". . . the process of generating unique products by transformation of existing products. These products, tangible and intangible, must be unique only to the creator, and must meet the criteria of purpose and value established by the creator." (p. 97).
Amabile	1983	". . . creativity can be regarded as the quality of products or responses judged to be creative by appropriate observers, and it can also be regarded as the process by which something so judged is produced." (p. 31).
Mumford & Gustafson	1988	". . . creativity appears to be best conceptualized as a syndrome involving a number of elements: (a) the processes underlying the individual's capacity to generate new ideas or understandings, (b) the characteristics of the individual facilitating process operation, (c) the characteristics of the individual facilitating the translation of these ideas into action, (d) the attributes of the situation conditioning the individual's willingness to engage in creative behavior, and (e) the attributes of the situation influencing evaluation of the individual's productive efforts." (p. 28).
Vernon	1989	". . . a person's capacity to produce new or original ideas, insights, restructurings, inventions, or artistic objects, which are accepted by experts as being of scientific, aesthetic, social or technological value." (p. 94).
Boone & Hollingsworth	1990	". . . any form of action that leads to results that are novel, useful, and predictable." (p. 3).
Ochse	1990	". . . creativity involves bringing something into being that is original (new, unusual, novel, unexpected) and also valuable (useful, good, adaptive, appropriate)." (p. 2).
Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares	1991	". . . does not represent a unitary psychological attribute, but rather an outcome of a dynamic interplay of certain individual and situational variables." (p. 91).

Author(s)	Year	Definition
Csikszentmihalyi	1996	". . . any act, idea or product that changes an existing domain, or that transforms an existing domain into a new one." (p. 28).
Herrmann	1996	"Among other things, it is an ability to challenge assumptions, recognize patterns, see in new ways, make connections, take risks, and seize upon a chance." (p. 245).
NACCCE	1999	". . . an imaginative activity fashioned so as to produce outcomes that are original and of value." (p. 29).
Parkhurst	1999	". . . is the ability or quality displayed when solving hitherto unsolved problems, when developing novel solutions to problems others have solved differently, or when developing original and novel (at least to the originator) products." (p. 18).
Candy & Edmonds	1999	". . . a set of activities that give rise to an outcome or product that is recognized to be innovative as judged by an external standard." (p. 4).
Seltzer & Bentley	1999	". . . is not an individual characteristic or innate talent. Creativity is the application of knowledge and skills in new ways to achieve a valued goal." (p. viii).
Eisenberger, Haskins & Gambleton	1999	". . . involves the generation of novel behavior that meets a standard of quality or utility." (p. 308).
Sternberg & Lubart	1999	". . . the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful, adaptive concerning task constraints)." (p. 3).
Corsini	1999	"Ability to apply original ideas to the solution of problems; the development of theories, techniques or devices; or the production of novel forms of art, literature, philosophy or science." (p. 234).
Csikszentmihalyi	1999	". . . a phenomenon that is constructed through an *interaction between producers and audience*. Creativity is not the product of single individuals, but of social systems making judgments about individuals' products." (p. 314).

Author(s)	Year	Definition
Aleinikov	1999	". . . the ability or the process of producing something new and useful." (p. 840).
Cropley & Urban	2000	". . . the production of relevant and effective novel ideas." (p. 486).
Boden	2001	". . . is the ability to come up with new ideas that are surprising yet intelligible, and also valuable in some way". (p. 95).
Van Hook & Tegano	2002	". . . the interpersonal and intrapersonal process by means of which original, high quality, and genuinely significant products are developed." (p. 3).
Feist & Barron	2003	". . . is a specific capacity to not only solve problems but to solve them originally and adaptively." (p. 63).
Carayiannis & Gonzalez	2003	". . . the ability to perceive new connections among objects and concepts – in effect, reordering reality by using a novel framework for organizing perceptions." (p. 588).
Mumford	2003	". . . involves the production of novel, useful products."(p. 110).
Ward & Saunders	2003	". . . is the result of the convergence of basic cognitive processes, core domain knowledge, andenvironmental, personal, and motivational factors which allow an individual to produce an object orbehavior that is considered both novel and appropriate in a particular context." (p. 862).
Plucker, Beghetto & Dow	2004	". . . 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).
Boden	2004	". . . the ability to come up with ideas or artefacts that are new, surprising and valuable." (p. 1).
Pope	2005	". . . is extra/ordinary, original and fitting, full-filling, in(ter)ventive, cooperative, un/conscious, fe<>male, re . . . creation." (p. 52).
Sawyer	2006	". . . the emergence of something novel and appropriate, from a person, a group, or a society." (p. 33).

Author(s)	Year	Definition
Runco	2007	". . . a reflection of cognition, meta-cognition, attitude, motivation, affect, disposition, and temperament." (p. 320).
Barnes & Shirley	2007	". . . the act of putting two or more ideas, materials or activities together in what feels (to the creators) like an original, surprising and valued way." (p. 164).
Ferrari, Cachia, & Punie	2009	". . . is skill for everyone; ability to make new connections; capacity to generate new ideas; divergent thinking; ability to get out of the rails; capacity to produce original and valuable outcomes. (p. 14).
Kampylis, Berki & Saariluoma	2009	". . . the activity (both mental and physical) that occurs in a specific time-space, social and cultural framework and leads to tangible or intangible outcomes that are original, useful, ethical and desirable, at least to the creator(s)". (p. 18).

As can be seen from Table 2, various ambiguities exist. For instance, in most of the definitions the key terms novel (along with new, original, unconventional, and so on) and appropriate (together with valuable, useful, functional, and so forth) are used in a vague way as it is not apparent for whom and to what extent the creative process and product are novel and valuable. Such ambiguities challenge the clarity of the concept of creativity and raise questions such as "How original is original enough?" (Perkins, 1988; Sawyer, 2000), or "For whom a product, process, or idea should be new" (Cropley, 1999, p. 513).

We further analyzed the collected definitions, utilizing the *thematic analysis* framework (Boyatzis, 1998) in an attempt to specify not only the key concepts, differences, overlaps, and intersections that emerged but also the key creativity elements that are absent or marginalized from these definitions. In particular, we investigated whether these definitions focus, explicitly or implicitly, on the positive/negative aspects of human creativity.

We discovered that these general definitions of creativity do not emphasize the positive/negative dimensions of the concept itself. Thus, it is not clear whether a particular type of creativity serves constructive or destructive means and/or ends. Moreover, it is not always clear for whom of the following the creative activity and product are novel as well as valuable: (a) for the person who creates; (b) for the specific field in which the novel product is created; or (c) for society in general.

Naturally, the short- or long-run timeline brings its own essence and difficulty in assessing and appraising the value and contribution of an original idea. It is

particularly difficult to foresee both the near and the distant future as well as to follow and understand the use and reuse of one idea as a stepping-stone to creating another. Moreover, it can be very hard for the creator of the original idea to anticipate the potential misuse(s) of his/her idea by end-user(s). In short, the timing and relevant marketing of an idea may be crucial for its understanding, final acceptance, and consequences. For example, English politicians were skeptical about electricity when it was discovered and unclear about its potential creative applications. However, they were convinced of its value when it was suggested that the government could at some point tax its use.

Historically, many creative ideas failed to find wide acceptance by their contemporaries, even though future generations may consider them extremely important. For instance, the enquiry-based teaching of Socrates and the resistance it raised among other philosophers and the masses in Ancient Greece is one of many examples that clearly illustrate the reluctance to accept new, different thinking and novel practices. A creative idea might be seen at first to be infeasible and negative, but over time the idea may become feasible and positive, and vice versa.

Only a small number of researchers have explicitly emphasized the absence of the positive/negative dimensions of creativity in their definitions. Rogers (1954), for instance, asserted that there is no fundamental difference in the creative process as evidenced in composing a symphony or devising new instruments of killing. The evaluation of the creative process and product as constructive or destructive rests in subjectivity, which is why Rogers avoided incorporating subjectivity in his definition (see Table 2).

Yet, by carefully examining the key components of creativity, novelty, and appropriateness, we will realize that these also rest in subjectivity. It is not always clear whether a process or a product is really novel and appropriate and for whom. However, the subjectivity of evaluations of creative processes and products as constructive or destructive should not deter us from seeking out ways to encounter and encourage the constructive aspects of creativity and not the destructive ones. For instance, on debates around climate change, Cropley (1999) has pointed out the ethical element of creativity by stating that

> . . . in addition to being effective and relevant, creativity has an ethical element. Nowadays, this aspect has become particularly urgent . . . where the need for environmental responsibility is increasingly being stressed (p. 513).

We claim that the ethical dimensions of creativity should be explicitly stated in its definitions. For this reason, we present here a new definition that can be applied specifically in the context of education, which explicitly refers to the ethical dimensions of human creativity:

> Creativity is the general term we use to describe an individual's attitude to, ability for, and style(s) of creative thinking that leads to a structured and intentional activity, mental and/or physical. This activity may be personal and/or collective, occurs in a specific space–time, political, economic,

social, and cultural context, and interacts with it. The creative activity aims to realize the creative potential of the creator(s) and leads to tangible or intangible product(s) that is (are) original, useful, and desirable at least for the creator(s). The creative product(s) should be used for ethical and constructive purposes.

However, the definitions are not the whole story in understanding creativity. Creativity collocations also play an important part in the formulation of the meaning of creativity.

CREATIVITY COLLOCATIONS

We continued our literature review by tracking down the most widespread collocations dealing with key aspects of creativity and classified them into five classes based on their value-laden usage: *positive*, *negative*, *everyday*, *exceptional*, and *neutral*. The non-exclusive list presented in Table 3 includes 120 words that collocate with creativity in various academic texts.

TABLE 3. Taxonomy of 120 collocations of creativity.

Positive	Aesthetic, Benevolent, Bright side, Collaborative, Critical, Deliberate, Democratic, Divine, Ethical, Evolutionary, Experimental, Germinal, Humane, Lifespan, Moral, Musical, Normal, Orthodox, Philosophical, Poetic, Positive, Proactive, Productive, Prolific, Radical, Religious, Revolutionary, Self-actualizing, Social, Spiritual, Spontaneous, True, Useful
Eminent	Big C, Bing-Bang, Distinguished, Elite, Emergentive, Eminent, Exceptional, Extraordinary, Great, High, Historical, Major, Outstanding, Primary, Profound, Special-talent, Sublime, Traditional
Neutral	Academic, Adult, Applied, Artificial, Artistic, Associative, Cognitive, Collective, Conceptual, Contemporary, Crystallized, Cultural, Digital, Entrepreneurial, Female, Fluid, Functional, Group, Hands on, Hidden, Human, Impromptu, Individual, Innovative, Institutional, Intellectual, Intentional, Inventive, Linguistic, Male, Mathematical, Mental Modern, Non-verbal, Organizational, Personal, Physical, Potential, Private, Pro-c, Psychological, Quantum, Reactive, Real-world, Scientific, Self-perceived, Sustained, Technical, Technological, Unpredictable, Verbal, Visual
Everyday	Common, Everyday, Expressive, Little c, Low, Mini-c, Minor, Mundane, New, Ordinary, Practical, Secondary
Negative	Abnormal, Dark side, Malevolent, Negative, Pseudo-creativity

Table 3 provides an overview of the 120 creativity collocations through identifying potential meanings. We selected these five categories because in this paper we are dealing with the consequences of human creativity. Otherwise, we do not want to compare and contrast the creativity collocations. A more detailed comparison of these would undoubtedly require a more detailed typology to justify the comparative nature of such research. In the following sections, we report on the meanings given to creativity according to the particular collocation used in conjunction with the word *creativity*.

Our review reveals that creativity scholars have utilized these collocations in order to determine different aspects of creativity, such as the distinction between *Big C* and *little c creativity* (for a review see Kampylis et al., 2009, p. 18). In other words, the meaning of the term *creativity* is partly expressed through the words collocated with it. More analytically, we discovered that

1. thirty-two (32) of these collocations imply that creativity is a somewhat *positive phenomenon* (e.g. humane, moral);
2. eighteen (18) collocations refer to *exceptional types* of creativity (e.g. eminent, elite);
3. fifty-three (53) collocations have *neutral meaning* (e.g. digital, verbal, visual);
4. twelve (12) collocations refer to the *everyday aspects* of creativity (e.g. ordinary, mundane); and
5. five (5) collocations provide a *negative meaning* (abnormal, dark side, malevolent, negative, and pseudo-creativity).

TOWARDS HOLISTIC ANALYTICAL FRAMEWORKS

The data analysis reveals that the negative aspects of creativity are emphasized neither in creativity's numerous definitions (see Table 2) nor in its collocations (Table 3). However, the creative outcomes may range from the most constructive (e.g. the invention and application of penicillin) to the most destructive ones (e.g. the development and use of weapons of mass destruction (WMD). Yet, these outcomes are considered equally creative because they are novel, appropriate, and desirable for the creative person(s). Even the same person may use his/her creative potential for constructive (e.g. da Vinci's artworks) and/or destructive (e.g. da Vinci's military devices and weapons) purposes (Runco, 2007). Therefore, when we use the term *creativity*, we must carefully consider the "... reciprocal relations between creativity and intentionality" (TenHouten, 1999, p. 800) and its consequences not only to the creators but also to others.

One promising method of examining the consequences of human creativity at a personal and social level is the three-dimensional Creativity Consequences Analytical Framework (Figure 1). In this framework, each dimension represents a key aspect of human creativity:

1. The intention(s) of the creator(s).
2. The effect(s) that the creative process and its outcomes have for the creator(s).
3. The consequences that the creative process and its outcomes have for any others and for the whole of society.

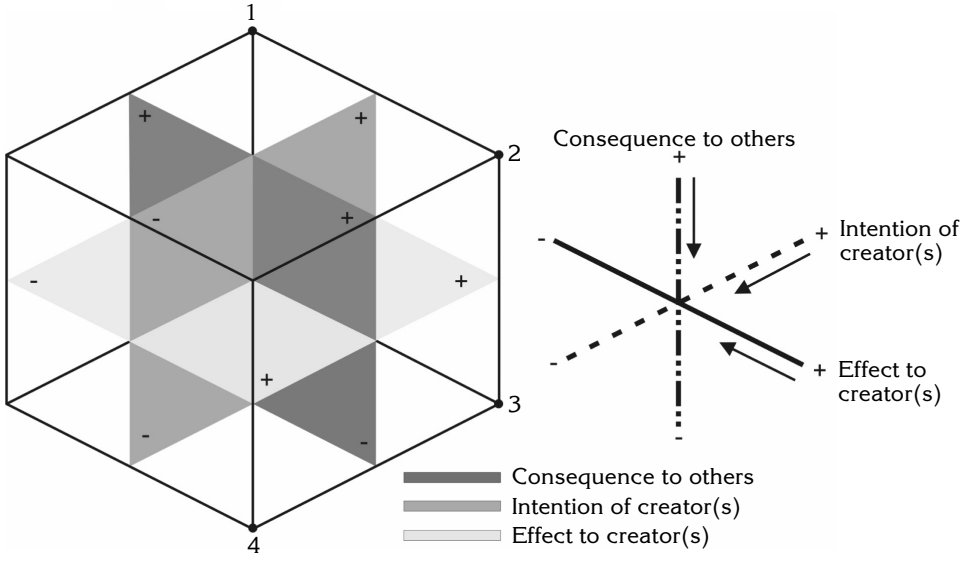

FIGURE 1. Creativity Consequences Analytical Framework.

To demonstrate the use and comprehensiveness of the proposed analytical framework, we will examine four cases of creativity applications, represented as bullets in Figure 1:

1. *Bullet 1* corresponds to cases such as the early support and affirmation of Copernicus' well-known heliocentric theory by Galileo Galilei, who was consequently placed under house arrest for the rest of his life. The creator, in this case originator, had positive intentions; the consequences for others — even for society as a whole — were constructive, but the effects for the creator himself were negative.
2. *Bullet 2* denotes creativity that derives from positive intentions targeting and achieving the "common good". The consequences are very positive not only for the creator(s) but also for others, even for the whole of society. A typical example is the discovery of penicillin by Alexander Fleming, which opened the way to the development of antibiotics.

3. *Bullet 3* represents the type of creativity that also derives from positive intentions. The difference between this type and that denoted by Bullet 2 is that the consequences of this type are positive only for the creator(s), while they are negative for other people. For instance, the discovery of the New World by Christopher Columbus had positive effects for Europeans but negative consequences for Native Americans.

4. *Bullet 4* symbolizes what Cropley and his co-authors (2008) call *malevolent creativity*. That is, the intentions of the creator(s) are consciously negative, whereas the outcomes are twofold: positive, useful, and appropriate for the creator(s), but (intentionally) negative and inappropriate for others. We can find many representative examples of malevolent creativity during times of war. For instance, Odysseus' stratagem of the Trojan Horse proved to be very creative and effective for the Greeks, because it allowed them to finally enter the city of Troy, but was catastrophic for the Trojans.

The bullets in Figure 1 represent the four extreme cases; obviously, there are an infinite number of other cases, because the degree of intentionality and the consequences can vary from very positive to very negative.

The proposed three-dimensional analytical framework can be utilized in many contexts, such as education, and can provide individuals and organizations with a holistic view of the potential/real consequences of a given creative process and product.

We argue that it is not enough to emphasize the Janus-faced character of human creativity (Rothenberg, 1996) by simply distinguishing between its malevolent/destructive and benevolent/constructive aspects. Therefore, one-dimensional approaches are clearly not suitable for examining all the multifaceted aspects of human creativity. Multidimensional approaches can offer a wider and deeper understanding of creativity by combining it with other constructs such as wisdom (e.g. Sternberg, 2003) and trusteeship (e.g. Craft et al., 2008).

However, we argue that to obtain a wider and deeper understanding of creativity we need to go more deeply than even multidimensional approaches. We need holistic approaches such as *manifold thinking* (Valtanen, Berki, Kampylis, & Theodorakopoulou, 2008), which balances critical, creative, caring, and reflective thinking and utilizes the principles of *problem-focus education* (Berki & Valtanen, 2007; Valtanen, Berki, Georgiadou, Ross, & Staples, 2009) for its implementation. Such holistic approaches can offer effective frameworks for formulating and answering key questions about human creativity and its consequences, such as: "Who should benefit from creativity and innovation?"; "How can we avoid using creativity for destructive purposes?"; and "How can we encourage ethical/constructive expressions of human creativity?"

CONCLUSIONS

As we enter the seventh decade of scientific research into human creativity, scholars in the field appear to be beginning to place a more balanced emphasis on its positive and negative aspects. However, more holistic approaches are required to fully understand and utilize human creativity. For such holistic approaches, is apparent not only the need to redefine creativity but also the move towards a new era of research.

To date, we can identify three main eras of development in the concept of creativity:

1. The *metaphysical era*, from antiquity to the Renaissance, in which a few geniuses are considered able to *create from nothing* ("ex nihilo") through divine (or other) inspiration.
2. The *aristocratic era*, from the Renaissance to the middle of the 20th century, in which a few charismatic geniuses are considered able to *create from something*.
3. The *democratic era*, from the middle of the 20th century up to today, in which anyone is considered able to *create from anything*.

However, during these eras the emphasis was mainly on the individual creativity without specific emphasis on its consequences, especially the negative ones, for the others and the society in general. Yet, following the multidimensional and holistic approaches, we have identified the need to move toward a fourth era of *conscientious creativity* in which all knowledgeable humans are considered able and wise enough to *create something ethical* and constructive for all. We use here the adjective *conscientious* with the meaning ". . . guided by or in accordance with conscience or sense of right and wrong" ("conscientious", n.d.). This is the key skill of wise thinkers, as envisaged by Sternberg (2003), and of the ancient Greek ideal citizen of *kalos kagathos* (= good and virtuous). Today's wise and responsible global citizen should be no different.

During the era of conscientious creativity, the challenge will be gradually, if not radically, to increase the focus on political as well as socio-economic factors and educational as well as organizational settings that promote benevolent and constructive creativity and, in parallel, to decrease the factors that promote malevolent and destructive creative activities.

We further support the view that the scientific study of creativity should follow a new path, with the realization that creative thinking alone is not enough for personal growth and social progress. The real challenge is to apply a holistic framework that can bring about a remarkable conceptual change in the ways that creativity is conceived and practiced. Otherwise, a human being with a creative idea could be a fatal combination particularly when that human has been taught to value and think in a narrow, one-sided way.

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