

CHAPTER TWENTY TWO

**THE CREATIVITY OF JONATHAN
PLUCKER**

**MATTHEW C. MAKEL
RONALD A. BEGHETTO
CAROLYN M. CALLAHAN
GAYLE T. DOW
AMBER ESPING
STEVE FREDERICKS
SALLY KRISSEL
HAYING Y. LONG
STUART OMDAL
SCOTT J. PETERS
MEIHUA QIAN
ANNE N. RINN
JULIA L. ROBERTS**

ABSTRACT: Jonathan Plucker is an educational psychologist whose research spans creativity, education policy, and talent development. Although often seemingly disparate domains, all his work aligns to reorient thinking about how best to define, measure, and promote success in children and adults. In this chapter, a team of his colleagues, collaborators, and former students (some of us are all three) provide an overview of Jonathan's work and its origins: 1. Defining creativity (and how researchers can push its boundaries); 2. Assessment and psychometrics of creativity; 3. Assessing the evidence of creativity; 4. Creativity across the globe; 5. Creativity in the classroom; and 6. Talent development through reducing excellence gaps across students from different demographic backgrounds, and gifted education. Through his work on each of these topics, Jonathan has helped advance the field's understanding and perspective while keeping any eye on the practical application and relevance of research. In this chapter, we overview his relevant contributions, introduce the cultural context in which his contributions came about, and some of the impact his work has had in the field and beyond.

[Authored by Matthew C. Makel, PhD, Associate Research Scientist, Johns Hopkins University and Anne N. Rinn, PhD, Professor, University of North Texas]

Jonathan A. Plucker, PhD is an educational psychologist known for his work in creativity, intelligence, talent development, education policy, and research methods. In this chapter, a team of his colleagues, collaborators, and former students (some of us are all three) provide an overview of Jonathan's work and the stories behind his work. Rather than write from a distant third person perspective, we chose to write from our individual and collective first person lived experiences collaborating with Jonathan. This perspective aligns closer with an oral history narrative. It may be atypical, but we hope that it better contextualizes Jonathan's creative contributions and his creative process. We want to highlight both his work as well as the process and intent behind his work. Plus, as illustrated below, we believe that one of his chief contributions has been the effect he has had on his students, colleagues, and collaborators.

Jonathan's origin story for being professionally interested in creativity began when he was in a master's program at the University of Connecticut in the 1990s. He was taking courses with many doctoral students that were about creativity, but the framing of creativity often felt like game playing (e.g., uses of a balloon) to him. This didn't fit his worldview of what innovation was. Jonathan hated creativity through that lens and felt something was missing. At the same time, Jonathan was taking science education courses where he saw creativity being discussed in a more focused and grounded manner. One day, while walking by a pond on the UConn campus, an idea popped in his head. He realized that we downplay the social aspect of creativity in education. In education, we did not talk about communication, persuasion, group idea generation, or other social components of creativity. This inspired him to read what had been done from this perspective (not a lot at the time). This connection inspired much of his subsequent work and thinking. He was hooked. The rest of this chapter tells the tale of his years and work that followed that walk around a pond.

We organize the chapter as follows: First, we explore how Jonathan worked to explore and define the term creativity, as well as how he worked to push the boundaries of the term both in research and in the field of creativity. Second, we review Jonathan's work on creative assessment and psychometrics work. The third section discusses Jonathan's work on assessing the evidence on creativity and making it accessible to broader audiences. The fourth section provides an overview of Jonathan's international work related to creativity. The fifth section recounts Jonathan's influence on creativity in the classroom. The final three sections discuss Jonathan's relevant work in the adjacent fields of excellence gaps, gifted education, and his role at the National Association for Gifted Children.

Defining Creativity

As of this writing, Jonathan's most highly cited work is a journal article asking why creativity is not more important to educational psychology and also provides a definition of creativity for the field (Plucker et al., 2004). In this

section, his co-authors on that paper, Dow and Beghetto review that piece as well as how Jonathan has influenced their careers. Next, Makel discusses how their work together on replication in the social sciences applies to creativity and how it pushes the boundaries of what is considered a creative research contribution. Finally, Long reviews her work with Jonathan that assessed creativity research journals and how their publications have changed over time.

[Authored by Ronald A. Beghetto, PhD, Professor, Arizona State University] Although creativity scholars are very familiar with Jonathan Plucker's creative contributions to the field, they may be less aware of the creative contributions he has made as a mentor. In my case, I'm deeply grateful to Jonathan for the creative and supportive mentoring he provided for me in the early stages of my scholarly development.

In the late 1990's, a time when creativity was essentially a non-topic in educational psychology, I was searching for a PhD advisor who could support my interests in creativity. To say that my pursuit was starting to resemble a Sisyphean exercise would be an understatement. I tried my luck at gathering what information I could about faculty in colleges of education. I used a combination of hardcopy directories of doctoral programs I found in the library and rudimentary internet searches. I discovered a few promising leads in gifted education, but my interests were focused on creative teaching and learning in general education settings.

I nearly abandoned my search after I had reached a faculty member (at an institution I will not name), who thought I was making a prank call! That person's response to my inquiry went something like, "Okay, right. You're a graduate student at the University of Wyoming who wants to come here to learn about creativity in education. Ha! Who is this, really!?!?"

In retrospect, this was not too surprising. This would not be the last time I would encounter incredulous responses from educational researchers about the nature and role of creativity in teaching and learning. Little did I know that Jonathan was having a similar experience and that such experiences would become a driving force in our early work together.

Connecting with Jonathan was therefore a critically important and serendipitous event in my scholarly journey. After becoming somewhat discouraged about the responses I received in searching for an advisor, a friend (who grew up in Indiana) encouraged me to take a look at Indiana University (IU). IU's school of education had a strong reputation and I thought perhaps someone there might be able to point me in the right direction.

As luck would have it, Jonathan had just recently joined the faculty in the Educational Psychology program at IU and I was quickly put in touch with him. It was immediately clear that Jonathan was someone who shared my enthusiasm for the concept of creativity and its potential importance as a topic of inquiry in education.

Based on our unique and shared interests and experiences with creativity in education, we started to formally pursue the question of: Why doesn't creativity seem to matter in educational theory and research?

This is a question that Jonathan and I frequently discussed over numerous occasions during our early work together. In the heyday of constructivist perspectives on education, we found it vexing and quite ironic that edu-

educational researchers were placing so much emphasis and effort on educational change and constructivist perspectives; yet the concept of creativity was all but absent from these efforts.

We therefore endeavored to map out the most active researchers in creativity studies, identify creativity texts that were being used in educational programs, co-teach a college level creativity course, and ultimately get a better grasp on the nature of the construct of creativity itself. We had a hunch, based on an interaction Jonathan had with one of his senior colleagues (Dr. Myrtle Scott), that perhaps part of the undervaluing of creativity in education came from a murky understanding of what creativity actually means. In other words, perhaps at the root of the problem was a definitional issue.

We thereby started our theoretical and empirical exploration of the definitional issues surrounding creativity. Together with Gayle Dow, we were successful in publishing the 2004 *Educational Psychologist* (Plucker et al., 2004) paper that reflected our efforts in this regard.

The publication of the 2004 *Educational Psychologist* paper was an important landmark for us as it signified that the field was regaining interest in the concept of creativity and the subsequent popularity of the paper further signified that a broader shift in education and psychology was underway. A shift that would increasingly view creative phenomena as an important area of study.

Although creative contributions in the form of published works, presentations, and applied work are clearly important, I would offer that equally important creative work occurs in the everyday mentoring of creative aspirations. Jonathan walked the creative talk in this regard. Rather than attempt to restrict or overly narrow my focus, he encouraged and supported my broader interests in the nature of creativity, including my remotely associated interests in teaching, learning, and instructional change. In fact, my dissertation didn't even focus explicitly on creativity (but rather instructional change in the context of schoolwide reform efforts).

As I have come to realize, one of the clearest ways creativity manifests is through everyday action. Jonathan's creative actions as an advisor and contributor to the field thereby serves as an example of the definition our team derived (Plucker et al., 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).

[Authored by Gayle T. Dow, PhD, Associate Professor, Christopher Newport University] How do you define creativity? That was the initial question. "We, as a field, need an agreed upon definition. There really isn't one." Jonathan shook his head solemnly in our first research meeting at Indiana University in the summer of 2002. I was two years into my PhD program on the west coast when I visited Bloomington, IN to work with Jonathan over the summer. Creativity researchers were a rare find and I eagerly looked forward to our collaboration, however brief it may be. I vividly remember sitting in his corner office those first few days chatting about creativity research. This conversation not only led to our first publication together, which was to develop an explicit definition of creativity, but began our 20 year research collaboration together. It was this summer project that resulted

in me transferring to Indiana University to finish my PhD under his mentorship.

This initial project addressed four main stereotypes that have plagued the empirical research into creativity and clouded its definition. The stereotypes include the misguided belief that creativity is innate and you are either born with it or without. In truth, we know from much research that creativity can be increased with training (see Dow & Mayer, 2004 for example). It also addressed the myth that creativity is restricted to the dark side of criminality, drug use, and mental illnesses. Although malevolent creativity is a recent and worthwhile topic of investigation, drug use and mental illness typically impede the creative process and prevent the final, necessary stage of evaluation to yield a worthwhile product. Similarly inaccurate is the third myth that creativity is limited to eccentric people who live on the fringes of society. Although socially withdrawn, creative geniuses do peak our curiosity, they are far from typical examples of those who are creative and instead we find that consistent hard work is more likely to produce creative achievements. Lastly, the fourth myth that teamwork fosters creativity should instead be balanced with the understanding that brainstorming yields higher fluency when it is a solo endeavor and other biases, such as groupthink, which can actually be detrimental to creativity.

In an attempt to put an end to these myths, and identify commonalities that tap into the latent construct of creativity, we reviewed nearly 100 research articles with the word creativity in their titles. Less than half of these publications provided an empirical definition of creativity, but by reviewing these and extracting implicit definitions from others, we concluded that creativity had three main consistent attributes: novelty, usefulness, and environmental influence. Thus, to answer our original question, we defined creativity as articulated in the previous section.

With the collaboration of Ron Beghetto, we published this call to action: “Why Isn’t Creativity More Important to Educational Psychologists? Potentials, Pitfalls, and Future Directions in Creativity Research” which requested, as a field, we use an explicit, consistent, definition of creativity to aid in clearer communication and foster creativity across multiple disciplines. As of April 2021, this paper has been cited over 1,600 times since its publication, including by the recent 2020 paper entitled “Defining Creativity: How Far Have We Come Since Plucker, Beghetto, and Dow?” Using a similar technique, Puryear and Lamb (2020) reported that more researchers are now using explicit definitions primarily involving the same three attributes of novelty, usefulness, and environment. The field of creativity research has grown and expanded extensively since my days at Indiana University and while we still have much research to explore, I believe this seminal work with Jonathan and Ron was one such catalyst that has propelled the field forward to where we are today.

Pushing Creative Boundaries

[Authored by Matthew Makel, PhD, Associate Research Scientist, Johns Hopkins University] As shared in the previous section, Jonathan’s work to

articulate a definition of creativity that is widely accepted helps assure that different people are speaking the same language. In a related stream of research, Jonathan and I have written a great deal about the importance of replication in research (Makel & Plucker, 2014a, 2014b; Plucker & Makel, 2021).

The seed of this research started when Jonathan handed me a brief magazine clipping about how marketing research was rarely replicated. He said something along the lines of, “let’s think about this.” This brief interaction and suggestion to connect and apply findings from one domain to another is a great example of Jonathan’s own creative problem finding, but also led to a book (Makel & Plucker, 2017) and more than a dozen papers on replication and its importance in research in creativity (Makel & Plucker, 2014a), psychology (Makel et al., 2012), education (Makel & Plucker, 2014b), gifted education (Makel & Plucker, 2015), special education (Makel et al., 2016), educational psychology (Plucker & Makel, 2021), and even criminology (Pridemore et al., 2018). This work highlights the prevalence (or lack thereof) of replication research, what it would (and would not) contribute, as well as suggestions for how to foster greater support for replication research.

Replication, or the intentional duplication of previous work to assess either veracity or generalizability, may superficially appear to be the opposite of creative. How could something that is an intentional duplicate meet the novelty criterion? In a response commentary in a special issue in *Psychology of Aesthetics, Creativity, and the Arts*, Jonathan and I (2014) approached the issue from a different angle: If a concept cannot be replicated, how could it meet the usefulness criterion of creativity? From this perspective, we argued that for a scientific finding to be creative, it must be replicable. Otherwise it is not particularly useful. One team finding cold fusion one time is not as useful as independent teams being able to replicate the effect.

In our work, we made the analogy to replications serving as scientific kidneys, helping filter out waste products (findings that cannot be repeated independently or in specific contexts of interest; Makel & Plucker, 2014b). Such filtering is part of any creative process when shifting from idea generation to winnowing routes to pursue for action. The landscape for ideas must be reduced from the population of all ideas generated to those that best meet the novelty and usefulness criteria. We believed that an important facet of the usefulness criteria in scientific research is that it can be replicated (preferably independently). It can serve as a dialysis differentiating creative contributions that are unique and replicable from contributions that only meet the novelty criterion.

We were not the first to consider replication as part of the creative process. Sternberg (1999), in his Propulsion Model, notes that replication is one of nine types of creative contribution. This framing of creativity needing replication pushes the boundary of the creative process beyond the narrow hegemony of novelty. Although not as well accepted as his definition of creativity, his work on the importance of replication is also growing in acceptance, with the Institute of Education Sciences in the U.S. now funding a specific call for proposals for systematic replications.

[Authored by Haiying Long, PhD, Associate Professor, University of Kansas] Although Jonathan's work with Beghetto, Dow, and Makel leads to discussion about the definition of creativity and replication in creativ-

ity research, that does not overshadow his work on understanding creativity research as a field. Our paper on research productivity and performance of journals in *creativity sciences* is such an example.

The idea of this paper started with Jonathan's vision of treating creativity as a scientific field, or "creativity sciences." This aimed to serve two purposes: one was to officially establish creativity as a field that can be distinguished from other fields in psychology; the other was to study the field as a whole from a more scientific way. This vision was as important as the definition of creativity for the development of the field of creativity because it had rarely been discussed, and studying a field from a scientific way was still a novel idea for many other fields in social sciences. This vision was also built from Jonathan's long-time engagement in creativity research as a leading researcher and his commitment to moving the field forward.

We began this work by searching journal articles on creativity in popular psychological and educational databases, such as PsycINFO and Web of Science, dating back to the first article published in the 1800s. We then included theses and dissertations on creativity collected in the database, ProQuest, and compared all the creativity publications with those published at the same period on other comparable topics in psychology, such as IQ, personality, and insight. We found many interesting patterns of creativity studies from this work, which were presented at an APA annual conference. Later, we focused on publications between 1965 and 2012 in four main creativity research journals, *Journal of Creative Behavior*, *Creativity Research Journal*, *Gifted Child Quarterly*, and *Psychology of Aesthetics, Creativity, and the Arts*. With the collaboration of colleagues in library science at Indiana University, we applied a bibliometrics approach that is popularly used in library science to examine research performance of *creativity sciences* through the analyses of publications and citations of the articles published in these journals and the impact factors of these journals. In our results, we presented the development trend of the research productivity and the impact of creativity sciences and provided creativity researchers with the first analysis of how the field looks at the macro level (Long et al., 2011).

Creativity Assessment and Psychometrics

Once creativity is defined, operationalizations and assessments can be created. Jonathan has also contributed substantial work to the assessment and psychometric evaluation of creativity. Jonathan's work in this area began when one of his early mentors, Joe Renzulli, was asked to write a creative assessment chapter for a handbook being edited by Robert Sternberg. Jonathan spent months reading and preparing it (Plucker & Renzulli, 1999) to make a good impression. This project not only gave him a foundational knowledge of creative assessment and psychometrics, but led to several future empirical and review papers. In this section, Qian recounts some of Jonathan's research on divergent thinking tests and scoring, domain expertise, and other psychometric work with creativity assessment. Long continues with relevant work on the Consensual Assessment Technique.

[Authored by Meihua Qian, PhD, Associate Professor, Clemson University] The year 2006 was one of the happiest times of my life because I

was admitted into the Educational Psychology PhD program at Indiana University in Bloomington and I could start working with Dr. Jonathan Plucker, one of the leading figures in the field of creativity. In the past 12 years, I have co-published eight articles and four book chapters with Jonathan, and we examined various theoretical and technical issues related to creativity assessment, which are described in detail in the sections below.

Divergent Thinking Tests and Scoring Techniques

Although there are multiple ways to measure creativity, divergent thinking (DT) tests remain one of the most popular approaches to assessing creativity (Plucker & Makel, 2010; Plucker et al., 2019), and participants' responses can be scored in terms of fluency (the total number of responses), flexibility (number of distinct categories of responses) and originality (uniqueness of responses). However, validity evidence associated with DT assessments is often mixed (e.g., Qian & Plucker, 2018), which is further complicated by a known contamination problem in DT tests (i.e., high correlations between fluency and originality scores). Hence, Jonathan and I identified and compared several methods for scoring originality. Our results showed that the percentage scoring method may be optimal for originality scoring for abstract and decontextualized DT tasks (Plucker et al., 2011) while a combination of objective and subjective scoring methods may be the most appropriate scoring strategy for real-world DT tasks (Plucker et al., 2014).

Domain Expertise and Creativity Assessment

The Consensual Assessment Technique (CAT; Amabile, 1982, 1996) is viewed as the "gold standard" of creativity assessment (Carson, 2006); this involves having a group of experts judge the creativity of creative products (Qian & Plucker, 2017). However, no consensus has been reached regarding the amount of domain expertise that is required to best judge creativity. To provide more rigorous evidence to help address this issue, Jonathan, other collaborators (James Kaufman and Jason Temple), and I analyzed college student (novice) ratings and critic ratings on movies released from 2001-2005 and compared them to those of self-identified critics on major movie rating websites. We found a moderate association between student ratings and critic ratings ($r = .43$) and a strong positive correlation between self-described novice rating and critic ratings ($r = .72$) (Plucker et al., 2009).

Creativity Assessment and IRT Framework

Many widely used creativity measures such as the Creative Personality Scale (CPS; Gough, 1979) were developed based on the classical test theory (CTT) framework. Due to the sample-dependent nature of CTT-based models, reliability and validity evidence associated with these measures often varies across studies. Therefore, the psychometric properties of the CPS were reexamined using the item response theory (IRT) framework. Results suggest that the CPS is multidimensional and associated with convincing evidence of criterion-related validity, although some items have low discrimination indices (Qian et al., 2019).

The Argument of Domain Generality vs. Domain Specificity and IRT Framework

Although creativity has been well studied in the past several decades, the question of whether creativity is domain specific or domain general still remains one of the major unresolved issues in the field of creativity. Given previous studies are associated with either conceptual or methodological issues, Jonathan, another collaborator (Xiangdong Yang), and I reexamined the domain generality-specificity argument from a new perspective using descriptive and multilevel explanatory IRT models. Essentially evidence supports domain generality (Qian & Plucker, 2018), but the significant domain effect of music suggested that it may be harder to be creative in music than in other domains (Qian et al., 2019).

[Authored by Haiying Long, PhD, Associate Professor, University of Kansas] Jonathan has written several articles or chapters on creativity measurement. I was fortunate to work on one chapter with him on assessing creative thinking in *The Routledge International Handbook of Research on Teaching Thinking* (Long & Plucker, 2015). This chapter focused on reviewing different approaches of assessing creative thinking under the school context and provides researchers, teachers, and practitioners with recommendations for how to integrate creativity assessment into teaching and classroom assessment.

My doctoral dissertation examining validity of the Consensual Assessment Technique (CAT) also benefited from Jonathan's insights on creativity measurement. When writing about creativity measurement, Jonathan often mentions that the CAT has usually been considered as one of the best approaches to measuring creativity, mainly because it eschews the criterion issue by using a panel of experts as judges. As described above, it also brings about a few other questions, such as, who can be the judges? What level of expertise is required of judges for rating products in a domain? Can the CAT be used in other tasks, such as those in divergent thinking tests? Based on the results of his work, Jonathan proposed to understand judges' expertise from a continuum perspective. He also compared different approaches of scoring real-world divergent thinking tasks, including the use of the CAT, and examined the reliability and validity of these approaches. My dissertation could be viewed as an extension of all the frontier work that Jonathan had done prior.

Assessing the Evidence and Making it Accessible

As demonstrated throughout this chapter, Jonathan is a keen researcher. He has an eye for identifying gaps in the literature and ways to remedy those gaps, but he also has a distinct ability to make research accessible and useful to all audiences. In this section, Callahan, Jonathan's long-time collaborator and doctoral advisor, reviews his application of research evidence in non-research contexts; specifically, its translation to non-research audiences.

[Authored by Carolyn Callahan, PhD, Commonwealth Professor of Education, University of Virginia] The contributions that a scholar makes to the literature in any field can range from the theoretical to the practical. Other portions of this chapter offer strong arguments for Jonathan's contributions to the theoretical and research literature in specific domains of education and psychology such as creativity and excellence gaps; however,

some of Jonathan's most exceptional talents lie in the realm of real-world of application. These include his ability to identify and act on the need to carefully evaluate the evidence available on a vast array of assertions made in education, his expertise in synthesizing and fairly evaluating the evidence surrounding those assertions, and most importantly, his extraordinary capacity to translate those evaluations into terms that practitioners, and particularly policy makers, can understand and accept.

My first exposure to Jonathan's ability to identify assertions about practice that should be scrutinized and domains of knowledge that need careful review was when he approached me about co-editing the first edition of *Critical Issues and Practices in Gifted Education* (Plucker & Callahan, 2008). As we began to discuss the range of topics to include in the first edition, his insights into the important issues to be scrutinized were reflective of his ability first to glean both the "time honored" and obvious targets that were often talked about by policy makers as if there was clear direction for practice (e.g., grouping), but were as likely to reflect belief systems as to reflect research-based practice. But then he also was cognizant of the practices and/or fads that were emerging in the field and should be carefully weighed by experts. The process of identifying those experts to review the literature also reflected the value he placed on ensuring that each issue would be considered with an eye that was not biased in favor of one point of view over another. This drive for equitable consideration of the literature carried over into his role of editor of the individual chapters as he raised critical questions of the evidence supporting assertions made by the chapter authors. In the subsequent editions (Plucker & Callahan, 2014; 2020) of the book he never lowered standards -- demanding the same level of integrity in the evaluation of evidence in all the chapters he co-authored or edited.

Not only does Jonathan set high expectations of others as an editor, his own work reflects an steadfast commitment to examination of evidence across the many practices in our field. When we were first approached to develop a review on the status of research and practice for a special issue of *Exceptional Children* (Plucker & Callahan, 2014) and when we were asked to expand on that publication for a chapter in the *Handbook of Special Education* (Plucker & Callahan, 2017), he insisted on taking a stand on all of the issues in a way that reflected applying strict criteria for evidence supporting or refuting assertions and practices in gifted education -- even those that are commonly accepted as truths and/or are "sacred cows" of leaders in the field. I recall conversations around the general statement "He/she isn't going to like us writing this" without flinching or backing off on our argument. Further, Jonathan's contributions always reflected examination of original research and sources rather than relying on secondary interpretations or syntheses of the work. And Jonathan also insisted on considering the literature outside of gifted education which had implications for any of the topics we were considering. For example, the *Top 20 Principles From Psychology for PreK-12 Creative, Talented, and Gifted Students' Teaching and Learning* (which he edited with Makel, Olszewski-Kubilius, and Subotnik; American Psychological Association, 2017) is a model of the use evidence-based practice from the domains of psychology as a basis for guiding instruction for gifted students. Jonathan's commitment to reviewing and carefully evaluating evidence has

prevailed in any writing or discussion I have had with Jonathan up to and including our recent article in the *Kappan* (Plucker & Callahan, 2020). Even when the editor suggested “softening” language he was steadfast that the meaning or conclusion not be altered by revisions to language. While some may quarrel with his (or our) evaluations of the evidence, one could never quarrel that Jonathan made the judgement based on his careful consideration of that evidence.

Although the publications mentioned above reflect Jonathan’s commitment to evidence-based practice, publication alone does not guarantee that policy makers and practitioners will hear the messages we try to convey. To that end, Jonathan has courted the attention of policy makers from small to large school –administrators as well as school board members and leaders at the level of state policy decision making by situating the circumstances and good practice for gifted learners in the context of good learning environments and practices of all students. In a presentation I did with Jonathan at the conference of the National School Boards Association each and every message was carefully crafted to communicate best practice in education with language that related to the decisions they routinely made for their school districts and with language that engaged them to think without dredging up potentially existing biases and prejudices about gifted students and associated beliefs about privilege. I can still clearly see the faces of students when Jonathan presented in my seminar and explained how powerful the argument for gifted education becomes when one simply situates the plight of gifted students in the overall argument of the achievement gap and loss of talent within the documented excellence gap. He went on to note that by pointing to the poor performance of “our highest achievers” or “those with the highest level of academic performance” rather than to the “gifted” he was able to redirect policymakers’ thinking from long-time rejection of that construct of giftedness to concern for *all* learners *including the gifted* using sound research evidence.

International Work

Jonathan’s extensive international collaborations (e.g., in China, The Netherlands, United Kingdom, South Korea, and Hungary) are often inspired by his desire to say yes when given an opportunity to collaborate. These collaborations connect him to networks of scholars, further opportunity, and great joy. In this section, Long and Qian discuss some of Jonathan’s international work in the field of creativity. Long discusses Jonathan’s involvement in research in China and Qian discusses Jonathan’s contribution to the literature using Chinese samples.

[Authored by Haiying Long, PhD, Associate Professor, University of Kansas] Jonathan is probably one of the first few American creativity researchers to work with creativity researchers in other countries. When I met him for the first time in 2007 in China, he had already worked with creativity researchers in China for a few years. Later, he expanded his collaboration with other Chinese creativity researchers, especially those at Beijing Normal University, East China Normal University, Shaanxi Normal University, and Capital Normal University. He was well respected in the community of crea-

tivity researchers in China and was invited to deliver keynote speeches for China's National Creativity Research Conference, the only conference on creativity research in China, for a few years in a row. I met him in Shanghai in 2007 at the conference sponsored by East China Normal University. He introduced the most updated development of creativity research around the world in his keynote speech, which was received well by the audience.

From his years of collaborating with Chinese creativity researchers, he has developed many publications with them (e.g., Chen et al., 2016; Wang et al., 2018; Yi et al., 2013), including examining Chinese adolescents' creativity development, factors affecting scientific creativity with colleagues in Shaanxi Normal University, examining Chinese migrant children's divergent thinking abilities with colleagues in Capital Normal University, and discussing the effect of policies in China on promoting creativity and with colleagues in East China Normal University.

Migration and Creativity

[Authored by Meihua Qian, PhD, Associate Professor, Clemson University] Many researchers have examined the impact of culture on creativity in terms of implicit and explicit conceptions of creativity, creative processes, creative performance, and culturally relevant creativity assessment (e.g., Ng, 2003; Leung et al., 2008; Qian et al., 2010; Shao et al., 2019; Tan et al., 2019). Some studies have also shown that within different cultures, experiences can enhance creativity and urban children often outperform rural children on creative tasks (e.g., Liu & Shi, 2004; Shi et al., 2012). However, little is known regarding how migration from rural to urban areas within a county might influence students' creativity development. In China, millions of people including their children migrate from rural areas to cities each year because there are plenty of job opportunities in big cities (Shi et al., 2012). To investigate the relationship between children's migration from rural to urban areas and their creative thinking ability, a study involving 909 fifth and sixth grade Chinese students who were either migrant children, rural children, or urban children was conducted. They were asked to complete a DT test, and we found that migrant children outperformed rural children on DT tasks, but still scored significantly lower than urban children on the DT test. Also, short-term (less than 3 years) migrant children scored significantly lower on the DT test than midterm (4-7 years) and long-term (≥ 8 years) migrant children. But no significant differences were observed between the DT scores of midterm and long-term migrant children (Shi et al., 2012).

The Chinese Adolescents' Creative Personality Inventory (CACPI)

Creative personality has been extensively studied since the 1950s, and numerous studies have been conducted with respect to creative personality characteristics, the construct of creative personality, and the relationship between creative personality and creative achievements (Qian et al., 2010). However, little is understood regarding Chinese adolescents' creative personality. To provide culturally relevant creative personality assessment, the Chinese Adolescents' Creative Personality Inventory (CACPI) was developed and tested. A total of 1,300 Chinese adolescents completed the instrument, and the results suggest that adolescents' creative personality consists of three dimen-

sions-Internal, External and Self factors, with the Internal factor including self-confidence, norm-doubt, internal motivation, and persistence, the External factor consisting of curiosity, risk-taking, openness and independence, and the Self factor pertaining to self-acceptance (Qian et al., 2010).

Creativity in the Classroom

One of Jonathan's favorite things to do in the classroom is teach about creativity. He takes a specific, deliberate approach to get each student to question their beliefs and stereotypes about creativity. This sometimes leads to some grumpy, confused students along the way. He thoroughly enjoys seeing them transition—some like flipping a switch, others more gradually—and seeing their worldview change. These changes are among the reasons Jonathan views creativity in the classroom as so important. It's an opportunity to help students discover their personal creativity.

[Authored by Amber Esping, PhD, Associate Professor, Texas Christian University] Twenty-odd years ago when I first learned of Jonathan Plucker, I was a first-generation college student with a clarinet performance degree and a naïve enthusiasm for human intelligence and creativity. When I first reached out to him, he put me in touch with one of his recent Indiana University PhD graduates, Ron Beghetto, so that I could ask questions and get honest feedback about what it was like to work under his mentorship. Beghetto told me then exactly what he reaffirmed earlier in this chapter. Now I, too, am deeply grateful for Jonathan's creative and generous mentoring early in my career. He always made his advisees feel like a priority, and only after I graduated and took my first tenure-track position did I fully realize what a gift this was. Despite Jonathan's impressive publication record and frenetic travel schedule I somehow had no idea how busy professors are. Moreover, he was genuinely open to hearing his advisee's ideas. When, about half-way through my program I abruptly changed directions and pitched a new and nontraditional dissertation topic that diverged from his own work, he didn't flinch. He seemed genuinely excited and actively sought support for me from other scholars who did work in this new area. Jonathan's open-mindedness and championing of his students' ideas speaks to the way in which he manifests through his pedagogy the definition of creativity that he, Beghetto, and Gayle Dow proposed in their much-referenced 2004 article. Or, to echo Beghetto's point earlier in this chapter: "One of the clearest ways creativity manifests is through everyday action." Jonathan is a fully engaged teacher-scholar who puts into practice the dispositions he advocates in his creativity publications.

Over the last 20 years, Jonathan and I have published three articles, seven book chapters, and one book together. One of the most meaningful collaborations for me personally has been our ongoing work on Jonathan's *Human Intelligence: Historical Influences, Current Controversies, Teaching Resources* Website (<http://www.intelltheory.com/>). In 1998 Jonathan began developing this resource as a flexible "living text" for courses covering human intelligence. However, many of the scholars featured on the site have also published on creativity (e.g., Joseph Renzulli, Robert Sternberg). The site can be very useful for disentangling constructs of intelligence from crea-

tivity, as Jonathan's careful attention to definitional issues can be seen in the personal definitions of intelligence provided by many of the featured scholars. The structure of the site itself is supported by learning and cognitive science research about how viewers interact with online content. The resources available include an interactive map demonstrating the chains of influence among theorists and researchers, biographical profiles of prominent individuals who have contributed to the development of intelligence theory and testing, in-depth articles exploring important controversies related to intelligence, and sample course syllabi that can be adapted for use by other faculty. It is further enhanced by videotaped interviews of prominent scholars discussing their work (Plucker & Esping, 2014a).

When possible, we conducted these interviews at conferences, but often Jonathan sent me to the scholar's homes. One particularly colorful anecdote is this one, related in Plucker & Esping (2014b):

We were very fortunate to connect with John Horn near the end of his life. His interview, conducted in his home office in California (which he lovingly referred to as "The Institute") can be found here. The interview posted on the site is actually a second attempt. The first attempt one year earlier failed because one of the present authors (A. Esping) and Dr. Horn collectively could not figure out how to turn on the video camera during the first visit. In an email exchange afterwards, Dr. Horn attributed this to Amber's deficit in a specific ability. (p. 173)

In John Horn's defense, he was quite elderly at the time of the interview and was unfamiliar with the kind of camera I brought with me. When I returned to Indiana University after the first attempt at the interview I was utterly mortified to have failed so magnificently. Jonathan received my apologies with his usual humor and grace.

Creative Articulation

[Authored by Stuart Omdal, PhD, Professor Emeritus, University of Northern Colorado] When I was a doctoral student at the University of Connecticut in the early 1990s, Jonathan Plucker was an undergraduate senior in the secondary professional teacher education program and a work-study student in the Gifted, Talented, and Creative Education program. He had been in a gifted education program during his elementary and secondary years and as a result was interested in topics addressed in the courses. He started to take graduate courses in the master's program (*this was before he finished his bachelors- in fact he was awarded his master's degree the day before his bachelor's degree!*) and was particularly interested in the course on creativity, an interest that he and I shared.

I recall one day he came into the office and told me that when he was walking down the long hill from the remote parking lot this morning he had a flash of insight regarding creativity while he was thinking about his great grandfather. His great grandfather had invented a rear back-up light system for cars, but did not successfully market it. Jonathan said that he realized that what was missing was the element of "articulation."

Fast-forward to 2017: Chapter 11 in *Creativity and innovation: Theory, research, and practice* is entitled “Creative Articulation” by Jonathan Plucker. In this chapter he establishes the importance of purposefully conveying one’s creativity/creative productions to audiences in different social contexts. These concepts are put to use in business and marketing and carry implications for students as well. When an upper elementary, middle, or high school student is involved with a self-chosen individual investigation, project-based learning product, or capstone/senior project, a topic of intense interest is often selected. Many times this interest is chosen because the student recognizes a “real world” problem and sees the need for a change in policy, procedure, ordinance, or law. This may be at a school district, local, or larger-scale level. To affect this change, students need more than earnest passion. They need to learn how to communicate effectively to those who are the decision-makers: the gatekeepers. They can be taught how to understand their audience, refine their message, set the mood, discern when the “time is right”, and locate advocates and organizations who share their concern. Learning about and experiencing these aspects of “articulation” equips students for subsequent involvement when they see something in society that needs changing or in the promotion of other creative endeavors with which they are involved. Creative articulation à la Jonathan Plucker can help enable the student to move from wanting change to occur to making change occur.

Attitudes Regarding Creativity

Jonathan’s work on the impact of an individual’s attitude toward creativity has implications for teachers interested in enhancing the creative behaviors of students in the classroom. Reporting the results of a study with college students in an article co-authored with Dow in 2017 (Plucker & Dow, 2017) they describe this important role of attitude in the development of creative behaviors. The role of prior experiences outside of the classroom and teaching/learning experiences in the classroom contribute to the formation of an individual’s attitudes regarding creativity throughout one’s schooling and beyond.

How can teachers help foster positive attitudes regarding creativity in the classroom? Plucker and Dow offer a “New Model for Creativity Enhancement”,

(Plucker & Dow, 2017) The first component is a deliberate focus on attitude change. They report that attitudes regarding creativity are influenced by past experiences and experiences in the classroom. This is applicable to children and adults. If a child is raised in an environment that encourages creative expression then their attitude towards creativity likely is positive. If a student in a professional teacher education program experiences creative teaching strategies from professors, they will be more likely to feel comfortable and confident integrating appropriately modified teaching strategies in their K-12 classrooms.

The second component of the model for creativity enhancement is to help students identify their strengths and understand the need to respect individual differences in abilities, interests and preferences. An approach suggest-

ed in the framework is to look at the areas of cognitive, political, social, environmental, and emotional strengths and preferences. The third component deals with balancing the emphasis on external and personal factors when cultivating creativity. This component is often important when a problem arises and individuals focus on the limitations imposed by the environment (school, work, culture) rather than creatively employing their personal strengths and preferences to find possible solutions.

Jonathan's work on the importance of addressing the issues regarding an individual's attitude toward creativity impacts the potential role of the teacher in fostering positive attitudes. Providing instruction that includes elements of experiential learning, active hands-on learning, and problem solving activities in an environment that is safe for taking risks fosters positive attitudes toward creativity that likely may have a life-long impact on the individual.

Excellence Gaps

In addition to his work in creativity, Jonathan has published widely on students whose learning needs may not be met in the regular classroom. As mentioned above, such students are often called gifted. But Jonathan has found that using other descriptors may be more effective when talking to policymakers. Perhaps Jonathan's biggest such reframing is his introduction of the term excellence gaps (unequal advanced performance) and his reports on their magnitude and sustained permanence in the United States. Jonathan feels it is an ethical duty to help a lot of kids and make sure they receive equitable opportunities to develop and learn. His work on Excellence Gaps highlights how far society has to go to fulfill this ethical duty.

[Authored by Steven Fredericks, Ed.D., Visiting Professor, Johns Hopkins University and Scott J. Peters, PhD, Professor, University of Wisconsin-Whitewater] Jonathan and I (Steve) were introduced to each other by the Dean of the Indiana University School of Education in 2009. The Dean thought there might be some mutual interest in each other's work as Jonathan was the Director of the Center for Evaluation and Education Policy at IU and I was leading the largest provider of after school programs in New York City. He wore a bowtie. I was from the Bronx. What a match. That was a day that led to more than a decade's worth of shared professional pursuits, but even more importantly, to the development of a friendship that has only grown stronger as the years passed. When he started sending me his quintessentially unique postcards I knew that we had matured into BFF.

In 2010, Jonathan released his *Mind the (Other) Gap* report, along with colleagues Nathan Burroughs and Ruiting Song, outlining the state of unequal rates of advanced achievement. When I (Scott) first read this report, I thought it would be a game-changer in the areas of equity and gifted education. Gifted education has always struggled to gain traction among policy makers and school administrators, in large part because of serious inequities among the populations often served. Finally, in *Mind the (Other) Gap*, someone was talking about the equity side of advanced learning – that if you don't have advanced services in schools, disparities will only grow as privileged families will always have access to resources, while less-privileged families

need to rely on the public sector. This 2010 report was only the beginning. Clearly this idea of “excellence gaps” was powerful to educators, funders, and policy makers alike.

In 2013 came the second excellence gap report entitled *Talent on the Sidelines* (Plucker et al.) – emphasizing that America’s approach to talent development was resulting in one team getting all of the attention while the other remained on the sidelines. Not only did this report document how excellence gaps had been growing since the mid-1990s across racial and income groups, but that America was also far behind its peer competitors internationally: more than 30% of South Korean fourth-graders scored advanced on the 2011 TIMSS compared to less than 15% in the United States. Again, both of these reports highlighted the importance of access and opportunity. The advanced-achievement rates for students eligible for subsidized meals in the U.S. were 1.8% in grade four math in 2011 compared to 11.4% for their more-privileged peers. This gap has exploded since 1996. People within the gifted education community had long argued that gifted students need support – that they will not make it on their own. But the two excellence gap reports made it clear that some kids will achieve at advanced levels without investment in public education infrastructure to do so. But this status quo only exacerbates long-standing inequities.

Not long after the 2013 report, I (Scott) received one of the life-changing offers of my career – to write a book with Jonathan on excellence gaps. It was humbling then and remains so now. An underappreciated part of writing a book is how much you get to learn while doing it. Sure, you might know a lot about a topic going in, but getting to devote a lot of time and energy to thinking about one topic can never leave you the same. In this book Jonathan and I explored many aspects of excellence gaps: how excellence is measured, how we might better find students who have the potential for excellence, and what kinds of services actually foster advanced achievement.

In 2016, I (Steve) was asked to review the book, *Excellence Gaps in Education*, which Jonathan and Scott Peters had just published. For me, it was a game changer that influenced my work profoundly. As I wrote at that time,

Excellence Gaps in Education needs to be read by all who understand that American exceptionalism is not to be taken for granted and is certainly not a given. Our educational system faces two critical challenges: ensuring that all segments of our student population, K-12, attain basic levels of competency and achievement, and secondly, that those students from all segments of our student population who are, and should be, identified as talented and gifted are given the opportunity to thrive. When these two challenges are met, the excellence gaps which are ‘differences between subgroups of students performing at the highest levels of achievement,’ will be closed. Plucker and Peters have produced what is, perhaps, one of the most important books on the American educational system of the 21st century. (2016)

We were all struggling with the never-ending issue of why urban (and rural) education was not equitably serving the needs of K-12 students in the most under-resourced schools in communities of poverty. And more specifically, those subsets of students who were capable of advanced learning, were not identified and, therefore, not afforded any opportunity to excel. Too often access to the kinds of opportunities that foster talent and develop advanced abilities are not equally available to all students. In too many places, the needle was just not moving. Jonathan knew the issues well and was crisscrossing the country trying to make a difference. He not only had to fend off the stereotypes of gifted and talented programs as only serving an elite population but was also searching for a pedagogical solution that would cut through the accepted practices of the day. This was the major challenge for closing excellence gaps. And then we (Jonathan and Steve) brainstormed. Jonathan recounted how gifted and talented programs were one of the first programs eliminated from the school day when budgets needed to be reduced. I responded that it was often the same for sports and arts and that's why we were providing those activities in the after school environment. Then the eureka moment happened. Why not provide programs for students capable of advanced learning in the after school settings (they were certainly funded) of these under-resourced schools?

I asked Jonathan if it had ever been tried and he said he was not aware of any serious undertaking throughout the United States. And that's when the idea for a new model to close excellence gaps was born. After working for about 18 months on the concept and the model, we implemented the project in a distressed school in the Bronx, and were convinced that we had the potential to change the face of urban and rural education throughout the United States. Jonathan's ideas, which were articulated in the aforementioned book, were put to the test. The project employed universal screening and local norms including all of the following identification criteria: teacher, principal and after school staff evaluations, standardized test score results (only available for the 4th graders) and interestingly enough, self-identification. In all cases, the parent/caretaker was required to agree to the child's participation and agree to communicate with the staff when needed. The initial cohorts were 3rd and 4th graders, all of whom were subsequently found to come from families at, or below, the poverty line. Each year we would add a new 3rd grade. Each cohort of 20 children was led by a teacher with advanced training in STEM as well as a counselor/mentor who served as the Social and Emotional Learning instructor and liaison to the school day staff and the parental community. The project was totally integrated into the regular after school program. While other students might be studying dance or participating in fine arts classes, these students might be working on coding for robots.

Just prior to the pandemic, we began to evaluate the results of the project which had been running for two years. The findings were encouraging. The only way to evaluate success so far had been to compare the results on standardized math and English language arts with their counterparts. In all cases, the students participating in the project greatly exceeded the scores of all their peers in the school, the school district, and the city. As a point of reference, this school scored well below its counterparts in its district and the

city. We knew we were on to something. Jonathan began to speak with educators throughout the country about this new model and the reception has been overwhelmingly positive. This all coincided with Jonathan being elected President of the National Association for Gifted Children and the heightened sensitivity surrounding equity and diversity. Jonathan's influence, ideas, and pioneering work will no doubt lead to the closing of excellence gaps which has, for too long, eluded our best efforts.

It's been ten years since the publication of the first report on excellence gaps. The concept and the goal (increasing the advanced-achievement rate for students from traditionally disadvantaged groups) has now become a major part of the culture of gifted education. Additional articles have been written on the international context of excellence gaps (Jacobs & Wolbers, 2018; Rutkowski et al., 2012), professional associations such as the Jack Kent Cooke Foundation and the Fordham Foundation have taken notice, and a range of researchers have studied interventions aimed at mitigating excellence gaps (e.g., Robinson et al., 2018). Perhaps one of the greatest contributions of excellence gaps as a concept is that they changed the culture within the field of gifted education. No longer is it sufficient to provide services for those students who, often because of privilege, are already high achieving. Instead, a true embrace of equity means to provide opportunities for all students to develop advanced potential. Regardless of background, humans develop their abilities because of the deliberate and purposeful provision of learning opportunities. Some children are lucky enough to have parents who can afford to provide those services starting at an early age. Others either require schools to provide such services, or they go without, creating what Jonathan and colleagues referred to as a permanent talent underclass.

Gifted Education

As Omdal mentioned earlier in this chapter, Jonathan had been in a gifted education program during his elementary and secondary years, which contributed to his interest in the field of gifted education as an undergraduate. During his time at the University of Connecticut, he met Sally Reis and Joe Renzulli. Their big picture thinking was an early inspiration. Their work also served as a natural entry point into gifted education, a field with deep connections to creativity. In this section, some of Jonathan's relevant work in gifted education is shared by Steven Fredericks and Julia Link Roberts.

[Authored by Steven Fredericks, Ed.D., Visiting Professor, Johns Hopkins University] In August 2019, the New York City Mayor's task force on School Diversity had just issued their recommendations and I was texting Jonathan Plucker. As the President of the National Association for Gifted Children, he would be at the center of a storm. The commission had recommended that for schools to achieve desegregation and diversity, gifted and talented programs should be shut down. The ill-thought out idea was that all children would benefit by being exposed to each other and that the classroom teacher would be able to differentiate and teach all of the children who, if truth be told, might be ranging across at least 5 grade levels in a class of 25.

Having worked with Jonathan for many years, I knew that this was not the outcome he would have voted for if he had been consulted. Education policy was not a subject he shied away from having been the Director of the Center for Evaluation and Education Policy at IU before being named an endowed professor at the University of Connecticut and then, again, at Johns Hopkins University. He responded to the text by calling me and we had an extended discussion which went well into the night. We had been working together on a project to close excellence gaps but were always thinking about the broader area of gifted and talented education, in general. Having an outsider's perspective, since I came to this field of inquiry called gifted and talented education very late in my professional career, it appeared that there were a number of barriers to overcome if there was to be widespread adoption of these types of programs. First and foremost, it needed to overcome its wide-spread reputation as being elitist and serving only those middle and upper class families who could afford to prepare, and then send their kids to advanced learning programs. The problem was that the reputation was accurate, with the startling exception of the Asian-American community of New York City. And that's where Jonathan Plucker has led the way in trying to overcome that reality by pointing out the underlying factors that result in the lack of diversity and equity in gifted and talented education.

Jonathan's voice is unique in that he has established trusted relationships with local, state and national leaders. He has actively contributed to journalists writing about this topic and has taken active stands on education policy decisions at the three levels of government. Jonathan recognized early on that if he only talked to the converted, the pie would not get bigger. In other words, he needed to proselytize. Jonathan has argued in the editorial pages of the leading newspapers and on the variety of social media outlets that gifted and talented education needs to be expanded, not dissolved. Why, he argues, would we not want to afford advanced educational opportunities to all of those children capable of advanced thinking? We, as a society, have no issue with providing those students displaying a talent in fine art to provide them with the instruction and tools to advance their talent. We, as a society, have no issue with distinguishing those students with exceptional athletic talent to be given the opportunity to pursue those talents with coaches who will hone those skills. We only seem to have a problem when we differentiate according to intellectual talents. Clearly, not everyone will be capable of becoming a brain surgeon, a rocket scientist, or an accomplished writer. But Jonathan asks, What if all of our children who displayed those gifts and talents could be nourished as well?

Returning to the issue that the New York City task force raised in 2019, Jonathan was sought out after the public was informed of its recommendations. He did not back down. He was clear-eyed that they came to a poor conclusion and he followed that up with OpEd articles on the editorial pages of the local papers. This is how you influence education policy. You take a stand. You argue with facts and have research to support your views. You do it every day. Jonathan is the exemplar from whom we can all take our cues. Our education system has not been serving all of our children all of the time. Jonathan is leading the way to change that system.

[Authored by Julia Link Roberts, EdD, Mahurin Professor of Gifted Education and Executive Director of The Center for Gifted Studies and the Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Western Kentucky University] Working with Jonathan on a variety of projects has been part of my professional life for about 15 years. The partnership began with a special issue for the *Kappan* (Roberts, 2008). Since then, we have enjoyed thinking together about several initiatives in gifted education and talent development.

Western Kentucky University has worked with a group of Kentucky superintendents for the past eight years. Jonathan has collaborated with each cohort of the Victoria Fellows, Kentucky superintendents. Jonathan has shared information about the Excellence Gap and urged them to gather data on students in schools in their districts and then make plans to address discrepancies they find.

Jonathan was interviewed for a video series on the Excellence Gap for a Javits grant in which The Center for Gifted Studies partnered with the Jefferson County Public Schools, the Kentucky Department of Education, and the University of Louisville. For the video series, Jonathan discussed the challenges presented by such gaps and described strategies to reduce gaps and support students achieving at advanced levels.

A project that developed out of questions raised at the Victoria Fellows (the cohort of superintendents) was with Dr. Houston Barber, superintendent of the Frankfort Independent Schools. This project led to the development of a Talent Development Plan. This plan looks across the school experiences at opportunities that allow a smooth transition of services throughout the school experience. They published a description of the Talent Development Plan (Plucker & Barber, 2021).

Jonathan's interest in policy matches a keen interest of mine. We have looked at policies that facilitate talent development and others that create barriers. We are preparing for a special issue of *Gifted Child Today* on policy. In *Mind the (Other) Gap* (2010), Jonathan and his colleagues posed two questions for decision-makers to ask prior to making a decision or putting a policy in place, "How will this [decision or policy] affect our brightest students? How will this [decision or policy] help other students begin to achieve at high levels?" (p. 30).

One of the very nice aspects of working with Jonathan is that he has a wide range of interests in gifted education. His interest is deep as well as wide, so he is willing to dig into a topic. Then, Jonathan is eager to share information in order to help parents and educators as well as decision-makers understand the needs of children with gifts and talents, needs that are often created by their strengths.

National Association for Gifted Children

In addition to his impact on research in the fields of creativity, intelligence, and gifted education, and his impact on policy in the field of gifted education, Jonathan is also known for his service to the field of gifted education. Most notably, he was the President of the National Association for Gifted Children from 2019-2021.

[Authored by Sally Krisel, Past President of the National Association for Gifted Children Board of Directors] Jonathan Plucker is well known for his own work in the field of creativity, including publications on sociocultural perspectives, assessment, curriculum, the role of technology in innovation, and how schools might include emphasis on creativity in accountability systems. However, when I think about Jonathan's service to the National Association for Gifted Children (NAGC), it is E. Paul Torrance's "survival definition" of creativity that comes to mind.

In the early 1950's, Torrance studied pilots in the U.S. Air Force Survival Training Program. He found that the most successful pilots were able to use creativity to overcome the extreme, constantly changing conditions they encountered there. Torrance explained the definition of creativity that emerged from his research with "ace" pilots this way: "Whenever one is faced with a problem for which he has no practiced or learned solution, some degree of creativity is required" (Millar, 1995, p. 39).

During much of Jonathan's tenure on the NAGC Board of Directors, the association was in survival mode. During his term as President-Elect and President (2017-2021), Jonathan led the association through three serious tests that required all of his creative problem-solving ability. Faced with one serious challenge after another, NAGC, the country's premier education association for gifted students, could easily have joined the long list of non-profit organizations that did not survive the economic crisis of 2020.

First came staff transitions. Always difficult in small organizations, staff changes can elicit strong emotional reactions from the remaining staff and from stakeholders with varied background knowledge and loyalties. During this time, Jonathan exhibited the courage to make hard decisions and the insight needed to heal rifts within the association. While maintaining the highest degree of integrity related to personnel decisions, Jonathan spoke honestly and compassionately with our remaining staff and with NAGC members, building confidence in the future of the organization.

Like many small education associations, NAGC had faced financial challenges for years. But NAGC leaders were feeling optimistic as Jonathan began his term as President in September 2019, just two weeks after a new Executive Director came on board, and both leaders began to share ideas for promising initiatives.

Six months later Jonathan faced another problem for which there was "no practiced or learned solution" – a global pandemic! Less than a week before our scheduled Leadership and Advocacy Conference in March 2020, Jonathan called the Board together to make a difficult decision. We would have to cancel the conference and do our best to get out of the many contracts associated with it. Even more distressing was what the coronavirus pandemic meant for our annual convention scheduled later that year. The NAGC Board of Directors was counting on the 2020 convention in Orlando to be a budget saver, but when it became clear that we would not be able to hold an in-person convention safely, Jonathan was again required to demonstrate the characteristics of Torrance's jet aces when they faced emergencies. It took courage, commitment, and immense creativity to pivot on short notice to re-

envision and plan a virtual convention when there was no flight manual on which to rely.

These accomplishments under extreme conditions were enough to earn Jonathan Plucker the admiration of all who worked with him on the NAGC Board. But in my mind, there is another example of survival creativity that will be remembered as a turning point in the field of gifted education. In the early summer of 2020, NAGC, like the rest of the nation, was rocked by the murders of George Floyd, Breonna Taylor, Ahmaud Arbery, and far too many other Black citizens. The spasm of racial reckoning that followed required all of us to face the deep-seated racism that still exists in all areas of American life, including gifted education. Jonathan represented NAGC in long, difficult conversations with groups of all sizes in which he acknowledged that the field of gifted education has at times contributed to the problem of systemic racism. When an eminent scholar like Jonathan Plucker, who has devoted so much of his career to equity work, could humbly describe his personal struggle to move beyond the natural inclination to respond to criticism of the field and the association defensively to reach a place where he could acknowledge that the progress we have made is inadequate, it gave others courage to engage in similar soul searching and rededication to equity and social justice in gifted education. Jonathan faced extreme conditions as an NAGC officer, multiple challenges for which there were no algorithmic solutions. With each test, he exhibited Torrance's survival creativity characteristics. But he did much more than help to ensure NAGC's survival during these crises. I believe his leadership during the time NAGC published a bold anti-racism statement and, most importantly, developed plans to act on that statement, will mark the beginning of a new era of success for the field of gifted education.

Conclusion

[Authored by Matthew C. Makel, PhD, Associate Research Scientist, Johns Hopkins University and Anne N. Rinn, PhD, Professor, University of North Texas] Jonathan's work has broad scope and impact. Indeed, his many contributions across time indicate multiple trajectories that continue to develop. These trajectories include conceptual definitions, psychometrics, meta-science, international and cross-cultural work, policy, and working with schools to change practice. Moreover, as we hope this chapter demonstrates, Jonathan's most lasting legacy may be his direct and indirect influence on his many students and collaborators, as well as his direct and indirect influence across several fields of study, including creativity and gifted education. Be they researchers, policy-makers, administrators, practitioners, or those working in industry, Jonathan's interactions, aptitudes, and process have helped foster an environment by which individuals and groups produce perceptible products that are both novel and useful within their social context. Through this lens, Jonathan not only studies creativity, but personifies creativity.

References

- Amabile, T. M. (1982). Social psychology of creativity: A consensual assessment technique. *Journal of Personality and Social Psychology*, *43*(5), 997-1013. <https://doi.org/10.1037/0022-3514.43.5.997>
- Amabile, T. M. (1996). *Creativity in context: Update to the social psychology of creativity*. Westview.
- American Psychological Association, Center for Psychology in Schools and Education. (2017). *Top 20 principles from psychology for preK–12 creative, talented, and gifted students' teaching and learning*. Retrieved from <http://www.apa.org/ed/schools/teaching-learning/top-twenty-principles.aspx>
- Carson, S. (2006, April). *Creativity and mental illness*. Invitational panel discussion hosted by Mind Matters Consortium, Yale University, New Haven, CT.
- Chen, B., Hu, W., & Plucker, J. A. (2016). The effect of mood on problem finding in scientific creativity. *The Journal of Creative Behavior*, *50*(4), 308-320. <https://doi.org/10.1002/jocb.79>
- Dow, G. T., & Mayer, R. E. (2004). Teaching students to solve insight problems: Evidence for domain specificity in creativity training. *Creativity Research Journal*, *16*(4), 389–402. https://doi.org/10.1207/s15326934crj1604_2
- Fredericks, S. (2016). *Customer Review*. Amazon. https://www.amazon.com/gp/customer-reviews/R39DPVXLYFIPT5/ref=cm_cr_dp_d_rvw_ttl?ie=UTF8&ASIN=1612509924
- Gough, H. G. (1979). A creative personality scale for the Adjective Check List. *Journal of Personality and Social Psychology*, *37*(8), 1398–1405. <https://doi.org/10.1037/0022-3514.37.8.1398>
- Jacobs, B., & Wilbers, M. H. J. (2018). Inequality in top performance: An examination of cross-country variation in excellence gaps across different levels of parental socioeconomic status. *Educational Research and Evaluation*, *24*(1), 68-87. <https://doi.org/10.1080/13803611.2018.1520130>
- Leung, A. K., Maddux, W. W., Galinsky, A. D., & Chiu, C. Y. (2008). Multicultural experience enhances creativity: The when and how. *American Psychologist*, *63*(3), 169-81. <https://doi.org/10.1037/0003-066X.63.3.169>
- Liu, G. X., & Shi, J. N. (2004). Development and nurturing of creative thinking of rural primary and secondary school students. *Chinese Journal of Special Education*, *2*, 76–79.
- Long, H., He, B., Ding, Y., Plucker, J. A. & Kaufman, J. (2011, August). Is “Creativity Studies” a scientific field? Mapping the history of the discipline.

Presented at the annual meeting of *American Psychological Association*, Washington, D. C.

Long, H., & Plucker, J. A. (2015). Assessing creative thinking: Practical applications. In R. Wegerif, J. Kaufman, & L. Li (Eds.), *The Routledge International Handbook of Research on Teaching Thinking* (pp. 315-329). New York, NY: Routledge.

Makel, M. C., & Plucker, J. A. (Eds.). (2017). *Toward a more perfect psychology: Improving trust, accuracy, and transparency in research*. American Psychological Association.

Makel, M. C., & Plucker, J. A. (2015). An introduction to replication research in gifted education: Shiny and new is not the same as useful. *Gifted Child Quarterly*, 57(3), 157-164. <https://doi.org/10.1177/001698621557874>

Makel, M. C., & Plucker, J. A. (2014a). Facts are more important than novelty: Replication in the education sciences. *Educational Researcher*, 43(6), 304-316. <https://doi.org/10.3102/0013189X14545513>

Makel, M. C., & Plucker, J. A. (2014b). Creativity is more than novelty: Reconsidering replication as a creativity act. *Psychology of Aesthetics, Creativity, and the Arts*, 8(1), 27-29. <https://doi.org/10.1037/a0035811>

Makel, M. C., Plucker, J. A., Freeman, J., Lombardi, A., Simonsen, B., & Coyne, M. (2016). Replication of special education research: Necessary but far too rare. *Remedial and Special Education*, 37(4), 205-212. <https://doi.org/10.1177/0741932516646083>

Millar, G. W. (1995). *E. Paul Torrance: The creativity man*. Ablex.

Ng, A. K. (2003). A cultural model of creative and conforming behavior. *Creativity Research Journal*, 15(2-3), 223-233. <https://doi.org/10.1080/10400419.2003.9651414>

Plucker, J. A. (2016). Creative articulation. In J. A. Plucker (Ed.), *Creativity and innovation: Theory, research, and practice* (pp. 151-163). Prufrock Press.

Plucker, J.A. (2017). *Creativity and innovation: Theory, research, and practice*. Prufrock Press.

Plucker, J. A. & Barber, (2021). Talent development plans help guide consistent, equitable service delivery. *Gifted Child Today*, 44(1), 39-43. <https://doi.org/10.1177/1076217520963673>

Plucker, J. A., Beghetto, R. A., & Dow, G. T. (2004). Why isn't creativity more important to educational psychologists? Potential, pitfalls, and future

directions in creativity research. *Educational Psychologist*, 39(2), 83-97. https://doi.org/10.1207/s15326985ep3902_1

Plucker, J. A., Burroughs, N., & Song, R. (2010). *Mind the (other) gap!: The growing excellence gap in K-12 education*. Center for Evaluation & Education Policy. <https://files.eric.ed.gov/fulltext/ED531840.pdf>

Plucker, J. A., & Callahan (Eds.). (2008). *Critical issues and practices in gifted education: What the research says*. Prufrock Press.

Plucker, J. A., & Callahan, C. M. (Eds.). (2014). *Critical issues and practices in gifted education: What the research says* (2nd ed.). Prufrock Press.

Plucker, J. A., & Callahan, C. M. (2014). Research on giftedness and gifted education: Status of the field and considerations for the future. *Exceptional Children*, 80(4), 390-406. <https://doi.org/10.1177/0014402914527244>

Plucker, J. A., & Callahan, C. M. (2017). Special gifts and talents. In J. M. Kauffman, D. P. Hallahan, & P. C. Pullen (Eds.), *Handbook of special education* (2nd ed., pp. 428-444). Taylor & Francis.

Plucker, J. A., & Callahan, C. M. (Eds.). (2020). *Critical issues and practices in gifted education: What the research says* (3rd ed.). Prufrock Press.

Plucker, J. A., & Callahan. (2020). The evidence base for advanced learning programs. *Phi Delta Kappan*, 102(4), 14-21. <https://doi.org/10.1177/0031721720978056>

Plucker, J. A., & Dow, G. T. (2017). Attitude change as the precursor to creativity enhancement. In R. A. Beghetto & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom* (2nd ed., pp. 190-211). Cambridge.

Plucker, J. A., & Esping, A. (2014a). Developing and maintaining a website for teaching and learning about intelligence. *Intelligence*, 42(1), 171-175.

Plucker, J. A., & Esping, A. (2014b). *Intelligence 101*. Springer.

Plucker, J., Hardesty, J., & Burroughs, J. (2013). *Talent on the sidelines: Excellence gaps and America's persistent talent underclass*. Center for Education Policy Analysis.

Plucker, J. A., & Makel, M. C. (2010). Assessment of creativity. In J. C. Kaufman & R. J. Sternberg (Eds.), *Cambridge handbook of creativity* (pp. 48 – 73). Cambridge University Press.

Plucker, J. A., & Makel, M. C. (2021). Replication is important for educational psychology: Recent developments and key issues. *Educational Psychologist*. <https://doi.org/10.1080/00461520.2021.1895796>

Plucker, J. A., Makel, M., & Qian, M. (2019). Assessment of creativity. In J. Kaufman & R. Sternberg (Eds.), *The Cambridge Handbook of Creativity* (pp. 44-68). Cambridge University Press. <https://doi.org/10.1017/9781316979839.005>

Plucker, J. A., & Peters, S. J. (2016). *Excellence gaps in education: Expanding opportunities for talented students*. Harvard Education Press.

Plucker, J. A., & Renzulli, J. S. (1999). Psychometric approaches to the study of human creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (p. 35-61). Cambridge University Press.

Pridemore, W. J., Makel, M. C., & Plucker, J. A. (2018). Replications in criminology and the social sciences. *Annual Review of Criminology*, 1(1), 19-38. <https://doi.org/10.1146/annurev-criminol-032317-091849>

Puryear, J. S., & Lamb, K. N. (2020). Defining creativity: How far have we come since Plucker, Beghetto, and Dow? *Creativity Research Journal*, 32(3), 206-214. <https://doi.org/10.1080/10400419.2020.1821552>

Qian, M., & Plucker, J. A. (2017). *Hot topic 5: Creativity assessment*. In J. A. Plucker (Ed.), *Creativity and innovation: Theory, research, and practice* (p. 223-234). Prufrock Press.

Qian, M., & Plucker, J. A. (2018). Looking for renaissance people: Examining domain specificity-generalizability of creativity using item response theory models. *Creativity Research Journal*, 30(3), 241-248. <https://doi.org/10.1080/10400419.2018.1488348>

Qian, M., Plucker, J. A., & Shen, J. (2010). A model of Chinese adolescents' creative personality. *Creativity Research Journal*, 22(1), 62-67. <https://doi.org/10.1080/10400410903579585>

Roberts, J. L. (2008). Talent development: A "must" for the future. *Phi Delta Kappan* 89(7), 501-506. <https://doi.org/10.1177/003172170808900710>

Robinson, A., Adelson, J. L., Kidd, K. A., & Cunningham, C. M. (2018). A talent for tinkering: Developing talents in children from low-income households through engineering curriculum. *Gifted Child Quarterly*, 62(1), 130-144. <https://doi.org/10.1177/0016986217738049>

Rutkowski, D., Rutkowski, L., & Plucker, J. A. (2012). Trends in education excellence gaps: A 12-year international perspective via the multilevel model for change. *High Ability Studies* 23(2), 143-166. <https://doi.org/10.1080/13598139.2012.735414>

Shao, Y., Zhang, C., Zhou, J., Gu, T., & Yuan, Y. (2019). How does culture shape creativity? A mini-review. *Frontiers in psychology*, 10, 1219. <https://doi.org/10.3389/fpsyg.2019.01219>

Shi, B., Qian, M., Lu, Y., Plucker, J. A., & Lin, C. (2012). The relationship between migration and Chinese children's divergent thinking. *Psychology of Aesthetics, Creativity, and the Arts, 6*(2), 106–111. <https://doi.org/10.1037/a0028023>

Sternberg, R. J. (1999). A propulsion model of types of creative contributions. *Review of General Psychology, 3*(2), 83–100. <https://doi.org/10.1037/1089-2680.3.2.83>

Tan, L., Wang, X., Guo, C., Zeng, R., Zhou, T., & Cao, G. (2019). Does exposure to foreign culture influence creativity? Maybe it's not only due to concept expansion. *Frontiers in Psychology, 10*, 537. <https://doi.org/10.3389/fpsyg.2019.00537>

Wang, L., Long, H., Plucker, J. A., Wang, Q., Xu, X., & Pang, W. (2018). High schizotypal individuals are more creative? The mediation roles of over-inclusive thinking and cognitive inhibition (*The first and second authors have equal contribution*). *Frontiers in Psychology, 9*, 1766. <https://doi.org/10.3389/fpsyg.2018.01766>

Yi, X., Hu, W., Plucker, J. A., & McWilliams J. (2013). Is there a developmental slump in creativity in China? The relationship between organizational climate and creativity development in Chinese adolescents. *The Journal of Creative Behavior, 47*(1), 22-40. <https://doi.org/10.1002/jocb.21>