CHAPTER ONE

INTRODUCTION

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The 2015 KIE Istanbul, Turkey conference book presents 12 chapters on a variety of creativity related topics including business applications, negative creativity, art, assessing environmental related issues, learning technologies, and professional development. There are chapters that inform how we explore the complexity of understanding creativity and of measuring creativity to those that share curricular and pedagogical experiences.

Guzik and Goff point out in chapter two that though the concept of creativity has been dominated by interpretations drawn from the field of psychology, economics too has something useful and interesting to offer to a more complete understanding of individual creativity.

In chapter three, Rosenthal shares his creativity focused course for his business students. The content and pedagogy described provide an excellent model that may be adapted across the academy.

Davis, in chapter four, introduces us to the ancient creative practice of narrative as a current activity in studying business as well as its role in commercial practice. This chapter focuses on narrative models developed in the field of screenwriting that underlie their use in film and television.

Hansika and Azizuddin (chapter five) discuss the Alternate Uses Test (AUT) and a self-report Creativity measure to assess positive and negative creativity. Suggestions for improving the AUT as a tool to measure negative creativity are proposed.

Coste and Nemeroff (chapter six) ask: "What is crazy? What is creative? And how does this play out in various environments?" They propose that answers to these questions are critical to attaining a firm grasp on how to enhance creative achievement.

Wilson and Brown, in chapter seven, explore experiencing new and unfamiliar ideas and investigating authentic creativity, notions of forgery and fakery, serendipity, accidental discovery, and the dynamics of positive and negative creative conditions. They embellish their chapter content with instructive visuals.

In chapter eight, Rick Kantor presents a novel addition to our readings as he urges the inclusion of the artist back into our schools, our corporations, our politics, our social and leisure activities. He suggests that we have marginal-

ized the artist as he points out that "As a society we have either ignored them or cloistered them away in galleries and museums, making them into commodities." Kantor argues that artists can be the spark of illumination, the catalyst of innovation, if we are open to discovering the fuse they light." He challenges the reader to "engage contemporary artists who have been our most underutilized resource in our quest to stay creatively vibrant and innovatively prolific."

Tsai (chapter nine) focuses on a population limited to university level students. However, but the author provides ideas for expanded application of this emphasis on assessing environment in contrast to focus on assessing person creativity.

Luo, Deng, and Zhou, in chapter ten, assess creative climate and group climate. They argue that we should not only take the assessment of individual creativity seriously, but also that of group creativity. For those who enjoy emphasis on statistical discussion, this is the chapter for them.

Brown and Wilson, in chapter eleven, draw from postmodern and post-structuralist perspectives as they discuss the transition from traditional artistic practice to situations in which elements are manipulated, mutated, combined and distorted. This chapter explores the relationship between the individual and domain-based creative practice drawing primarily from musical and audio-visual examples. The authors focus on the interpretation of creativity as essentially a process of recombination and manipulation through which new ideas emerge. Again this creative collaborative provide amazing visuals to enhance communication of their ideas.

The final chapter contributed by Hasseler, Enos, Dowling, and Shea describe the Creativity Fellows Program (CF) at Bryant University located in Smithfield, Rhode Island, U.S. This is a one-year seminar devoted to nurturing faculty members' creative practices. The endeavor was created to literally transform the culture of teaching and learning-university-wide and the chapter includes voices of the participating faculty. The authors provide specific information that may be replicated by other institutions.

Inaugural Conference Highlights

Two inaugural venues were established at the KIE Istanbul 2015 conference; namely, The E. Paul Torrance International Roundtable on Creative Thinking and the RDCA Special Interest Group (SIG).

October 8, 2015 marks the 100th birthday of Dr. Torrance. As the program brochure states, the goal of the panel is to "refresh the work and legacy of Dr. Torrance internationally, especially, among today's crop of creativity enthusiasts, push the boundary of knowledge on creative thinking as well as increase knowledge sharing within the creativity field."

Dr. Torrance's body of work includes 1,871 publications: 88 books; 256 parts of books or cooperative volumes; 408 journal articles; 538 reports, manuals, tests, etc.; 162 articles in popular journals or magazines; 355 conference papers; and 64 forewords or prefaces (Spilman, 2002). He also created the Future Problem Solving Program International, the Incubation Curriculum Model, the Threshold Hypothesis and the Torrance Tests of Creative Thinking.

Future Problem Solving Program International (FPSPI)

The goal of the *Future Problem Solving Program International* (FPSPI), founded by Dr. Torrance in 1974, is to "engage students in creative problem solving". This program has involved over 250,000 students annually from Australia, Canada, Hong Kong, Japan, Korea, Malaysia, Portugal, New Zealand, Russia, Singapore, Great Britain, Turkey, India and the United States.

Torrance Incubation Model of Creative Teaching and Learning

Mathew Worwood (2011) presents a great summary of Torrance's Incubation Model (see references for his url). He describes the model as having three stages:

Stage One, Heighten Anticipation. It is here that the learner is mentally prepared for the project ahead. Torrance describes this as a Warming Up Period with the following six functions, (1) Create the Desire to Know, (2) Heighten Anticipation and Expectation, (3) Get Attention, (4) Arouse Curiosity, (5) Tickle the Imagination, and (6) Give Purpose and Motivation.

Stage Two, Deepen Expectations. This is where the problem is defined, applied, and creativity nurtured; a list of actions or metaphors is used. For example, Digging Deeper encourages students to go beyond the surface of the problem (identify the unknown), discover things that were missed, synthesize the information, and begin to come up with solutions and actions that can be applied to the project.

Stage Three, Extend the Learning. This stage involves another list of metaphors that encourages students to take the lead and apply the project in a real context to extend their learning. For example, Building Sand Castles is a metaphor that challenges

students to use their imagination and discover ways to apply the project to a real world context.

Torrance identified specific behaviors associated with those that demonstrated creative accomplishments. These behaviors were characterized into three elements, Ability, Skill, and Motivation. This work helped form the foundation of the Torrance Tests of Creative Thinking (TTCT) that is described below the Threshold Hypothesis discussion..

Threshold Hypothesis

Correlations between intelligence and creativity have suggested that these correlations were low enough to justify treating them as distinct concepts. The "threshold hypothesis", proposed by Torrance is that low IQ and low creativity are related, but that past a threshold (around IQ 120) they're not necessarily related. This makes sense because the rationale for scoring IQ and creativity tests differ. To score high on an IQ test you must answer in the same vein as the norming population. But to score high on a creativity test, you want your responses to be statistically different from the norming population. Thus, there is an inverse relation between obtaining a high IQ score and a high creativity score, especially from 120 IQ and beyond. Thus, in a general sample, there will be a positive correlation between low creativity and intelligence scores, but a correlation will not be found with higher scores. Research into the threshold hypothesis, however, has produced mixed results in terms of accepting this hypothesis.

Torrance Tests of Creative Thinking (TTCT)

Building on Guilford's ideas, especially the distinction between divergent and convergent thinking, the Torrance Tests of Creative Thinking (TTCT), is a test of *creativity*, that originally involved simple tests of *divergent thinking* and other problem-solving skills, which were scored on four scales:

- Fluency. The number of ideas generated in response to a stimulus.
- Flexibility. The number of different categories of relevant responses.
- Originality. The statistical rarity of the responses.
- Elaboration. The amount of detail in the responses.

The third edition of the TTCT in 1984, eliminated the Flexibility scale from the figural test as statistically it added little to the scoring. Torrance created the Resistance to Premature and Abstractness of Titles tasks for the figural battery. He also provided 13 criterion-referenced measures that include: emotional expressiveness, story-telling articulateness, movement or actions, expressiveness of titles, syntheses of incomplete figures, synthesis of lines, of circles, unusual visualization, extending or breaking boundaries, humor, richness of imagery, colorfulness of imagery, and fantasy.

   Although the TTCT uses many of Guilford's concepts, in contrast to Guilford, the TTCT uses tasks that can be scored for several factors, involving both verbal and non-verbal aspects and relying on senses other than vision. The TTCT represents a fairly sharp departure from the factor type tests developed by Guilford and his associates (Guilford, Merrifield and Cox, 1961; Merrifield, Guilford, Christensen, and Frick. 1960). and they also differ from

the battery developed by Wallach and Kogan (1965), which contains measures representing creative tendencies that are similar in nature.

To date, several longitudinal studies have been conducted to follow up the elementary school-aged students who were first administered the Torrance Tests in 1958 in Minnesota. There was a 22-year follow-up (Torrance, 1980, 1981a, 1981b), a 40-year follow-up (Cramond, MatthewsMorgan, Bandalos, & Zuo, 2005) and a 50 year follow-up (Runco, Millar, Acar, & Cramond, 2010).

Torrance (1962) grouped the different subtests of the Minnesota Tests of Creative Thinking (MTCT) into three categories.

1. Verbal tasks using verbal stimuli
2. Verbal tasks using non-verbal stimuli
3. Non-verbal tasks

A brief description of the tasks used by Torrance is given below:

Verbal Tasks Using Verbal Stimuli

Unusual Uses. This task involves using verbal stimuli that are direct modifications of Guilford's Brick uses test. Torrance (1962) substituted tin cans and books for bricks because he believed that children would be able to handle tin cans and books since both are more available to them than bricks.

Impossibilities. It was used originally by Guilford and his associates as a measure of fluency. Torrance, after much experimenting with this task ask the subjects to list as many impossibilities as they can.

Consequences. The consequences task was also used originally by Guilford and his associates. Torrance made several modifications whereby he designed three improbable situations and the children were required to list out their consequences.

Just suppose. As in the consequence task, the subject is confronted with an improbable situation and asked to predict the possible outcomes from the introduction of a new or unknown variable.

Situations. The situation task was modeled after Guilford's test designed to assess the ability to see what needs to be done. Subjects were given three common problems and asked to think of as many solutions to these problems as they can. For example, if all schools were abolished, what would you do to try to become educated?

Common problems. This task is an adoption of Guilford's Test designed to assess the ability to see defects, needs and deficiencies and involves "sensitivity to problems". Subjects are given common situations and they are

asked to think of as many problems as they can that may arise in connection with the particular situations. For example, doing homework while going to school in the morning.

Improvement. This test, adopted from Guilford's apparatus test that assessed ability to see defects and sensitivity to problems. In this task the subjects, given a list of common objects, are asked to suggest as many ways as they can to improve each object without concern about whether or not it is possible to implement their suggested change.

Verbal tasks using nonverbal stimuli

Ask and guess. This task requires the individual first to ask questions about a picture – questions which cannot be answered by just looking at the picture. Next he is asked to make guesses or formulate hypotheses about the possible causes of the event depicted, and then their consequences both immediate and remote.

Product improvement. In this task common toys are used and children are asked to think of as many improvements as they can which would make the toy "more fun to play with". Subjects are then asked to think of unusual uses of these toys other than "something to play with".

Unusual uses. Here the child is asked to think of the cleverest, most interesting and most unusual uses of the toy used in *Product improvement*, other than as a plaything. These uses could be for the toy as it is, or for the toy as changed.

Non-verbal tasks

Incomplete figures. This is an adaptation of the *Drawing completion test* developed by Kate Franck and used by Barron (1958). On an ordinary white paper an area of fifty-four square inches is divided into ten squares each containing a different stimulus figure. The subjects are asked to sketch some novel objects or design by adding as many lines as they can to the ten figures.

Picture construction. In this task children are asked to think of a picture in which the given shape (jelly bean) is an integral part. They should add lines to make any novel picture and then write the name of their picture at the bottom.

Circles and squares. Two forms are used in the test. In one form, the subject is confronted with a page of forty-two circles and asked to sketch objects or pictures which have circles as a major part. In the alternate form, squares are

used instead of circles.

Torrance-Reisman Research Using the Torrance Tests

Following are two publications describing Torrance tests used as an assessment:

Reisman, Floyd, and Torrance (1981) investigated whether a measure of creative thinking would better predict achievement on (1) traditional Piagetian measures having one correct answer (convergent problem solving), (2) a modified Piagetian set of measures eliciting a variety of alternative solutions (divergent problem solving), and (3) a mathematics readiness test that also permits a variety of solutions or methods of obtaining correct answers (Reisman, 1985). Analyses examined the extent to which sex, age, and Thinking Creatively in Action and Movement (TCAM) scores predicted the performance of 20 female and 14 male 38–68 month olds on the 3 measures of cognitive development. Results showed that performance on the TCAM significantly predicted young Ss' performance on the modified Piagetian tasks that involved divergent problem solving and on a mathematics readiness test. It is suggested that creative thinking ability, as assessed by the TCAM, predicts cognitive performances that involve some divergent thought.

The purpose of this next study (Reisman and Torrance, 1979) was to examine the relationships of children's performance on the Torrance Tests of Creative Thinking (TTCT) and on selected Piagetian tasks of conservation. Study subjects, 133 kindergarten and first grade multi-racial boys and girls, were administered the TTCT-Figural Form A and selected Piagetian tasks of conservation of number, of continuous quantity (pouring water), of mass (quantity of clay) and of time measurement. Two assumptions were tested: (1) that characteristics of creative thinking, such as flexibility of thought and resistance to premature closure, in particular, also underlie ability to conserve, and (2) that those children who attained an above average creativity index on the TTCT would be early conservers. Analysis of variance yielded significant correlations at the .001 level that indicated that conservers were more resistant to premature closure and their thinking was more flexible than non-conservers. A multiple regression of the creativity variables that were significant as a result of canonical correlation was done to identify those useful in predicting readiness for conversation. Piaget's notion of reversibility of thought is brought into question as thought goes forward in time. Instead, conservation is interpreted as reconciling simultaneous opposites or "Janusian thought" after Janus, a Roman God who has two faces, each looking in the opposite direction. Janusian thinking is the ability to imagine two opposites or contradictory ideas, concepts, or images existing simultaneously. In conservation of mass, for example, the child must realize that changing a ball of clay into a snake does not change the quantity, just the form. Similarly, pouring

water from a short fat beaker into a tall skinny beaker does not change the amount of water, just the height in the beakers. The same holds when changing the physical arrangement of six raisins; this change does not affect a change in the number of raisins since none were added or taken away. The time conservation task requires simultaneously realizing that when two toy cars move at different speeds for the same amount of time, the faster car will stop at a greater distance from the starting point than the slower car. In summary, the TTCT predicted early ability to conserve.

Reisman Diagnostic Creativity Assessment (RDCA) SIG

Inauguration of the KIE RDCA SIG opens conversations and future research that involve online creativity assessment, self-report creativity assessment, and extends the eleven traditional creativity factors tapped by the RDCA to include attitudes and personality traits. It is expected that conversations addressing the RDCA SIG issues (online creativity assessment, self-report creativity assessment, and inclusion of attitudes and personality traits) will continue virtually beyond the conference close.

RDCA

The Reisman Diagnostic Creativity Assessment (RDCA) (Reisman, Keiser, & Otti, 2012), validated over several administrations, is a free self-report mobile app available for the iPad, iPhone and iTouch. The RDCA assesses an individual's self-perception on 11 major creativity factors that have emerged from the creativity research (fluency, originality, elaboration, resistance to premature closure, flexibility, tolerance of ambiguity, convergent thinking, divergent thinking, risk taking, intrinsic motivation, and extrinsic motivation). Some of the RDCA factors are similar to those tapped by the Torrance Tests of Creative Thinking (TTCT), which in turn stems from Guilford's creativity research (Guilford, 1967). The 40 item RDCA may be completed in less than 10 minutes, is automatically scored, and provides immediate results that a user may email to themselves or others. Using a Likert-type format, the RDCA results are provided in a self-report designed to be used diagnostically to identify one's creative strengths on each of the 11 creativity factors rather than emphasizing prediction of creativity. The RDCA provides the assessment taker with an instant overall creativity score, as well as scores to identify specific creativity factors in which the taker may already be strong, factors they may be personally satisfied with, and factors the taker may wish to strengthen through selected creativity exercises.

Next step in RDCA Development: Creativity Attitudes and Personality Traits

Table 1 is a heuristic for looking at creativity related attitudes and personality traits that complement the original 11 RDCA characteristics.

Trait	Strongly Agree	Moderately Agree	Mildly Agree	Mildly Disagree	Moderately Disagree	Strongly Disagree
1. I am aware of my creativeness.						
2. I see things in new ways.						
3. I do not fear being different.						
3a. I am self-centred						
4. I am not afraid to try something new.						
5. I am enthusiastic.						
5a. I am impatient.						
6. I like to hear other's ideas.						
7. I am playful.						
8. I am attracted to complexity.						
8a. I can be argumentative.						
9. I engage in fantasy.						
10. I have aesthetic interests.						
11. I am open-minded.						
11a. I can be arrogant.						
12. I need alone time.						
13. I have a heightened sensitivity to details and patterns.						
14. I can express my feelings.						
14a. I am predisposed to perceive things in familiar ways.						
15. I am ethical.						

Table 1. Creativity and Attitude Traits

There are negative traits inserted and these are marked as the *a's.* The new items are categorized by creativity factor in Table 2.

Creativity Factor	Item
Originality	1, 14a
Flexibilty	2
Risk Taking	3, 4, 8a
Intrinsic Motivation	5
Resistance to Premature Closure	6, 11, 5a
Tolerance of Ambiguity	8
Sense of humor	7
Capacity for fantasy	9
Artistic (aesthetic interests; sensitivity to beauty)	10
Needs alone time (internally preoccupied; prefers to work alone; introspective; reflective)	12
Intuitive (perceptive; sees relationships, implications; good at problem finding; observant; heighten sensitivity to details and patterns)	13
Emotional (can express feelings, emotions; sensitive; moody; has emotional highs and lows; needs attention, praise, support)	14
Ethical (altruistic; idealistic; empathic)	15
Egotistical (intolerant, self-centered, snobbish)	11a

Table 2: Items By Category

Challenges in Self-report Assessments

Self-report studies have many advantages, but they also suffer from specific disadvantages due to the way that subjects generally behave. Self-reported answers may be exaggerated; respondents may be too embarrassed to reveal private details; various biases may affect the results, like social desirability

bias. Social desirability bias is a term that describes the tendency of respondents to answer questions in a manner that will be viewed favorably by others. It can take the form of over-reporting "good behavior" or under-reporting "bad", or undesirable behavior. Subjects may also forget pertinent details. Self-report studies are inherently biased by the person's feelings at the time they filled out the questionnaire. If a person feels bad at the time they fill out the assessment, their answers will be more negative. If the person feels good at the time, then the answers will be more positive[1].

 One of the most common rating scales is the Likert-type s*cale*. A statement is used and the participant decides how strongly they agree or disagree with the statements. One strength of Likert scales is that they can give an idea about how strongly a participant feels about something. As with any questionnaire, participants may provide the answers that they feel they should. The RDCA is a Likert-type scale.

The two main statistics that determine the veracity of a measurement's results are reliability and validity. An assessment is said to be reliable or consistent if it produces similar results if used again in similar circumstances. It is suggested that reliability of self-report measures can be assessed using the split half method. This involves splitting a test into two and having the same participant doing both halves of the test. If the two halves of the test provide similar results this would suggest that the test has internal reliability.

Validity refers to whether a study measures or examines what it claims to measure or examine. Questionnaires are said to often lack validity for a number of reasons. Participants may lie; give answers that are desired and so on. It is argued that qualitative data is more valid than quantitative data. A way of assessing the validity of self-report measures is to compare the results of the self-report with another self-report on the same topic, referred to *as concurrent validity* . The RDCA is continuing to undergo concurrent validity assessments with TTCT comparisons. Silvia, Wigert, Reiter-Palmon, and Kaufman (2012) reviewed recent developments in the assessment of creativity using self-report scales. They concluded that "based on the latest generation of tools, self-report creativity assessment is probably much better than creativity researchers think it is."

Author's Brief Bio

Fredricka K. Reisman, PhD is professor and founding Director of Drexel's School of Education, oversees the online Master's in Creativity and Innovation degree and certificates in the School of Education, as well as the forthcoming online EdD concentration in Creativity and Innovation. Additionally, she served as Assistant Provost for Assessment and Evaluation, Interim Associate Dean for Research of the Goodwin College, and is Director of the Drexel/Torrance Center for Creativity and Innovation. Dr. Reisman received

her PhD in Mathematics Education from Syracuse University. Prior to coming to Philadelphia, Dr. Reisman served as Professor and Chair of the Division of Elementary Education at the University of Georgia and as an elementary, middle school, high school mathematics teacher in New York State, and mathematics education instructor at Syracuse University. She is the author of several books with subjects that include, diagnostic teaching, teaching mathematics to children with special needs, elementary education pedagogy, mathematics pedagogy, and application of creativity and innovation to corporate situations. She also has co-authored a trilogy of books on teaching mathematics creatively with world-renowned creativity scholar and researcher, E. Paul Torrance with whom she enjoyed a collaborative relationship for 34 years, commencing with her academic appointment at the University of Georgia and continuing until his death in 2003.

Dr. Reisman has recently published in the Handbook of Talent Management, in a text for bioscientists, and the Journal of Pharmaceutical Sciences. In addition, she has developed the Reisman Diagnostic Creativity Assessment (RDCA), which is a self-report assessment of research-based traits of creative strengths and is currently a free Apple app for the iPhone, iPad, and iTouch. Her forthcoming book with Dr. David Tanner is Creativity and Innovation: Bridging Education and Industry. Dr. Reisman was awarded the 2002 Champion of Creativity Award by the American Creativity Association (ACA), was appointed to the ACA national Board and served as ACA Treasurer. She currently is completing her Fourth year as ACA President.
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