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A Decline in Creativity? It Depends on the Domain

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Earlier studies using psychometric tests have documented declines in creativity over the past several decades. Our study investigated whether and how this apparent trend would replicate through a qualitative investigation using an authentic nontest measure of creativity. Three-hundred and fifty-four visual artworks and 50 creative writing works produced by adolescents between 1990–1995 and 2006–2011 were assessed. Products were analyzed using a structured assessment method based on technical criteria and content elements. Criteria included in the current investigation (e.g., genre, medium, stylistic approach) are relevant both to the specific media domains and to previously established dimensions of creativity, such as originality and complexity. Results showed strong domain differences: performance in visual arts increased on a variety of indices of complexity and technical proficiency, and performance in writing decreased on indices related to originality and technical proficiency. Findings highlight the value of analysing creativity across domains. The importance of considering cultural and technological changes in characterizing and understanding apparent trends in amount and types of creativity is discussed.

CREATIVITY IN THE 21ST CENTURY

Creativity is vital in contemporary society; creative ability facilitates and enhances problem solving, enabling progress across economic, scientific, social, and artistic domains (Hennessey & Amabile, 2010; Runco, 2004). As the demands of the labor force continue to evolve and computers increasingly used for basic tasks, more complex thinking skills are essential (Levy & Murnane, 2004). The public has embraced the Internet and new media technologies, which equip citizens of all ages with opportunities for instantaneous communication and

unprecedented access to information. The dramatic scale and pace of these changes underscore the ever-present question of how best to prepare the next generation (Parkhurst, 1999; Slabbert, 1994). Different frameworks advocate unique constellations of *21st century skills*, but innovative thinking, problem solving, and creativity are omnipresent (Dede, 2010).

Contextual shifts, aided in part by the Internet, create a unique environment for creative expression. New media technologies offer opportunities for increased creativity by providing novel tools and platforms for creating and editing. Ardaiz-Villanueva and his colleagues (2011) found that new media programs supported both idea generation and originality among the university students in their study. These technologies can also support creativity by lowering the costs of experimentation and creation and by eliminating traditional gatekeepers (Gangadharbatla, 2010; Jenkins, 2006; Shirky, 2010). However, technology may be a double-edged sword, restricting the range of possibility according to program specifications and increasing reliance on tools

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and models for inspiration. Greenfield's (2009) synthesis of studies investigating the relationship between technology and cognitive processing indicates that although media technologies such as videogames are associated with strengthened visual-spatial intelligence, they are also associated with weakened deep processing abilities, including inductive problem solving, critical thinking, and imagination. Gardner (2009) suggested that creativity is now global; people are no longer working in isolated contexts in disconnected cities and, consequently, they need different analytic tools than in the days of solitary creativity.

Concurrently, policy shifts resulting in an emphasis on standardized testing within the United States have led to concern about the development of creative thinking among youth (e.g., Katz-Buonincontro, 2012). Standardized testing initiatives may prove problematic for creativity for several reasons. First, standardized tests are generally characterized by a singular emphasis on convergent thinking—the ability to come up with a single right answer—rather than divergent thinking, which is traditionally implicated in discussions of creativity (Sawyer, 2011). Second, the algorithmic instructional practices that frequently come hand-in-hand with an emphasis on standardized testing are associated with reduced student tendencies to deviate from traditional formulae (Ruscio & Amabile, 1999).

RESEARCHING CREATIVITY: TRENDS AND METHODS

The aforementioned societal changes offer legitimate reasons for both optimism and concern related to young people's creativity. In an attempt to shed light on the question of how creativity may have changed over the past several decades, Kim (2011) conducted a large-scale quantitative analysis of scores on the Torrance Tests of Creativity Thinking (TTCT) from 272,699 kindergarten through 12th-grade students and adults. Kim's examination points to decreases in fluency (the ability to generate many ideas), originality (the ability to produce unique and unusual ideas), creative strengths (which include emotional and verbal expressiveness, humorosity, unconventionality, and passion and abstractness), and premature closure (the tendency to remain open-minded and intellectually curious). Kim concluded that although intelligence scores have risen since 1990, creative thinking test scores have declined considerably.

The TTCT—the creativity test at the center of Kim's analysis—is a widely used and psychometrically validated approach to assessing creative thinking (G. A. Davis, 1989; Kim, 2006; Parkhurst, 1999). The test is largely a divergent thinking test; assessing creativity by way of divergent thinking is a long-standing

tradition within creativity research (Guilford, 1950; Silvia et al., 2008; Weisberg, 2006). On divergent thinking tests, participants generate ideas in response to a set of prompts. For example, participants might be asked to list unusual uses for common objects (e.g., ballpoint pen) or similarities between common concepts (e.g., meat and milk; trains and tractors; Torrance, 1966).

Although the TTCT holds a well-established place within the domain of creativity research, both the TTCT and divergent thinking tests, in general, are criticized for their tenuous connection to real-life creative output (Sawyer, 2011). The challenges related to connecting scores to real world creativity are likely the result of domain specificity, for which the test does not account (e.g., Baer 1993/1994; Diakidoy & Spanoudis, 2002; Runco, 2004; Sternberg, 1999). Gardner (2007) pointed out that, until recently, creativity was viewed as a trait that an individual should be able to demonstrate across domains and that, consequently, could be appropriately measured through a test (see also Baer, 2008). However, as Baer (1993/1994) contended, components of creative expression differ across different domains; accordingly, evidence of creativity may look different in, for example, visual artworks, as compared to short stories. Runco (2004) suggested that the concept of domains “must be acknowledged because most of what has been uncovered about creativity is domain specific” (p. 678). Further, Runco suggested that considering and elucidating differences across domains is “one of the most important impetuses in the literature” (p. 678). To understand how creativity is actually changing in different domains, it is imperative that research considers the products of those domains.

There is considerable support for the notion of domain specificity related to creativity and, consequently, for analyzing products and interpreting changes in the context of specific domains. But how should these products be identified and evaluated? Traditionally, products assessed for creativity are generated for the explicit purpose of evaluation, frequently in response to a particular prompt or assignment and in a laboratory setting. For example, the Hall Mosaic Test assesses creativity through 8- × 10-inch collages created by participants during a 30-min period and using preselected supplies (Hall, 1972). The IPAR word rearrangement test similarly provides a set list of words, prompting participants to create a short story including the delineated vocabulary (Barron, 1962). Other approaches require participants to generate sketches, poems, or even cartoon captions (see Kaufman, Plucker, & Baer, 2008; Sawyer, 2011).

More recently, the extension of assessment to nonparallel creative products by Baer, Kaufman, and Gentile (2004) has expanded the number of possible artifacts for consideration, and also opened the doors for

exploring creativity evinced in products created for purposes other than explicit creativity evaluation. In their investigation, Baer et al. explored students' narratives and poems, demonstrating the validity of exploring real-world productions and providing insight into the nature of creative expression and imagination in authentic work generated by youth.

In general, the generation or identification of creative products is followed by a subsequent evaluation. The appraisal can take multiple forms, including non-structured, subjective approaches or structured assessment based on pre-determined design elements (Yen & Sun, 2008,¹ in Lu & Luh, 2013). The Consensual Assessment Technique (CAT) is among the most robust and widely used non-structured approaches (Hennessey, 1994). The CAT approach requires judges familiar with the domain to assign ratings to works generated in response to relatively open-ended tasks prompts (Hennessey, 1994). Although the CAT is well suited for domain-specific explorations of creativity, the scoring method includes an inherently subjective component and the approach necessitates the participation of experts (Kaufman, Cole, & Sexton, 2008; Lu & Luh, 2012). Accordingly, although the CAT approach may be a robust method of identifying artifacts that exhibit creativity, the subjective nature of judgments does not illuminate the particular elements of the work that contribute to creativity or a lack thereof.

More structured approaches rely on assessments of particular features or criteria of the overall product. Besemer and O'Quin (1989) described semantic-differential rating scales that consider, for example, whether a piece is surprising or unsurprising and elegant or inelegant. Semantic-differential approaches and similar criteria-based methods provide more concrete evidence about why a particular product is judged creative, but they offer relatively little insight into what, for example, contributes to a rating of originality, surprise, complexity, or technical quality in work within a particular domain.

Accordingly, although a number of methods exist for identifying creativity, isolating particular elements of a product that demonstrate creative thinking is somewhat more challenging. Central to this challenge is the fact that creativity is defined in a multitude of ways. Definitions frequently include reference to novelty and value (Kampylis & Valtanen, 2010; Parkhurst, 1999), but also often emphasize constellations of attributes including technical quality, complexity, coherence, relevance, and originality (e.g., Furst, Ghisletta, & Lubart, 2012; Runco, 2004; Taylor, 1975).

What is evident across these definitions is an emphasis on elements of both content and form: deviation

from traditional or expected formulae (novelty) and complexity and technique (quality) are hallmarks of creative expression (Besemer & O'Quin, 1987; Gardner, 1982; Winner, 1982). Further, the aforementioned importance of domain-specificity related to creativity indicates the particular elements that merit consideration in these facets of creative expression may well differ significantly across media. Accordingly, the selection of nonparallel, authentic student work was prioritized in our investigation of changes in young people's creative productions over the last 20 years, and domain-specific elements of style, content, and form constituted the focus of analysis. Through this approach, our investigation sought to illuminate deviations from formulae in high school students' visual artworks and creative writing, in order to quantify specific changes in originality and complexity and to shed light on questions about changes in creative expression between 1990 and 2011.

THE RESEARCH STUDY

This article describes the results of an analysis of young people's creative productions over the last 20 years. This timespan was chosen both because the two periods represent times before and after the widespread adoption of Internet technologies, and because the 20-year span is approximately representative of one generational change. In the present investigation of 50 fiction stories and 354 pieces of adolescents' visual artwork, the aim was to identify changes in youth's creative expression and to extend extant methodological approaches to enable structured, comparative exploration of authentic nonparallel creative productions. In particular, the following question was explored:

How have the style, content and form of adolescents' art-making and creative writing changed over the last 20 years?

METHOD

Samples and Data Collection

The exploration of changes in adolescents' creative expression over more than a decade—as evidenced through authentic works generated outside of laboratory conditions—requires a unique type of sample. The intention was to draw works from a complete source that included products catalogued for similar purposes each year over the period of interest. A second aim was to find works generated under comparable conditions,

¹Original article in Chinese.

without notable change to the guidelines for production or assessment at any point. Third, curatorial processes that may have resulted in discarding or retaining particular works were minimized or at least as consistent as possible. Maximal consistency related to characteristics of the creators was also desirable.

The endeavor to identify art and creative writing samples that would appropriately adhere to the aforementioned criteria took place over the course of a year. Veteran teachers, schools across different districts, and a range of publications were all contacted. Repeatedly, these conversations revealed that key process elements related to production or curating had fundamentally shifted or, more frequently, that only exemplars of strongest and weakest work were retained from prior years. Finding complete and maximally consistent samples was a major objective, and after months of searching, two teen publications that met the criteria in important ways were identified.

Visual artwork. The sample of visual artwork was selected from monthly publications of magazine showcasing teen work. The magazine was first published in 1989 and has been edited by the same husband-and-wife team since its inception. The magazine includes 10 monthly issues per year (a combined January and February and no August issue was replaced by a combined Summer issue, including June, July and August in 2000) and each issue includes an art gallery devoted to adolescents' original visual artworks. The magazine has maintained an open call for submissions since its first issue, and the only curatorial fluctuation during the period of interest was the inclusion of a few themed galleries at various points, such as a Valentine's Day theme. Although the publication's readership and, in turn, number of submissions grew from 1989 to 2011, the consistent curatorial eyes limit concerns about otherwise significant changes.

Three pieces from each issue's art gallery were randomly selected, with the exception of the February 1991 issue, which was not available in the magazine's archives. The December 2011 issue was additionally omitted, to select samples from an equal number of months in both the early and late periods. The final sample included 354 works of adolescents' visual art: 177 pieces published between 1990 and 1995, and 177 pieces from 2006 to 2011.

Prior to September 1999, the magazine was printed in black and white. Due to the low print quality of the early issues, which limited the amount of visible detail, original pieces were collected from the publication's archives for the analysis of the works prior to 1999. If an original artwork was not available, selections were rerandomized from the available originals in the archive; approximately 35 pieces (<10% of the sample) were

ultimately reselected.² Visual artworks were coded from the later period directly from the printed issues, because printing quality was comparable to the quality of the original submissions. The final sample included pieces selected from 59 different issues of the publication.

Creative writing. The creative writing sample was similarly culled from a teen publication with the same supervisory editor over the entire period of interest (1990–2011). The magazine, which includes fiction writing produced by students attending a publically funded, preprofessional creative arts school in the United States, is published annually. Consequently, the total sample of possible creative writing works for inclusion in the current sample was smaller than the visual artworks sample. However, because all of the stories were selected from one particular school, this sample had the additional benefit of a relatively constant population in terms of both size and demographics (the school did increase in size and diversity over the 20-year period).

The faculty director who supervised publication throughout the period of interest oversaw a peer-review selection process to determine which works would be published. The students on the board reviewed pieces and decided which to select, accepting or rejecting the works as is (except for very minimal changes). In this process, students endeavored to select works from as broad a range of styles, genres and subject backgrounds as possible relative to the submission pool.

All of the short stories from each issue of the publication between 1990 and 1995 and 2006 and 2011 were initially selected. To avoid having a sample composed heavily of repeat authors (i.e., because their work appeared multiple times during their high school tenure), pieces from authors with multiple publications were randomly selected for omission. Stories were scanned from the original publications for inclusion in the analysis. The final sample included 50 stories selected from 10 different issues of the literary magazine: 25 stories produced between 1990 and 1995 and 25 stories produced between 2006 and 2011.

Data Coding

The goal of developing appropriate domain-specific, structured assessment methods to capture particular elements of each medium resulted in the development of two related, but distinct, coding schemes: one for coding visual artwork and another for coding creative writing. Although parallel coding schemes would have

²There was no indication of systematic differences between works for which originals were available and those for which there were no available originals. Therefore, this reselection was judged not to have introduced bias into the sample (i.e., with respect to quality).

simplified comparisons across art and writing, primary importance was placed on the goal of maintaining the integrity of domain-specificity and, therefore, of coding for elements specific to each medium. Initial lists of key features of art and writing works were developed through focus groups with relevant professionals (e.g., visual arts and creative writing teachers), and consultation with trained art educators and historians, as well as English and writing teachers. The original lists included (for visual art) genre, medium, color, composition, use of light, perspective, lines, background, repetition, tone, symbolism, theme and viewpoint, and (for writing) genre, point of view/voice/tense, setting/time period, temporal span, structure, mood, style/language, and several considerations related to content (e.g., characters, identity, symbolism).

The process was informed by literature on both art and writing assessment and creativity. This review allowed for the refinement of the coding lists and the identification of key components that might enable both exploration of domain-specific elements and the opportunity to bridge the exploration to a discussion about creativity. Five visual art codes from the original list were selected for the investigation—genre, background, composition, medium, and stylistic approach—because of their emphasis in both practitioners' lists and their connection to fine arts standards of technique and interpretation (Burnham & Kai-Kee, 2011; Janson & Janson, 2001). The list of writing codes was similarly refined to include genre, structure, style, and language (including subcodes for voice, tense, and language/word choice), which similarly represent fundamental components of creative writing practice and interpretation (Harper, 2008; Morley & Neilsen, 2012).

Two research assistants with formal training in visual arts coded the visual artworks; two research assistants with backgrounds in writing and English teaching, respectively, coded the creative writing works. Both teams used a primary coder/shadow coder approach. Through the coding process, each research assistant served as the primary coder for half of the pieces. This modified “check-coding” approach (e.g., Miles & Huberman, 1994, p. 64) extends the double-coded portion to the entire sample and embeds constant dialogue about the application of codes throughout the coding process, facilitating a collaborative agreement for each designation (Smagorinsky, 2008).

Throughout the coding process, raters were blind to the year of publication of each piece and to hypotheses about what was considered creative and why. Works were coded with a focus on objectively capturing the aforementioned criteria, and without judgment about the overall quality or degree of creativity. The extent to which pieces broke away from formulae in each of the categories was subsequently examined. For instance,

in fiction writing, a linear structure is the typical narrative formulae (Chatman, 1978). Nonlinear structures were not initially coded as more creative; the story structure was objectively recorded and a subjective judgment about trends in creativity was reserved for the subsequent analysis (e.g., when a shift in the number of stories written in a linear or nonlinear fashion was observed). Similarly, Brians (1998) reviewed historic traditions in fiction and concluded that realism is the default style of modern narrative. Taking into account traditional creative writing genres (Bulman, 2006), those present across the current sample (e.g., realism, magical realism, science fiction, absurdism) were identified. These discrete literary genre categories were used to guide the coding for genre in the creative writing works. Then, following the previously described approach, works following the default realism formulae, and those departing from the default mode, were considered and compared. In the context of written language, using slang and conversational language rather than more conventional academic vocabulary is considered less cognitively demanding to conceptualize, and a marker of lower proficiency in teaching and assessing English writing (Cummins, 1989; Townsend & Lapp, 2010). For voice, third-person voice represents the traditional model for narration and past-tense is the standard tense convention in fiction writing (Rog & Kropp, 2004); both have roots in ancient verbal storytelling and even more modern formal fairytales.

A similar approach was used in the analysis of visual artworks. For background, a fully-rendered space is considered more complex and “finished” in the context of art education and students' skill development than a “default” blank, untreated background (Scott, 2006, p. 6351; see also National Art Education Association, 1994). For composition, the central placement of the subject on the canvas is considered amateur or basic; when the subject appears off-center in the visual plane, the balance of the piece is considered more dynamic, thus deviating from a more rudimentary presentation (Krages, 2005). In the context of medium, pen-and-ink drawings represent basic, more foundational materials (Janson & Janson, 2001). Regarding stylistic approach, conservative works follow the traditional conventions of the medium and subject matter (e.g., still life, landscapes, or portraits), whereas unconventional works either develop a unique visual language or merge/remix existing styles (Sands, 2012). Although successful and acclaimed works can contradict these rules of thumb, the aforementioned criteria serve as indicators of increased complexity and deviation from traditional practice within the context of art education (Diket & Brewer, 2011; Ormond, 2001). Following the coding process, pooled-sample *t*-tests were used to determine the statistical significance of each of the observed changes.

RESULTS

Visual Art

Background. The background of each piece was analyzed by evaluating how the artist treated the space around and behind foreground figures and objects. The sample included works presented on blank, fully rendered, and partially rendered backgrounds. In pieces with blank backgrounds, the objects of the foreground appear to float in space, such as one drawing of a hand holding an apple that stands alone on an otherwise untouched canvas. In contrast, fully rendered pieces depict figures in complete context. For example, one fully rendered piece depicts a burly man walking through a graveyard at sunset; the image fills the canvas, stretching to all of the edges.

The analysis revealed a significant increase in fully rendered works and a corresponding significant decrease in works on blank or partially rendered backgrounds. In the early set (1990–1995), 49% (67/177) of the figures are situated in fully completed contexts, 12% (21/177) are presented in partially rendered spaces, and 38% of the objects are presented with blank backgrounds. In the later works (2006–2011), the vast majority of the pieces (78%; 131/177) have fully rendered backgrounds; 8% (14/177) have blank backgrounds and 7% (12/177) have partially rendered backgrounds. Consequently, the recent works appear, as a group, more developed and complete than the earlier works.

Composition. The composition, or balance, of each piece was explored by examining the positioning of the figures and objects in the visual plane. In particular, whether the figures and objects were in the center of the plane was noted. For example, a drawing of a bowl of lemons, which are centered both vertically and horizontally, has a different balance than a pen-and-ink sketch of a man's face on an otherwise blank background; the image is so close to the right edge of the paper that only half of the face is visible, yet the left half of the paper is blank. In another off-center piece, a teenage boy is the focus of the image, yet his body appears off-center, on the right side of the image. The use of stylized cropping, evidenced by the extension of figures beyond the visual plane, was also explored. Cropped compositions were considered to reflect images that extended to the edge of the surface with a "cropping" of the represented object. For example, a drawing that shows only half of a face would qualify as cropped in the coding. In one photograph coded as cropped, two hands reach out to each other over train tracks.

Two main changes were observed with respect to composition: a decrease in the number of centrally composed pieces and an increase in the number of cropped

pieces. In the early set, 58% (102/177) of the works are balanced with respect to the distribution of weight, with the figures, colors, or objects positioned in the center of the visual plane. In comparison, 49% of the works in the later set are centrally composed. An increase in the number of pieces with stylized cropping from 4% (8/177) in the early set to 18% (27/177) in the later set was also observed.

Medium. Pieces composed using traditional media, such as pen and ink and drawings with charcoal or pencil, and pieces using less traditional media, such as digital art, collage, public art, found objects or mixed media were also catalogued. Both a departure from traditional production practices and an increase in the range of media represented were observed. First, the analysis revealed a decline in traditional pen-and-ink drawing from 54% (97/177) in the early set to 14% (24/177) in the later set. An increase in the prevalence of nontraditional media works (e.g., collage, digital art, public, found, mixed-media) from less than 1% (1/177) in the early set to 8% (13/177) in the later set was also observed. The difference is most apparent in viewing the drawings that are more common in the early set—such as a pencil-drawn portrait of a young woman with a cross earring or a pen-and-ink drawing of a bridge outside of a building—in juxtaposition to the digitally-composed collages—such as one mixed-media collage depicting Angelina Jolie on a background of historic female icons like Betty Boop.

Manipulation through digital means was also explored. Pieces edited with Photoshop or tailored by post-production photography manipulation, like the Angelina collage described previously, were coded for digital manipulation. Unsurprisingly, given the increased accessibility and availability of software programs for digital manipulation, an increase in the number of digitally manipulated works from less than 1% (1/177) in the early set to 10% (17/177) in the later set was observed.

Stylistic approach. The overall stylistic approach was analyzed by examining each piece holistically in terms of both content and technique. Each piece was classified in one of three categories: conservative, unconventional, or neutral. Conservative pieces follow traditional conventions of the medium, often borrowing thematic or stylistic content from popular art historical references. For example, still-life pieces, landscapes, and traditional portraits are all classified as conservative, as are those that incorporate brushstrokes overtly in the style of Monet or Picasso. Unconventional works are those that depart from traditional content and technique by either developing a unique visual language or merging/remixing existing styles in unexpected

ways; these works represent a departure from the traditional formulae within the context of stylistic approach. Unconventional works include a portrait entirely constructed from ripped color photographs and a painting that uses a cast of the human body as its primary canvas. Neutral pieces neither adhere wholly to traditional practices nor do they offer a provocative approach to the subject. Works classified as neutral include a number of color snapshots of the artists' pets or documentation of friends, neither of which adhere to nor subvert technical or stylistic conventions.

In the sample, an increase in the number of pieces with an unconventional stylistic approach and a decrease in the number of conservative works was observed. The number of unconventional works increased from 18% (31/177) in the early set to 27% (48/177) in the later set. The number of conservative works decreased from 33% (58/177) in the early set to 19% (33/177) in the later set. The number of neutral pieces increased slightly from 49% (88/177) to 54% ($n = 96/177$).

Creative Writing

Genre. In an effort to characterize each story holistically, the type of genre employed by the author, including realism, satire/parody, science fiction, magical realism, and historical fiction, was evaluated. In the analysis, two overarching categories were identified within this code: stories with events bounded by reality and stories that include fantasy (e.g., impossible) elements. For example, one story that deviates from reality describes a time when a mirror covers the entire sky around a US city and all crime and corruption is exposed. The local administration responds by cleaning up dilapidated housing projects, and the residents are forced to examine their own behavior and lifestyles. One young woman looks up and sees her own bruised face reflected in the sky, an experience that prompts her to leave her abusive significant other. Another story that includes impossible, fantastical elements describes the narrator's visit with his psychiatrist, who is a crab. After some conversation, the frustrated narrator uses red-handled tongs to grasp the doctor by his middle and thrust the doctor into his briefcase, exclaiming, "Tonight I dine on boiled crab!" The realist stories lack these impossible fantasy elements. For example, one realist story describes a family's Thanksgiving vacation to the coast and their somewhat disappointing, though generally uneventful, Thanksgiving dinner at the hotel. Other realist stories describe events that might not be everyday happenings, but are nonetheless realistic. For example, in one story, two young men are in France and one is shot accidentally. Although this is not an event likely experienced by a high school student living in the United States, it is still categorized as realism

because the events are feasible and realistic, and there is no element of impossibility. Although a multitude of genres were initially coded, this distinction between realist stories and stories with fantasy or magical elements represented a critical divide between qualitatively different types of stories, and most closely aligned with existing assessments for creative writing (e.g., the TTCT, which considers fantasy in writing a creative strength).

An increase in stories categorized as formal realism and a corresponding decrease in stories with fantasy, magic, and absurdist themes was observed. A majority of the stories written between 1990 and 1995 (64%; 16/25) include fantasy elements, whereas a majority of the stories written between 2006 and 2011 (72%; 18/25) exemplify traditional realism and do not include any departures from reality. This dramatic shift represents an abundance of fantastical, impossible, and frequently bizarre elements in the early set, compared to their absence in favor of strictly realistic content in the majority of the later stories.

Structure. Coding for structure captures the organization of each story, specifically, whether each story follows a conventional, linear structure or a nonlinear story arc. Stories with linear structures progress chronologically. As an example, one piece begins with a train coming into the narrator's view, goes on to describe the narrator's observations of the passengers aboard the train, and concludes with the train's departure from view. Another linear story describes the progression of a classroom discussion during one class period, reaching back briefly to provide additional context about the narrator's relationship with another classmate. Although the classroom story deviates from a completely linear structure, the brief departure from linearity is clear and supports the story's linear progression (e.g., the story is predominantly linear).

In contrast, one nonlinear story is a sketch of Hell with no plot or story arc. Another nonlinear story jumps between past and present and includes the constant repetition of a phrase ("Go away devil"). The combination of the numerous, uncertain shifts between past and present and the phrase repetition throughout make it unclear to the reader what is happening now and contribute to the impression that the narrator is disoriented and, perhaps, paranoid.

An increase in the number of stories adhering to a basic linear structure, and a corresponding decrease in the number of stories with nonlinear structures was observed. A majority of the stories written between 1990 and 1995 (60%; 15/25) are nonlinear, whereas a majority of stories written between 2006 and 2011 (64%; 16/25) progress in a predominantly linear manner, with only minor deviations from linearity (e.g., reaching back) to support the linear progression of the plot.

Voice. The narrative voice of each story was examined, capturing whether the story was written from a first-, second-, or third-person voice, or a combination. Pieces written in the first person are told from the perspective of a character. One first person story begins, “If I get any colder, I think, I will harden and burst like a pipe in the winter.” The story goes on to describe the innermost thoughts and anxieties of a teenage girl, the world presented entirely from her perspective. Stories written in the second person seem to address the reader directly: “This is the first year of your adulthood that you have not spent working... You worked hard to raise your children well.” The third-person voice, which is traditionally used in storytelling and is predominant in fairy-tales and folklore, is characterized by narration, frequently by an omniscient narrator who is not a character in the story. One such story begins,

Once, in a time very close to ours, a man rested his fruit, vegetable and wildflower cart. It so happened that he was under a mill bridge and a strong gust of wind broke through the trees in the nearby forest, toppling the poorly constructed bridge he had taken shelter under.

Comparing the early and late pieces, a slight increase in the number of stories written in the third person and a corresponding decrease in the number of stories written in the first or second person was observed. In the 1990–1995 set, 36% (9/25) of the stories are written from a third-person perspective and 48% (12/25) of the stories are written from a first-person or second-person perspective. In the 2006–2011 set, 48% (12/25) of the later stories are written from a third-person perspective and 36% (9/25) are written from a first-person or second-person perspective. Both sets also include a number of stories (16%; 4/25 in both early and late sets) written in “mixed” or shifting perspectives (e.g., first and third person).

Tense. Tense was coded for to catalogue authors’ use of past and present tense in each time period. The analysis of the tense code did not reveal a meaningful change in narrative tense between the two sets of stories. In the 1990–1995 stories, 48% ($n = 12$) are written in past tense, 44% (11/25) are written in present tense, and 8% (2/25) are a mix of past and present tense. In the 2006–2011 set, 52% ($n = 13$) are written in past tense, 44% (11/25) are written in present tense and 4% (1/25) are a mix of past and present tense.

Language/Word choice. Language was explored by examining word choice and vocabulary. In line with the other analyses, the analysis of language distinguished between stories written using formal, relatively traditional academic language, and those stories with more

casual, pedestrian language. Compared to the early stories, the language in the later stories is considerably less formal. A strong majority of the early stories (76%; 19/25) adhere to conventional, academic language and do not include slang, cursing or made-up words. In contrast, a strong majority of the later stories (80%; 20/25) do include informal language. For example, the contemporary authors include expletives like *piss* and *shit*, slang such as *awesomeness* in their writing.

Summary

Overall, the analysis of the visual artworks indicates a rise in sophistication and complexity, as well as an increase in the number of works portraying a less conventional presentation of subjects (Table 1). By contrast, the analysis of the creative writing stories indicates a

TABLE 1
Pooled Sample t-Tests for Visual Artwork Sample

<i>Design Element</i>	<i>Observed</i>	<i>Change</i>
<i>Background</i>	Fully Rendered	-5.667***
	Blank backgrounds	1.604
	Partially rendered	6.706***
<i>Composition</i>	Centrally Composed	1.698*
	Stylized Cropping	-4.209***
<i>Medium</i>	Pen and Ink	7.944***
	Non-Traditional Media	-3.177***
	Digital Manipulation	-3.714***
<i>Stylistic Approach</i>	Conservative	3.003***
	Unconventional	-2.028*
	Neutral	-0.941

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 2
Pooled Sample t-Tests For Creative Writing Sample

<i>Design Element</i>	<i>Observed</i>	<i>Change</i>
<i>Genre</i>	Realism	-1.869*
	Fantasy Elements	2.554**
<i>Structure</i>	Linear	-1.698*
	Non-Linear	0.992
<i>Voice</i>	Third	-0.851
<i>Tense</i>	Past	-0.283
	Present	0
	Mixed	0.595
<i>Language/Word Choice</i>	Conventional Language	3.963***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

significant increase in young authors' adherence to conventional writing practices related to genre and a trend toward more formulaic narrative style, though language is significantly more conversational, casual and invented (Table 2).

Discussion

In the course of this analysis, the challenges and opportunities related to delineating and understanding changes in creativity were considered. The method used in our investigation sheds light on several specific changes and on the divergent pattern of creativity changes across domains. In addition, the method highlights the advisability of investigating the changing landscape of creativity through a range of assessment approaches.

The investigation uncovers several domain-specific changes. Contemporary adolescents' visual artworks deviate significantly from more basic, or default, formulae in several capacities. That is, as a group, the more recent works have backgrounds that are more fully-rendered, rather than blank and untreated; subjects are presented asymmetrically, rather than in the traditional balanced, center-point position; stylized cropping is more common; traditional pen and ink is less common and, correspondingly, a broader range of mixed media works are represented; and there is a significant decrease in conservative works and a corresponding increase in unconventional works in the context of stylistic approach. Taken together, these trends reveal a shift between 1990 and 2011 toward more complexity in visual artworks and a wider variety of divergent approaches ostensibly indicative of increased originality.

Conversely, in adolescents' creative writing, contemporary works shift to greater adherence to traditional formulae, and less technical proficiency. The findings document a significant increase between 1990 and 2011 in the number of pieces of traditional realism, and a corresponding decrease in fantasy or impossible elements. This decline in out-of-the-box elements in fiction writing contributes to an impression of reduced originality and, perhaps, a shift toward premature closure (i.e., away from psychological openness; Kim, 2006) in the later set. The modest shifts toward traditional third-person narrative voice and past tense may also indicate a move to more conventional practices of writing. In addition, a significant shift towards conversational, pedestrian language is observed.

Kim (2012) described several key declines in subscale scores for the high school group, including decreases in originality scores, fluency scores, and resistance to premature closure. This analysis of creative writing products generated during the same period of interest (1990–2011) appears to align with Kim's findings: The

significant increase in and adherence to strict realism evinces more bounded fiction realities, as compared to those of the stories generated in the early 1990s. However, the changes in adolescents' visual artworks indicate a divergent reality in the domain of visual arts: Works are more complex and increasingly depart from more traditional formulae through artists' play with a range of production elements.

Contemporaneous Societal Changes

The observed domain changes could undeniably be the result of any number of societal changes over the period of interest. Two changes highlighted by Kim (2011), however, may be particularly relevant to high school students' experiences and their creative expression: the increase in digital media technologies and the rise of standardized testing schools. In the context of art, online galleries offer unprecedented access to even the most renowned masterpieces. A simple Google search instantly produces art ranging from anonymous displays of graffiti to Klimt's *The Kiss*, providing contemporary adolescents with an impressive range of models from which to draw inspiration. Gardner and Davis (forthcoming; Davis & Gardner, 2012) hypothesized that this extraordinary access to visual stimuli provides today's artists with expansive mental repositories of visual imagery, a state of affairs that can both inform and inspire their own works.

In addition, new technological tools can facilitate the actualization of artistic vision. Digital programs for creating and editing art are available, many free of charge, and provide both novice and expert artists with myriad editing tools. Corel Painter 12, for example, is a digital art software that "opens up a world of creativity" thanks to "progressive drawing tools," including digitized paints, oils, and watercolors (Corel Corporation, 2012). Graphics tablets facilitate speed drawing, speed painting, and new methods for recreating images like television cartoon characters with near perfection. Apps such as ArtStudio, Procreate, and Instagram allow artists to create and edit work on-the-go with their cellphones or iPads (Gardner and Davis, forthcoming). Consequently, young people not only have a wealth of images from which to draw inspiration for their creations, but also unparalleled tools to help them create (Davis & Gardner, 2012).

In the context of writing, standardized assessment metrics are increasingly common in the era of *No Child Left Behind* and *Race to the Top*. On these rubrics, clear, linear structures are frequently rewarded, and less direct organizational approaches are penalized. Consider the five paragraph essay: In preparation for testing and evaluation, many students are taught—in no uncertain

terms—that the word *essay* is synonymous with composing a paper with a “first, next and last” linear structure (Hillocks, 2002). In addition, the remarkable increase in adolescents’ digital media use provides a multitude of opportunities for casual text-based communication: Today’s adolescents instant message, blog, tweet, e-mail, Facebook, and, of course, text message. In 2012, 63% of adolescents reported texting every day, whereas in 2006 only roughly one-quarter of adolescents even used text messaging as a way to communicate (Lenhart, 2012; Ludden, 2010). Today, the median American teen (14–17 years of age) sends 100 text messages per day (Lenhart, 2012). The widespread use of these communication methods represents a significant amount of time that youth spend translating thoughts into (frequently abridged) conversational written form. We do not contend that these changes are responsible for the observed trends, but rather that the findings of this study might be considered in light of them; given the pace of technological adoption and the trends in education reform, they represent an important context for an understanding of creativity at this time.

Limitations

The decision to focus on authentic, nonparallel products offers a new dimension to the complex endeavor of understanding changes in creativity. However, the challenge of identifying appropriate samples for this analysis resulted in a decision to prioritize criteria, such as finding intact sets of products, over more traditional randomization processes. The literary publication that was used as the source for the creative writing investigation comes from a selective, publically funded school where arts training is a central focus. The creative writing findings cannot, therefore, be generalized to all students in all schools across the United States, let alone in other countries. The same is true of the visual artworks, which were selected from one particular publication. In both cases, students also exerted a curatorial process over their own work as they decided which pieces to submit. This process may have included complex decision making about what others would value and publish; these processes are not captured by the study’s analytic approach. Further, the number of students submitting to the art publication and attending the creative arts high school both grew over the period of interest, likely resulting in changes in the demographic characteristics of the producers. This trend, too, is unfortunately not controlled through the current approach.

IMPLICATIONS AND CONCLUSION

This study offers a new approach for exploring changes in creative expression, and its findings highlight important

real-world trends in the context of two domains: visual art and creative writing. The decreased conventionality in contemporary visual artworks and the increased adherence to more traditional default genres in contemporary creative writing works collectively paint a fuller picture of changes in adolescents’ creative productions over the past 2 decades. Perhaps most critically, findings indicate the importance of assessing creativity through multiple methods to gain a fuller picture of the nature of changes. Is creativity in crisis? It depends on where one looks. With so much at stake, creativity research seeking to document and explain putative trends in creativity is well advised to use a variety of measures and a variety of media as creatively as possible.

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