THE CULTIVATION AND INHIBITION OF CREATIVITY FROM THE PERSPECTIVE OF INDIVIDUALS WITH MULTIPLE PATENTS

Dissertation

Submitted to

The School of Education and Health Sciences of the UNIVERSITY OF DAYTON

In Partial Fulfillment of the Requirements for

The Degree of

Doctor of Philosophy in Educational Leadership

By

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December 2015
THE CULTIVATION AND INHIBITION OF CREATIVITY FROM THE
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ABSTRACT

THE CULTIVATION AND INHIBITION OF CREATIVITY FROM THE PERSPECTIVE OF INDIVIDUALS WITH MULTIPLE PATENTS

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This research utilized a constructivist, phenomenological methodology, a qualitative, semi-structured interview method, and a theoretical framework informed by organizational theory as well as creativity theory to explore (1) sources of supports and inspiration for creativity cultivation, (2) experiences that had a positive impact on creativity cultivation, and (3) experiences that had a negative impact on creativity cultivation. The research focused on the process of creativity cultivation, as opposed to the focus of most existing work on the established creative individual and/or the creative product.

The overwhelming majority of interviewees reported that early childhood provided important sources of support and inspiration for creative behaviors and influenced their life-long creative processes. This finding was not widely reported in the previous literature. The concentration of this study on the process of creativity cultivation may have allowed this new insight. Further, the interviewees also identified iv
two types of experiences that had positive impacts on their cultivation of creativity: (1) varied experiences and (2) organizational factors. Finally, the interviewees identified organizational factors as also being the most significant experiences that negatively impacted their creativity cultivation. A majority of interviewees noted that they left organizations that were exerting negative influences on their creativity cultivation. Many of the interviewees also indicated that they had established, or had plans to establish, their own organizations to foster future creative endeavors.

This paper includes the nascent outline of an analytical and integrative template to link creativity and organizational research to allow deeper and fuller future analysis. Finally, this paper concludes with analysis and recommendations for future investigations into creativity cultivation supports and inhibitors.
Dedicated to my husband Bill Grilliot, daughter and son-in-law Moira and Patrick Murty, son and daughter-in-law Will and Jessica Grilliot, and especially to my grandson Sean Murty. I also want to thank a dear friend who has become family, Jack Reilly, for his invaluable proofreading assistance. Without my beloved family’s unfailing support, it would have been impossible to pursue this Ph.D. and dissertation process.
ACKNOWLEDGMENTS

I wish to express my deepest appreciation to my Mentor and Chair, Dr. Michele Welkener whose unfailing wisdom and guidance were an inspiration to me throughout the entire Ph.D. process.

I also wish to express my gratitude to my Committee, Drs. Lasley, Davis and Demmitt and to my peer students/candidates in the Educational Leadership Ph.D. program. I further wish to thank my interviewees whose insights and remarks propelled this research effort, their time and inputs are deeply appreciated.

I have grown as a person and scholar, throughout the pursuit of my Ph.D. primarily because of the exceptional community I have found in my family and my School; I only wish I could adequately express the depths of my humble gratitude and appreciation.
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CHAPTER 1
INTRODUCTION

This dissertation describes research intended to allow better understanding of what encourages and discourages the cultivation of creativity. Because creative behaviors occur within the social contexts of creative individuals (Simonton, 1975), I have explored the research in both creativity and psychology that relates particularly to social and contextual impacts on the cultivation of creativity. Similarly, because such organizations as family, school, church, and employer dominate most individuals’ social and contextual environments (Amabile, 1996; Zhou & Shalley, 2008), I have also incorporated organizational theory into this discussion of creativity cultivation.

In this chapter, I begin with a discussion of the research problem. With that background, I explore the research purpose and research questions. I next address the educational significance of the research, supplemented with a discussion of the significance of the research to educational stakeholders. I move on to a discussion of research approach and researcher perspective. The chapter concludes with definitions of terminology used in this study.

Research Problem

In spite of the complex and intimate relationship among social, contextual, and organizational impacts on creativity cultivation, there is little existing work that integrates
research in these three distinct fields (Amabile, 1996). The bulk of creativity research has focused on the characteristics of individuals who have successfully demonstrated creativity, as opposed to focusing on the social development of those creative skills:

There is almost no empirical research on the impact of specific social factors on creativity. Creativity researchers have instead concentrated primarily on individual differences in creative abilities or constellations of personality traits that characterize outstandingly creative persons. While those areas of inquiry are important, there are a number of reasons to develop a social psychology of creativity. On a practical level, social variables represent one of the most promising avenues for influencing creative behavior. (Amabile, 1996, p. xv)

**Research Purpose and Research Questions**

The purpose of this study is to gain a clearer understanding of the social, contextual, and organizational factors that encourage and/or discourage the cultivation of creativity. To shed light on the overall problem and to fulfill the research purpose, I have explored the following research questions.

1. What source(s) of support or inspiration have influenced multiple patent holders’ creativity/creative process?
2. What experiences have had a positive impact on their creativity cultivation?
3. What experiences have had a negative impact on their creativity cultivation?
Educational Significance of the Research

Duderstadt and Womack (2003, p. 30) noted, “The same powerful economic, social, and technological forces driving change in society are also transforming its needs and expectations for the contributions of the university.” The cultivation of creativity is critical to meeting the demands of evolving economic and social conditions, and the increasingly strident demands for higher education to cultivate creativity are hard to dispute (Christensen & Eyring, 2011). Linkner (2011) taught that originality, imagination, and creative problem solving have become the currency of success within the new world, both professionally and personally. In addition, because changes are coming more rapidly than ever before, the demand for creativity cultivation is now both particularly pressing and at a historically high premium for individuals and societies. As a result, the demands being placed on the higher educational system to cultivate creativity will only intensify (Christensen & Eyring, 2011). Researchers have highlighted the escalating needs for creative innovation in essentially all areas of life:

As many investors have discovered, yesterday’s investment strategies do not necessarily work anymore. As many politicians and citizens alike have discovered, yesterday’s ideas about ethical behavior and propriety do not necessarily apply today. As many CEOs have discovered, the competition today is quite different from at any time in history. Printed newspapers, for example, have to compete not only with each other, but with their own online versions. We live in a society where those who do not creatively innovate, risk failure in any of several domains of life. (Kaufman & Sternberg, 2010, p. xiii)
The higher educational economic models were historically built primarily upon the “sale” of knowledge available only from the “learned lips” of professors (Christensen & Eyring, 2011, pp. 18-19). Those models have little value when knowledge is freely available via the now ubiquitous and high-speed internet, on a 24/7 basis, within even the most remote areas (Friedman, 2005). It will be the creative ability to take that now ubiquitous knowledge and see new and valuable connections that will have value in the rapidly evolving future (Friedman, 2005).

Higher education organizations, like all organizations, are dependent for survival upon sustaining inputs, such as students and tuition. Those sustaining inputs, eventually, become available in direct proportion to the perceived societal needs for the organization’s outputs (Christensen & Eyring, 2011). Universities can no longer simply impart raw facts. In the evolving economic and social climate, universities must respond to the over-arching demand for creativity cultivation in order for them to be judged relevant and supportable (Christensen & Eyring, 2011). Thus few educational research topics exist that are more significant an area for investigation than creativity cultivation.

Perhaps as a result of such clear needs, the higher education community is increasingly focusing on encouraging creative endeavors. For instance, the 2012 Ohio Board of Regents Annual Report on the Condition of Higher Education in Ohio focused on Advancing Ohio’s Innovation Economy by improving commercialization efforts among the Ohio higher education and business communities (Ohio Board of Regents, 2012). Earlier, the passage of the Bayh-Dole Act in 1980 had allowed universities to patent and retain ownership of technological developments arising from federally funded research (Slaughter, Campbell, Hollerman, & Morgan, 2002). Since that time, university
patents have increased four-fold, and the higher education community has focused considerable attention on creative pursuits (Slaughter, et al., 2002). However, while “creativity is featured prominently in many college mission statements” (Welkener, 2004, p. 13); educators struggle to adequately respond to the demand to cultivate that creativity in students (Welkener, 2004).

For higher education professional to respond effectively to the demands for the cultivation of creativity in students, it will be critical for those educators to have more and clearer information about what factors encourage and inhibit this cultivation. I designed this dissertation research to provide such information, specifically on the social and other factors that support or inhibit creativity cultivation.

Moreover, universities and colleges are organizations and organizational characteristics have powerful impacts on creativity cultivation (Amabile, 1996). This dissertation research also specifically addresses organizational impacts on creativity cultivation. Such insights should be particularly valuable to educators as they both design and administer courses and programs for the higher educational organization.

**Significance of the Research to Educational Stakeholders**

Institutions of higher education have historically felt strong responsibilities to their stakeholders. Duderstadt and Womack (2003) noted: “Service to society and civic responsibility are among the unique and most important themes of higher education in America” (p. 6). That dedication to others is another key reason that educators critically need guiding research addressing the social, organizational, and other factors that positively or negatively impact creativity cultivation. Such information should allow educational institutions to better develop the creative skills that stakeholders are
demanding. Universities have traditionally served as disseminators of cutting-edge research, in order to benefit the operations of stakeholders (Duderstadt and Womack, 2003). The literature of educational stakeholders offers many examples clearly establishing the need for, and the value of, information on the factors that help support or inhibit creativity cultivation. I will separately address the needs expressed by five of these key educational stakeholders: (1) individual students; (2) the business community; (3) the American nation; (4) governmental units whether national, regional, local, or international; and (5) the integrated global community.

**Individual students.**

Clearly, higher education has many individual student stakeholders. Maslow (1971) made perhaps the most compelling case for the criticality of personal creativity cultivation, drawing a direct connection between creativity and the highest levels of human motivational development: “My feeling is that the concept of creativeness and the concept of the healthy, self-actualizing, fully human person seem to be coming closer and closer together, and may perhaps turn out to be the same thing” (p. 57). This observation’s application to individual students offers strong argument that students would benefit from a better understanding of the factors that influence creativity cultivation.

**The business community.**

Businesses and higher education have long enjoyed a close and mutually beneficial relationship (Duderstadt & Womack, 2003). Universities train students to meet business needs and the business world provides vital supports to higher education in the form of donations, grants, scholarships, reimbursed tuitions, and research contracts.
Businesses recognize that the world is entering a new economic age in which creativity and innovation will be the most valuable economic commodities for organizations and by extension, individuals, and societies as a whole (Friedman, 2005). Palmisano (2009) underscored the same point:

Global integration is the new playing field, and innovation is how you win the game. The nature of the game today can be summed up in a very simple principle: When everything is connected, work flows. It is like water finding its own level. And success in getting work to flow to you—whether you are a business, a nation, a region, a community, or an individual—increasingly depends on how you differentiate yourself through innovation. (p. 131)

Accordingly, most business leaders now recognize that creativity will be the skill set for future success and are eager for information on the factors that inhibit or support creativity cultivation. For example, in May of 2010, IBM reported the results of surveys with more than 1,500 chief executive officers within 33 industries and 60 countries; survey results indicated that creativity is viewed as the most crucial factor for future business success (Tomasco, 2010):

CEOs are confronted with massive shifts: new government regulations, changes in global economic power centers, accelerated industry transformation, growing volumes of data, rapidly evolving customer preferences—that according to the study can be overcome by instilling “creativity throughout an organization.” (p. 1)

Thus, the business community has become an increasingly vocal force arguing for creativity cultivation and innovation. Skarzynski and Gibson (2008) noted that
corporations, within the first few lines of their annual report to shareholders, now nearly universally express “unwavering commitment” (p. 11) to creativity and innovation. The Business Roundtable of the United States (2005) and the U.S. Council on Competitiveness (2005) have issued reports stressing that creativity and innovation are the cornerstones of future economic success. As the remarks and references above suggest, it is clear that the business community has clearly expressed its need for guidance on creativity cultivation, and it is natural that it will turn to the higher educational system to help them address those needs.

The American nation.

The American university has long and willingly served as a positive instrument contributing to social and economic national needs (Christensen & Eyring, 2011). In recognition of this contribution, national leaders of all political persuasions have financially supported and encouraged the pursuit of higher education (Duderstadt & Womack, 2003).

Recent American research has underscored the criticality and time sensitivity of addressing the need for creativity cultivation on a national level. Kim (2011) reported a troubling decline in creativity performance that is reversing decades of constantly improving creativity results:

The Torrance Tests of Creative Thinking (TTCT) was [sic] developed in 1966 and renormed five times: in 1974, 1984, 1990, 1998, and 2008. The total sample for all six normative samples included 272,599 kindergartens through 12th grade students and adults. Analysis of the normative data showed that creative thinking scores remained static or decreased, starting at sixth grade. Results also indicated
that since 1990, even as IQ scores have risen, creative thinking scores have significantly decreased. (Kim, 2011, p. 285)

These research results strongly suggest that the American nation would benefit from a better understanding of what factors improve or inhibit creativity cultivation.

Declining TTCT scores (Kim, 2011) are not the only indication that U.S. creativity performance is declining, at least in relation to creative activity globally. Beginning in 2008, the U.S. Patent Office has awarded more patents to foreign inventors as compared to U.S. inventors (United States Patent Office website, 2015). Further, the percentage of awards to foreign investors has increased consistently each year since 2008, while overall patents have increased dramatically (United States Patent Office website, 2013).

With that background, it is logical to assume that the American nation will look to the higher educational system that it has traditionally supported to address the now clearly evolving and critical need to understand creativity cultivation. To insure continued national support, American institutions of higher education would ideally be able to provide that guidance. This research should help develop the type of creativity cultivation guidance needed.

**Governmental units.**

Nations, like the American nation discussed above, have governmental structures and those governmental structures are organizations in their own right with their own expressed needs. There are also regional and local governmental units within this group of stakeholders that have expressed similar needs.
Universities have had a long history of interactions with, and/or support from local, regional, national, and international governmental units around the world, and there are few topics more important to these governments than creativity cultivation. It has become almost ubiquitous for governmental units to focus on creativity to create jobs and economic prosperity. The European Union (2009) identified the year 2009 as “The European Year of Creativity and Innovation” (p. 1). Many Asian countries, including China and Singapore, are engaged in long-term strategic initiatives focused on creativity (Lau, Hui, & Ng, 2004; Singapore Ministry of Education, 2002).

In order to insure continuing support, institutions of higher education need to address the legitimate need of governmental units to show creativity generation leadership for their regions. This research, by isolating the key organizational and other factors that encourage and discourage creativity cultivation, will assist the educational community in potentially providing that guidance to governmental units.

The global community.

Universities are increasingly becoming global players, recruiting foreign students and establishing operations in multiple nations. Throughout the world, there is growing interest in understanding the factors influencing creativity cultivation (Friedman, 2005). Creativity is widely credited as being the force that will determine future global progress and prosperity (Adams & Carfagna, 2006; Ambrose & Sternberg, 2012: Business Roundtable of the United States, 2005; Christensen & Eyring, 2011: Csikszentmihalyi, 1999; European Union, 2009; Friedman, 2005; Kaufman & Sternberg, 2010; Kim, 2011; Linkner, 2011; Mumford, 2012; Nussbaum, 2013; Ohio Board of Regents; 2012: Palmisano, 2009; Runco; 2007; Runco & Pritzker, 2011; Simonton, 1984, Singapore

As such, it is clear that the global community is looking for guidance on creativity cultivation, and that it will look to institutions of higher education to provide that guidance. This research has the potential to inform educational responses to worldwide stakeholders’ needs by isolating key elements of creativity cultivation.

**Research Approach**

The characteristics of the research problem and purpose informed the choice of my research approach. Because little research has been done on the process of creativity cultivation (Amabile, 1996), I designed the research to be emergent in nature. With the paucity of earlier work on the creativity cultivation process itself (Weisberg, 2006), I designed the study to allow free exploration of the lived experiences of the interviewees. I aligned the research problem, research purpose, and research approach to provide congruence (Creswell, 2013) in this study. For the reasons explained in depth in Chapter 3, this research utilized a constructivist, phenomenological methodology, a qualitative, semi-structured interview method, and a theoretical framework informed by organizational theory as well as creativity theory.

**Researcher Perspective**

I bring the history of a long business career that’s success, in great measure, was fueled by close to 300 personally held U.S. and international patents. Thus, I bring personal experience with the development of new creative concepts. I am also intensely
familiar with the impact of those developments on business enterprises and the individuals who are stakeholders in those enterprises. I am convinced that studying the socially supported or socially inhibited processes of creativity development, in contrast to the examination of characteristics of creative individuals, will offer more pertinent information to (1) guide others in developing their creativity, and (2) guide others in constructing social and organizational tools that support creativity development. Studying the characteristics of creative individuals to learn how to be creative is analogous to studying Philadelphia to learn how to get there. Creative success may have changed the personal characteristics of the creator, so that observation of personal characteristics after the creative event would be unreliable when applied to the individual at the beginning or in the midst of a creative process. In this research, I thus concentrated on the metaphorical path to Philadelphia—that is, on the creative process/path as it unfolded for serially creative individuals, with emphasis on isolating what encourages or discourages creativity cultivation. For purposes of this research, I have defined serially creative individuals as individuals who hold at least two U.S. patents. I have utilized serially creative participants with the rationale that they have exhibited a pattern of creativity, whereas individuals who hold only a single patent may reflect only a serendipitous stroke of good luck. Interviewees held from two to 87 patents, with an average of 11.5 patents each.

**Definitions of Terminology Used in This Study**

Because the following topically specific terms will appear throughout the study, their definitions are provided.
Creativity.

The bulk of academic definitions of creativity rather circuitously define creativity as the process that results in a product or concept that is creative (Sawyer, 2012). Amabile (1996) specified the following definition:

A product or response will be judged as creative to the extent that (1) it is both a novel and appropriate, useful, correct, or valuable response to the task at hand, and (2) the task is heuristic rather than algorithmic. (p. 33)

Clearly, this definition references a creative output rather than more ideally addressing the process of creativity.

There is justification, however, for an outcome-centric definition of creativity. Like most current definitions of creativity, the consensual definition is based on the creative product [emphasis in original], rather than the creative process or person. Given the current state of psychological theory and research methodology, a definition based on process is not feasible. (Amabile, 1996, p. 93).

Amabile’s analysis justifying the consensual support for an outcome centered definition of creativity is compelling since she suggests the current state of the theory and research makes a process based definition untenable. For that reason, this research utilized Amabile’s (1996) output focused definition of creativity quoted above.

Design patent.

The U.S. Patent office grants design patents to individuals who invent a “new, original, and ornamental design for an article of manufacture” (United States Patent Office website, 2015).
Entrepreneurship.

Shane (2003) explained that “entrepreneurship is an activity that involves the discovery, evaluation, and exploitation of opportunities to introduce new goods and services, ways of organizing, markets, processes, and raw materials through organizing efforts that previously had not existed” (p. 4).

Innovation.

Innovation is the “implementation or application of creative ideas into practice” (Zhou & Shalley, 2008, p. 215).

Non-obviousness.


Novelty.

Novelty refers to the uniqueness and first conception of an idea. The U.S. Patent Office cannot issue a patent unless the idea is original and unique from existing knowledge or inventions (United States Patent Office website, 2015).

Patent examiner.

Patent examiners are technical experts in their field of specialty. Advanced degrees in the examiner’s specialty are usually required. Supervisory patent examiners are members of the Select Executive Service (SES) and must typically pass the equivalent of a patent bar exam. Patent examiners review patent applications to determine whether a patent should be granted. They must recuse themselves if they have any personal or business connections to the patent applicant, or if they have any financial interests in the particular technology being proposed. Patent examiners are required to
make a thorough review of previous inventions, referred to as prior art, to verify that the applied for concept is not anticipated by other work in the field (United States Patent Office website, 2013).

**U.S. patent.**

A United States patent is an intellectual property right granted by the U.S. government to an inventor, allowing the inventor to exclude others from making or offering for sale the invented product for a limited period of time in the United States. For utility patents and plant patents, the U.S. Patent Office grants a patent period of typically 20 years from the date of first patent application, provided annual maintenance fees are paid. The U.S. Patent Office typically awards design patents for a period of 14 years, but does not require annual maintenance payments (United States Patent Office website, 2013).

**Utility patent.**

The U.S. Patent Office grants a utility patent to anyone who “invents or discovers any new and useful process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof” (United States Patent Office website, 2013).

**Chapter Summary**

Chapter 1 provides introductory remarks describing the research and presenting in detail the research problem, research purpose, and research questions. This chapter explores the educational significance of the research and the significance of the research to educational stakeholders. Also presented in this chapter are the research approach and perspective, as well as the definitions of key terminologies used in this study. Chapter 2 is a review of existing literature on creativity research, organizational theory research,
and the more preliminary work in organizational creativity research. Chapter 3 then
details the methodologies and methods utilized in the research. Chapter 4 provides a
summary of research findings, and Chapter 5 provides an analysis and interpretation of
those findings.
CHAPTER 2
LITERATURE REVIEW

Introduction to the Review of Literature

In this dissertation, I sought to illuminate factors that encouraged or inhibited creativity cultivation and the creative processes of serially creative individuals, including social, contextual, and organizational factors. To begin this work, I reviewed relevant literature including (1) creativity research, (2) organizational theory research, and (3) the more limited work in organizational creativity research.

I reviewed multiple information sources to conduct this literature review including books, journal articles, and Internet resources. The information was isolated through the use of ERIC, Google Scholar, Ohio Link Electronic Journal Center, ILIAD Inter-Library Loan Program, Psych Articles Review, University of Dayton Library Print Holdings, Business Source Complete, Academic Search Complete, Education Research Complete, Psychology and Behavioral Sciences Collection, Soc INDEX with Full Text, Meta Press Complete, and ProQuest. I constructed an NVivo interactive database for the major source documents consulted. For each of these source documents, I made notes on topics covered, as well as entered links to other related literature allowing quick searches for research and comments by topic across fields.
Chapter Organization

I organized this literature review to reflect the three-pronged research focus discussed above. First, I review the creativity literature focused on the three major phases of creativity research (Amabile, 1996; Kaufman, 2009; Sawyer, 2012; Weisberg, 2006): (1) creativity theories based on personality traits of creators, (2) creativity theories based on cognitive processes of creators, and (3) socio-cultural confluence creativity theories. I preface the exploration of these three phases of creativity research with a review of the creativity tests that are utilized to develop these major theories. Second, because confluence creativity research has demonstrated that creativity is as much a social process as it is an individual, intra-psychic process (Csikszentmihalyi, 1999) and because the social environments of most people are composed of organizations (Zhou & Shalley, 2008); I summarize the research on organizational theory by reviewing the work through the lenses of leadership, motivation, and organizational description. Third, I highlight the more limited work emerging in organizational creativity research. I supplement this discussion of organizational creativity research with a discussion of a minority dissent position that creative organizations are inefficient. Fourth and finally, I enumerate gaps in the literature on creativity research, organizational theory research, and organizational creativity research.

Creativity Theory Research

Scholarly research on creativity began in earnest on September 5, 1950, at Pennsylvania State College when Guilford delivered his keynote address as the newly elected President of the American Psychological Association (Guilford, 1950). As was customary for an incoming president, Guilford (1950) highlighted a topic that deserved
increased research attention. Guilford laid out a strong argument for increased attention to creativity research. In the years following Guilford’s speech, researchers pursued as many creativity studies per year as had been done in the previous 23 years combined (Sternberg & Dess, 2001). Psychologists have most often pioneered creativity research and have generally pursued research on individuals (Kaufman, J. C., 2009).

It is difficult to overstate the amount of creativity discussion that has occurred since 1950, as well as the amount of creativity research that is currently occurring. The sheer amount of historical and current creativity discussion is all the more remarkable considering the word *creativity* first appeared in written English in 1875 (Weiner, 2000), and did not appear in French or Italian for 50 more years (Sawyer, 2012). The word *creativity* was not included in English dictionaries until well after World War II, with the first confirmed inclusion occurring in 1962 (Kristeller, 1983).

In 2011, only four of the eight associations focused on creativity were U.S.-based. Three of the remaining associations were based in China, Hong Kong, and the European Union, respectively. The eighth association, the International Forum of Creativity Organizations, provided contact information on creativity researchers and organizations throughout the world. Five of the annual creativity conferences were U.S.-based, while the remaining two were held within the European Union countries (Sawyer, 2012).

Sawyer (2012) also generated important data on academic publishing activity in the field of creativity research for the period terminating at the end of 2011. As of 2011, there were four U.S. published journals and one Korean-published journal concentrating on creativity research (Sawyer, 2012). From 1958 through 2011, journals published 39 special issues focusing on creativity (Sawyer, 2012). Increasingly top-tier business and
education journals are also featuring articles that focus on creativity. Since 1981, there have been 16 books and nine literature reviews summarizing creativity research in peer-reviewed publications (Sawyer, 2012).

Even with this level of attention, there remains no generally accepted theory of creativity cultivation (Weisberg, 2006). Hennessey and Amabile (2010) found that creativity research was becoming increasingly fragmented, with researchers from varying viewpoints and disciplines operating in segregated silos. Further, within some disciplines, creativity “research” is nothing more than collected anecdotes (Weisberg, 2006). Hennessey and Amabile (2010) further argued that an inter-disciplinary approach to complex issues such as creativity research was necessary if tenable theories were ever to be developed. Unfortunately, such inter-disciplinary research is preliminary at best and non-existent at worst (Hennessey and Amabile, 2010). In this research project, it is my intent to integrate distinct, but related, research in creativity and organizational theory. I believe this may allow the development of a refined theory that reflects the impact of organizational characteristics on creativity cultivation.

Creativity tests.

One of the first areas that creativity researchers pursued, after Guilford’s (1950) call to action, was the development of tests to measure individual creativity so that creativity could be compared to other characteristics such as personality traits, cognitive processing styles, socio-cultural confluents, organizational characteristics, or any other alternative measure (Sawyer, 2012). These creativity tests were almost exclusively quantitative in nature, and great psychometric care was taken in attempts to maximize validity and reliability (Sawyer, 2012). These creativity tests fall into eight general
categories: (1) evaluations of the creative product, (2) evaluations of the creative person, (3) self-report testing, (4) creative functioning testing, (5) remote associates testing, (6) divergent thinking testing, (7) intelligence testing, and (8) emerging testing technologies.

**Evaluations of the creative product.**

Some creativity tests are based on the analysis of a required product generation. Participants are asked to write a story, draw a picture, write a poem, or perform some other creative activity. Psychologists, artistic experts, peers, or another identified group then rates the creative output. There are several prominent tests within this category of testing, including the *Barron and Welsch Art Scale* (Barron & Welsh, 1952), the *Hall Mosaic Construct Test* (Hall, 1972), and the *Consensual Assessment Technique* (Getzels & Csikszentmihalyi, 1976).

These tests rely on subjective evaluations by experts or psychologists, and subjective judgment is culturally, socially, and experientially formed (Runco, 2008). Thus, it is possible that art experts from different cultural traditions will have completely different evaluations of the same work. It is also true that variations in judgment about creative products are very common even when the artist and evaluator share a common cultural heritage (Runco 2008). Runco (2008) also argued that studying products does not tell us what we really need to know, which is what distinguishes the creative process.

**Evaluations of the creative person.**

Another class of tests rate creativity upon the evaluation of the creative person, for example a teacher’s evaluation of students. However, interpersonal relationships may inaccurately influence teacher evaluations (Acar & Runco, 2012).
Several researchers have also used biographical inventories in an attempt to isolate common life characteristics and experiences of creative individuals. Among the more prominent of these biographical inventory tests are the Alpha Biographical Inventory (Institute for Behavioral Research in Creativity, 1968) and the Biographical Inventory of Creativity (Schaefer, 1969). A number of other researchers also developed biographical inventories (Cattell, 1959; Holland & Astin, 1962; McDermid, 1965; Owens, Schumacher, & Clark, 1957). All of these studies involved in-depth interviews of both low-creativity and high-creativity individuals within specific groups, and then the determination of differences between the two groups’ biographical responses. Researchers typically classified individuals as either low or high in creativity through interviews with the individuals’ supervisors. While such studies may provide important information, it is also true that they raise concerns (Acar & Runco, 2012). Again, interpersonal tensions and/or friendships can influence the supervisors' evaluation of creative skills. It is also possible that participants self-censor embarrassing experiences, seeking to project a socially acceptable image for the researchers. Finally, researchers tended to concentrate their studies on unique segments of the general population, such as NASA researchers or U.S. Navy personnel. The difference in biographical background may vary differently within these types of narrowly defined sub-groups, and an identified biographical detail may not correlate equivalently, or even remotely, with creativity in the general population pool. For instance, if the research focusing on U.S. Naval personnel showed a uniquely high number of Annapolis graduates who are creative, it is doubtful that the study of a more general population will also show as strong a correlation between creativity and an Annapolis education.
**Self-report testing.**

There are several self-report tests that have gained popular usage (Sawyer, 2012). These tests ask participants to self-identify what types of adjectives describe them, what type of creative work they have done, or what they enjoy doing (such as drawing original artwork or concentrating intently on a subject for hours). The more popular self-report tests include the *Things Done on Your Own Test* (Torrance, 1962), the *Lifetime Creativity Scale* (Richards, Kinney, Benet, & Merzel, 1988), the *Runco Ideational Behavior Scale* (Runco, Plucker, & Lim, 2001), the *Creative Personality Scale* (Gough, 1979), and the *Domino Creativity Scale* (Domino, 1970).

The structure of a self-report test relies on the accuracy, clarity, and openness of the person responding. A flawed self-image, a perceived need to conform, or a desire for privacy could easily affect test accuracy (Runco, 2008). Further, it is clear that even if accurately reported, these self-tests would typically speak only to the potential for creativity, not creativity itself. It would be possible, for instance, to draw an original artwork that mirrors work previously seen, or to concentrate intensely on a subject for hours without generating a creative idea.

**Creative Functioning Test.**

Smith and Carlsson (1987) developed the Creative Functioning Test (CFT) to test two hypothesized characteristics of creative persons, *ideational flexibility*, and *creative strength*. The participant is presented with extremely short exposures (1/50th of a second initially) to heavily shaded and contoured drawings of two objects. The shadings and contours are visually significant enough that short viewing exposure could lead participants to see different objects than the ones drawn. The exposure time is gradually
lengthened until eventually the participant sees the drawing long enough to identify the stylized objects correctly. The number of differing objects “seen” before the correct answer is given is the score of ideational flexibility. Then the same picture is shown for shorter and shorter periods of time so that eventually it is hard to identify as the correct object. Participants with high creative strength will start offering alternative object guesses sooner than individuals with low creative strength, who will tend to stubbornly cling to the correct object identification even when they can no longer actually see the object clearly (Smith & Carlsson, 1987). This approach raises concerns related to individual differences in vision and to how visual acuity could affect test responses. The research literature did not address this issue. Even if reported results were reliable, these tests would typically speak to only the potential for creativity, not to demonstrated creative acts.

Remote Associates Test.

Trivia players are probably familiar with the next test, the Remote Associates Test (RAT). The RAT test presents three words and asks participants to provide a fourth word that has relevance to all of the first three words provided. An example of words provided could be hound, pressure, and shot (Mednick, 1962). A creative person should be able to come up with the fourth word that has relevance to the three words provided—such as blood. Mednick (1962) developed this test and felt it offered a unique value in that dissimilar words could be combined, mimicking the biggest breakthroughs in science, which often occurred by integrating dissimilar disciplines or concepts. Bloodhound, blood pressure, and blood shot, from the example Mednick offered, are relatively dissimilar concepts. As a confirmed Trivia player, I have found my skill at
remote associates has increased dramatically with experience. However, the literature does not reflect any investigation of test-retest impacts on Remote Associates Testing performance. Finally, RAT tests do not measure creative output, only the potential for creativity.

**Divergent thinking tests.**

Guilford (1950, 1967) pioneered divergent thinking tests (DT) as a measure of creativity (Sawyer, 2012). There are now a large number of DT tests, many of them using Guilford’s (1967) Unusual Uses Test, in which participants are asked to list as many uses possible for a familiar object, such as a brick. Many DT tests also use Guilford’s (1967) Consequences Test, in which participants are provided with a typically unlikely presupposition and asked a question—for instance, “What would be the results if people no longer needed to or wanted to sleep?” (Sawyer, 2012, p. 47).

Whatever the testing mechanism, DT tests typically evaluate subjects on four measures; (1) **fluency**, measured by the number of answers provided, (2) **originality**, measured by the number of answers not provided by others, (3) **flexibility**, determined by the number of categories that answers fall into, and (4) **elaboration**, rated by the detail of description included in each response (Sawyer, 2012).

The Torrance Test of Creative Thinking (TTCT), referenced earlier in this dissertation in Kim’s (2011) report of declining creativity performance, is one of the most commonly used DT tests. The TTCT has been translated into over 30 languages, has been used in over 2,000 studies (Frasier, 1990), and is widely accessible through the Scholastic Testing Service (Scholastic Testing Service website, 2013).
Most creativity researchers today no longer see DT as synonymous with creativity, however (Weisberg, 2006). Numerous studies have shown DT plays, at best, “an important but very small role” in “more inclusive models of creativity” (Plucker, Beghetto & Dow, 2004, p. 85). It is also clear that, even if accurately reported and reliable, these tests would typically speak to only the potential for creativity, not to evidence of creative accomplishments.

**Intelligence testing.**

When Guilford (1950) called for contemporary creativity research, many psychologists were convinced that IQ tests were both a measure of intelligence and creativity (Sawyer, 2012). It is an ongoing debate. Terman (1916) adapted the Binet and Simon IQ test to track 1,528 California schoolchildren with the highest IQ scores in the state. Terman followed these children, all with IQs of 140 or higher, for 35 years into adulthood. Terman’s participants were affectionately dubbed “Terman’s Termites” and were widely studied (Sawyer, 2012). Terman found high IQ offered good predictive validity for life achievement, but higher IQ did not translate into higher achievement, and not more than one third of the phenomenally high IQ “termites” were noticeably creative (Rhodes, 1961, p. 307). This implies that some measure of creativity might have discriminant validity, measuring creative indices that the IQ test does not. While many researchers and individuals clearly distinguish between creativity and intelligence, the research record is mixed (Sawyer, 2012). Taylor (1962) reported that psychologists have routinely reported clear distinctions between creativity and intelligence. Runco (2004) also noted that active practitioners in the field rarely question that there is a distinction between creativity and intelligence. Wallach and Kogan (1965) later performed a major
study of schoolchildren and agreed, finding that student creativity could not be predicted from IQ scores (i.e., intelligence and creativity scores differed). In contrast, however, Getzels and Jackson (1962) did not find a distinction between intelligence and creativity scores.

Researchers’ evolving understandings and definitions of intelligence further complicate the discussion of any link between intelligence and creativity (Kaufman, A. S., 2009). Spearman (1923) first pointed out that the early intelligence tests were actually assessing two measures of performance: g, or general cognitive ability and s, or task-specific skills. Factor analysis has allowed psychologists to determine how much of performance is attributable to g and how much of performance is attributable to s (Sawyer, 2012). Psychologists have used that information to redesign intelligence testing to explore g and the relevant discriminating s factors. A. S. Kaufman (2009) points out that most intelligence researchers feel that thinking or cognitive skills are hierarchical, with g at the apex; followed by broad skills, such as fluid thinking or processing speed; followed by very specific skills peculiar to one domain of activity or another, such as a musician’s ability to read or write music. The Cattell-Horn-Carroll Theory identifies ten types or factors of intelligence, and is the basis of essentially all IQ testing today (Kaufman, A. S., 2009). Flanagan, Ortiz, & Alfonso (2007) offered a recap of each of these ten types or factors of intelligence. Gf measures fluid intelligence, the ability to apply a variety of mental operations to solve novel problems, specifically ones that do not benefit from past learning or experience. Gq measures quantitative knowledge. Gc measures crystallized intelligence, the breadth and depth of a person’s accumulated knowledge of a culture and the ability to use that knowledge to solve problems. Grw
measures reading and writing skills. \( G_{sm} \) assesses short-term memory competence. \( G_{v} \) evaluates visual processing performance. Similarly, \( G_{a} \) evaluates auditory processing performance. \( G_{lr} \) deals with long-term memory capabilities. \( G_{s} \) provides information on the processing speed of the mind. \( G_{t} \) is an indication of decision speed and reaction time. However, contemporary intelligence tests measure, at most, only seven of these intelligence factors and different intelligence tests measure different factors (Kaufman, A. S., 2009). The very popular Wechsler scales, for instance, measure only four factors (Kaufman, A. S., 2009). Perhaps even more significantly, most factorial analyses show that creativity correlates most with the factor \( G_{lr} \), long-term storage and retrieval, and most current intelligence testing does not measure \( G_{lr} \) at all (McGrew, 2009).

Gardner (1983) criticized what current intelligence tests measure, and then he proposed a Theory of Multiple Intelligences. This proposal posited seven intelligences that should be measured to properly understand intelligence and creativity: verbal, logical-mathematical, spatial-visual, bodily-kinesthetic, musical, intra-personal, and inter-personal. Gardner (1983) also pointed out that traditional intelligence tests measure only the first two or three of the intelligences he identified. More than a decade later, Gardner (1999) added an eighth intelligence, naturalistic, which creativity tests also do not measure.

Similarly, Sternberg (1999) suggested a more inclusive and expansive concept of intelligence, which he termed successful intelligence. Sternberg (1999) argued that three types of intelligence allow individuals to achieve creative success in life, and he noted that traditional IQ testing measures only one of those skills. Sternberg (1999) specifically identified successful intelligence as including analytical, practical, and creative abilities.
The analytical abilities to judge, compare, contrast, and evaluate are important, and they are measured on traditional IQ tests. Practical abilities allow the application or implementation of ideas, but they are not measured on traditional IQ tests. Creative abilities are used to create new concepts, explore new ideas, and imagine new views, and they, too, are not measured on traditional IQ tests.

Thus exploring linkages between intelligence and creativity are complicated by intelligence tests that have changed historically, that are challenged as to the adequacy of material tested, that vary from one another on the specific intelligence factors studied, and that typically do not measure Gc, which factorial analysis suggests is most closely linked to creativity. Even if accurately reported, reliable, and valid, these IQ tests would typically measure only the potential for creativity, not expressed or actualized creativity.

**Emerging assessment and testing technologies.**

Some new technologies have allowed creativity researchers to pursue alternative creativity tests and assessments. The popular media often mention these new initiatives, but they do so without clear academic references (Sawyer, 2012).

**Biological assessments of creativity.**

As the understanding of human biology has increased, there has been a natural tendency for researchers to attempt to explain creativity biologically. DNA, genes, and cells are the smallest units of analysis by which creativity could be explained, and scientists prefer small units of analysis for their superior power and universality (Sawyer, 2012). Unfortunately, the work in biology has not supported biologically based theories of creativity; instead, this work has tended to refute biologically based hypotheses about creativity (Sawyer, 2012). Burrell (2004) taught that the brains of geniuses are not
anatomically different in any significant manner. Similarly, research has shown that creativity is not a function of only the right brain, but instead a function that draws on many diverse areas of the brain (Bogen & Bogen, 1988). Barron (1972) taught that there is no demonstrated link between mental illness and creativity. Finally, there is no evidence that creativity is hereditable (Pfenninger & Shubik, 2001).

Cognitive neuroscience assessments of creativity.

Developments in cognitive neuroscience, an outgrowth of medical brain imaging developed first in the 1970s, have allowed three-dimensional images of how brain activity changes during assigned cognitive tasks (Sawyer, 2012). By observing what brain areas are activated during a task, neuroscientists can make inferences about how the brain accomplishes the task. The implications for understanding the creative process are both obvious and exciting.

However, cognitive neuroscience to date has done little more than confirm the earlier findings that creative cognition does not occur in a discrete brain area but is widely diffused across different cross-lobal areas (Sawyer, 2012). Brain imaging techniques will continue to develop, but there are currently issues that limit neuroscientists’ ability to explain creativity through brain imaging (Sawyer, 2012). First, participants are not doing solely the experimentally assigned cognitive task; they are also breathing, moving, smelling, and seeing. All of these activities activate large areas of the brain. Moreover, the brain imaging machines are very loud, so significant amounts of auditory input is being processed by the participants during any scanning. In short, it is hard to determine what function is occupying an active brain region. The researcher must often make informed judgments using subtractive processes in trying to determine brain
area activation and the particular cognitive task assigned. Those judgments are not beyond challenge (Sawyer, 2012). Furthermore, even if a brain area of activation is correctly correlated with a particular cognitive task, causation is not discernible. A brain area could be activated during a particular task but not play a critical role in that activity; the area could simply be monitoring the activity in another brain area where the critical role is being performed (Sawyer, 2012).

*Computer simulations of the creative process.*

Recent advances in the field of *artificial intelligence (AI)* have allowed a number of researchers to develop computer simulations of various artificial creative processes (Sawyer, 2012). The final results of some of this work can be startling—for instance, when IBM’s chess-playing Big Blue computer appeared to develop creative strategies to beat the chess world champion Garry Kasparov in 1997 (Sawyer, 2012).

Several researchers have explored various aspects of the creative experience through the use of computer simulations. Meehan (1981) used the TALE-SPIN program to emulate creative writing. Creative mathematical explorations were also computer simulated (Lenat, 1977, 1983). Cohen (2007) used computer simulation programming, dubbed AARON, to attempt to develop creative works of art. Finally, McLurkin (2002) and Huang (2003) attempted to develop a creative artificial orchestra through computer simulation.

Even though the end results can appear to be precedent shattering, close review of the process supporting each and all of these simulations reveals that, while these programs can replicate the rational, conscious, algorithmic aspects of the creative cognitive process, they cannot yet even approach the rich complexity of the full creative
cognitive process. In fact, the current AI programs function only because of systematic intervention by human programmers to compensate for still-missing AI capabilities. In all of the programs referenced above, the programmer must intervene in critical ways to allow any creative output to occur. In other words, the programmer must define the problem to be solved (Sawyer, 2012). Further, the program cannot evaluate output; it can generate output based only upon rules established by the programmer. Every night AARON is programmed to produce 150 pieces of art, and the bulk of it is repetitive and uninspired (Cohen, 2007). Cohen (2007) reported he is lucky if he has just a few pieces of artistic merit daily; he uses the discarded efforts to help him refine the programming instructions. The program cannot evaluate the artistic merit of the work, go beyond the programmed instructions provided, nor suggest what further instructions it needs. Therefore, while Cohen (2007) over time will provide more and more precise programmed instructions, AARON has not demonstrated the ability to go beyond Cohen’s coded information to create further new knowledge or art.

AI programs may continue to evolve toward greater capabilities, so creativity researchers will have to continue to monitor developments. In addition, of course, AI programs currently do offer insights into the rational phases of creative cognition.

**Summary on creativity tests, a critical caution.**

The creativity tests just presented have clearly provided important information for creativity researchers. However, as can be seen from the discussions of the individual tests, essentially all of the major creativity tests have limitations. Researchers developing creativity theories tend to rely on the comparison of some secondary characteristic or factor to compile scores of creativity generated by these creativity tests. If these tests
incompletely or incorrectly assess creativity, the resultant theory may have an improper foundation. The more imperfect the test utilized, the less reliable the theory may be. The validity and reliability of creativity theories are inextricably tied to the validity and reliability of the tests used to measure creativity. Csikszentmihalyi (1994) noted, “If one turns to the literature of creativity research and asks the simple questions: What is being measured? What is creativity? One soon realizes that the entire research enterprise moves on very thin ice” (p. 143). It is crucially important that this caution ground the review of the more widely used creativity tests, as well as ground the review of the more widely recognized creativity theories that were developed using these tests. Perhaps, more importantly, it suggests the value of exploring a complex topic like creativity (at least supplementally) with the qualitative method suggested in this dissertation. With such cautionary observations as background, I will now explore the three major categories of creativity theories: (1) creativity theories based on personality traits of creators, (2) creativity theories based on cognitive processes of creators, and (3) socio-cultural confluence creativity theories.

**Creativity theories based on personality traits of creators.**

Beginning in the 1950s and 1960s, immediately following Guilford’s (1950) call for creativity research, the first work in the field focused on correlating creativity with personality traits of creators.

*General or domain specific creativity theories*

Domain general or domain specific creativity theory underscores personality trait creativity theories (Weisberg, 2006). A domain is a recognized area of human specialization, perhaps influenced by personality traits, skills, and personality
preferences. Domain examples include music, particle physics, architecture, and writing. General or domain specific discussions have become an important part of the discourse on creativity and creativity cultivation, especially those discourses focusing on creativity theories that are based on the personality traits of creators (Weisberg, 2006).

During the first wave of creativity investigation, researchers were looking for a test of personality trait or type that would assess creative potential generally across most domains, much as IQ testing assesses individual intelligence applicable to a number of fields (Weisberg, 2006). As the previous section suggested, the efforts to develop such a test have not been very successful. Treffinger (1986) calls this search for a general creativity corollary to the IQ test, the “creativity quotient fallacy” (p. 16), and researchers eventually noted that there is a critical difference between intelligence and creativity (Weisberg, 2006). Intelligence typically refers to the ability to successfully master what others have mastered, while creativity refers to the process of developing something that is novel. Creativity thus implies leaving the road most traveled and forging a new, better path. To go beyond what others have done may very well mean having a greater depth of knowledge in the particular domain where the creative act will apply, as opposed to more generalized knowledge. Researchers, therefore, increasingly theorized that creativity may be far more domain specific than general, unlike intelligence (Feldman, 1974). Put into more practical terms, a creative person in one field is not expected to be creative in all fields. A brain surgeon, for example, is not asked to design the hospital architecture where he or she will work. Academic research eventually demonstrated that far larger portions of creative ability are domain specific rather than domain general (Kaufman &
Since creative skills are primarily not domain general, this may explain why creativity measurement on a general basis has not been particularly successful.

There is a growing consensus among researchers suggesting that there is a hierarchy of domain-general and domain-specific creativity skill sets (Kaufman & Baer, 2005). General creative abilities and inclinations provide the framework within which knowledge and skills in a particular domain can be exercised creatively (Kaufman & Baer, 2005).

*Individual personality traits of creative people.*

During World War II, many leading psychologists were involved in developing tests in ability and personality that assisted the military in selecting individuals for wartime positions (MacKinnon, 1978). After the war, many of those researchers joined the Institute for Personality Assessment and Research (IPAR) at the University of California, Berkley, to continue their research. IPAR drove much of the initial work on individual personality traits of creative people (MacKinnon, 1978). IPAR researchers had field experts nominate eminently creative individuals in a variety of fields for a weekend at a former fraternity house in Berkley. The researchers and participants lived together, cooked together, and had deep discussions during the day exploring questions such as “What makes a person great?” and “What should we do to shape the future now?” (MacKinnon, 1978, p. 2). During the day, the participants were exhaustively tested using a variety of the tests mentioned previously.

The IPAR researchers found that these creative individuals exhibited some consistent traits (MacKinnon, 1978), such as higher than average scores in IQ and domain specific tests. For example, writers and communicators scored higher on verbal
IQ, while artists and architects scored higher on spatial measures of intelligence (MacKinnon, 1978). The researchers further found that openness to new experiences and people were characteristic of creative people (MacKinnon, 1978). Perhaps relatedly, the researchers noted low scores on inhibition, repression, and suppression mechanisms, which can control impulses and imagery (MacKinnon, 1978). The IPAR work additionally identified alertness to details and high retention of details among highly creative individuals. IPAR researchers also reported that creative individuals showed high levels of critical discernment when evaluating details and ideas, leading to evaluative proficiency (MacKinnon, 1978). Yet another confirmation was that creative individuals exhibited comfort with ambiguity and complexity, typically coupled with a desire to develop unifying or explanatory theories (MacKinnon, 1978). Data analysis further suggested less stereotypical, more unique, less socially prescribed personalities were common among highly creative individuals; in particular, creative men tended to score higher on feminine traits than was average for men (MacKinnon, 1978). These highly creative individuals also tended to have conventional, financially secure childhoods; however, these childhoods were not remembered as particularly happy, perhaps because their lower-than-normal repression levels may have allowed these eminently creative individuals to remember unpleasant experiences (MacKinnon, 1978).

While this study was based on work with eminent creators, the level of creative accomplishment varied among the participants, and no adjustment was made for those creative performance differentials. As a result, these tests correlate to varying levels of creative potential rather than correlating directly with actual creative performances.
Five Factor Model.

Personality types are identified by a cluster of personality traits (Furnham, 2008) identified by psychological testing. Over time, factor analysis allowed researchers to cluster traits so that they could study individual personality type. The Five-Factor model is one of the most commonly used measures of personality trait. Researchers often refer to Furnham’s model as the OCEAN model, an acronym for the five factors assessed: “openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism” (Furnham, 2008, p. 2). Of the five factors, openness to experience is associated most closely with creativity prediction, ranging from 10% of the creativity variances (Furnham, Crumb, Batey, & Chamorro-Premuzic, 2009) to almost 50% of the creativity variance (Silvia, Martin, & Nussbaum, 2009). Further, King, Walker, and Broyles (1996) established discriminant validity between openness to experience measures and creativity measures. Of course, any correlation between these personality traits, even if reliable, highlights only the potential for creativity, since there is no measure of creative output. In other words, a person may show skills that indicate creative potential, but motivation, opportunity, or other factors may also be necessary to allow creativity to occur.

Kirton Adaptive Inventory (KAI).

Kirton (1976) theorized that two creative styles, innovator or adapter, could be used to describe individuals. He wrote that these styles were distinct from the level of creative performance; either innovators or adapters could be low or high in creative performance. Innovators earn a high KAI score and concentrate on changing how things are done, while adapters earn a low KAI score and concentrate on improving current
practice. Of course, these traits, even if reliable, would speak only to the potential for creativity, not to demonstrated creative results.

Summary comments on personality theories of creativity.

As all of this suggests, essentially all of the personality theories of individual creativity offer conflicting, limited, or contested findings. By 1980, many creativity researchers determined that the 30 years spent studying individual personality traits and types had failed to achieve their goals (Weisberg, 2006). Many of those researchers then turned their attention to the cognitive processes of creative individuals (Sawyer, 2012).

Creativity theories based on cognitive processes of creators.

Geneplore Model of Creativity.

At its simplest, creative thinking is generating new ideas and eliminating the unacceptable ones so that the proposed idea is useful and appropriate. Finke, Ward, and Smith (1992) proposed a Geneplore Model, which describes an alternating generative and exploratory model of the creativity process. Put another way, the creative process begins with divergent thinking, which gradually converts into more convergent thinking. A number of creativity researchers have studied the creative process by breaking down that simple two-step creativity model into more manageable and discrete steps. Sawyer (2012) has reviewed nine of the most cited creative cognitive process models: Bransford & Stein, 1984; Burnard, Craft, & Grainger, 2006; Gordon, 1961; Isaksen, Dorval, & Treffinger, 2000; Kelley, 2001; Qualifications and Curriculum Authority, 2005; Scott, Leritz, & Mumford, 2004; Sternberg, 2006; Wallas, 1926, and Sawyer summarized those models into an eight-stage model for the creative cognition process. Sawyer’s eight-stage model provides a good structure for to explore the creative cognitive process.
**Sawyer's Eight Stages of Creative Cognition.**

*Find the problem.*

Sawyer’s first stage of the creative cognition process is to “find the problem” (Sawyer, 2012, p. 90). Real-life problems are often hard to find, hidden by one’s own unconscious filters, but creative people often see problems that others miss (Weisberg, 2006). Identifying a problem in a way that invites creative solutions is one of the most important skills that creative people can have: “The formulation of a problem is often more essential than its solution...To raise new questions, new possibilities, to regard old questions from a new angle, requires creative imagination and marks real advance” (Einstein & Infeld, 1938, p. 92).

*Acquire the knowledge.*

Sawyer’s second stage is to “acquire the knowledge” (Sawyer, 2012, p. 93). Domain mastery is a critical component of the creative process. Understanding the intricacies, technical knowledge, and inter-relationships of the domain facilitates the remaining five stages of the creative process. Gardner (1993) reported that, across a wide variety of domains, major breakthroughs tend to come only after the inventor has been deeply immersed in the domain for at least 10 years. Researchers (Ericsson, Krampe, & Tesch-Romer, 1993) have documented that deliberate practice, which they explain as “the repetitive practice of material at the upper reaches of an individual’s ability, result in deeper levels of knowledge acquisition than through essentially any other learning modality” (p. 363). These researchers were able to document across a wide variety of domains that eminent or extraordinary performance was almost always preceded by 10,000 hours of deliberate practice. Ericsson et al. (1993) also found that eminent
producers tended to deliberately practice four hours per day for five days per week, which extends out to 10,000 hours after approximately 10 years of practice (Ericsson et al., 1993). Mumford, Baughman, Supinski, and Maher (1996) demonstrated that the type of information encoded or retained affects how one solves novel problems in the future. Specifically, they found that creative people tended to focus on relevant information while closely examining inconsistent information. It is obvious that repetitive practice at the high limit of current ability would tend to help develop a skill set that could identify relevant information while searching for new information.

*Gather related information.*

Sawyer’s third stage of the creative cognition process is to “gather related information” (Sawyer, 2012, p. 96). Many creative acts result from a person’s recognition of linkages, “at connecting information from various sources in new and surprising ways” (Nussbaum, 2013, p. 32). This implies that the creative person has to be observantly immersed in the world and actively involved in removing his or her perceptual filters. Creativity often bridges several domains (Weisberg, 2006), so the effective creator must remain involved in many areas. The scientist who never leaves the lab while searching for a breakthrough denies herself or himself the inspiration of related informational catalysts, and may actually be creating roadblocks to creative discovery.

*Incubation.*

How and why does the moment of insight happen? The answer may lie in how humans experience and perceive the world. Sensory inputs literally bombard individuals every conscious moment. The central nervous system can process, at most, seven bits of sensory input (sounds, visual stimuli, non-verbal content, and nuances of emotion) at one time, and the quickest that humans can process one bit of information is 1/18 of a second (Csikszentmihalyi, 1990). This means individuals can process at most 126 (seven times 18) bits of sensory inputs per second (Csikszentmihalyi, 1990). Yet their senses are providing over 11 million bits per second of sensory inputs (Markowski, 2013).

Human brains must filter out, based on personal experience and assumptions, what is perceived to be non-essential information, and then convey to the consciousness only the information that is threatening, relevant, and/or deserving of conscious recognition. Those filters are absolutely essential to functioning and to making concentration possible. However, those filters simultaneously isolate us from many inputs. Those filters can also encourage dogmas. Ambrose and Sternberg (2012) noted, “Dogmatism confines many of our brightest minds by narrowing and shortening their field of vision and by precluding any probing beneath the surface level of important issues” (p. 4). Incubation is often the path around dogmas. Some cognitive psychologists theorize that the brain unconsciously continues processing issues even when the individual is no longer considering the issue consciously (Csikszentmihalyi, 1996). The unconscious mind is freed from dogmatic rules and pre-conceptions, which can lead to “sudden” insights (Csikszentmihalyi, 1996, p. 101). The theory is that unconscious thought, hence non-directed thought, free-associates, leading to novel linkages that the conscious mind would not explore. Other psychologists suggest a
distinction between conscious serial processing and unconscious parallel processing (Csikszentmihalyi, 1996). When individuals consciously deal with a problem, they tend to follow the typically linear paths or approaches that have worked effectively for humans in the past. However, there is no intentionality with unconscious thought, and many psychologists think the mind tries out many paths on parallel and simultaneous tracks. The alternative paths may provide unexpected and novel solutions that would not be consciously explored (Csikszentmihalyi, 1996).

Other researchers believe incubation works because it allows time to rest for the part of the brain consumed by some problem (Sawyer, 2012). Smith and Blankenship (1989) have also advanced the theory of selective forgetting as an explanation for incubation insights. The idea is that the conscious mind clings to unproductive conventional paths. Unconsciously, the mind is not invested and allows selective forgetting, which makes the productive and creative answers more obvious. Finally, some researchers theorize that during incubation, related concepts in memory are activated and those related concepts can suggest novel solutions (Sawyer, 2012).

**Generate ideas.**

Sawyer’s fifth stage of the creative cognition process is to “generate ideas” (Sawyer, 2012, p. 107). There has been a relatively heated dialogue between psychologists as to how creative ideas are generated (Sawyer, 2012). Gestaltists feel thought is irreducible into components and is conceptually holistic (Duncker, 1926). Gestaltists also believe that creativity is often blocked because people make unwarranted assumptions, which create fixations and impasses (Wertheimer, 1945). On the other hand, associationists believe that new ideas are combinations of old ideas:
The mind being prepared beforehand with the principles most likely for the purpose. . . incubates in patient thought over the problem, trying and rejecting, until at last the proper elements come together in the view, and fall into their places in a fitting combination. (Bain, 1855/1977, p. 594)

Most creativity researchers today believe that the associationist view—that creativity occurs through the combination of known ideas—is more accurate than the Gestaltist view of sudden insights (Sawyer, 2012). The mind typically does not suddenly restructure; it incrementally and gradually combines existing knowledge in an ever more accurate approach to the correct solution. While the final solution may be perceived as a sudden insight, research has shown that participants who are asked to vocalize their thoughts during insight exercises are typically approaching the solution incrementally, although they may not perceive that themselves (Perkins, 1981).

*Combine ideas.*

Sawyer’s sixth stage is to “combine ideas” (Sawyer, 2012). If indeed the associationists are correct that we develop new ideas incrementally and gradually, combining existing knowledge in an ever more accurate approach to an acceptable solution, then it is clear that deep and varied experiences should fuel the creative process. Koestler (1964) agreed: “All decisive advances in the history of scientific thought can be described in terms of mental cross-fertilization between different disciplines” (p. 230). Individuals who have multiple projects and multiple interests in multiple domains have a large pool of experiences and basic ideas. As a result, those individuals have a significantly better chance of having novel and new combinations during incubation (Simonton, 1988a).
One of the most encouraging results from research on conceptual idea combination is the finding that the process can be influenced toward better quality output (Baughman & Mumford, 1995). There are two primary techniques of idea combination: (1) feature mapping and (2) metaphor/analogy development. Feature mapping essentially means asking participants to identify shared features and unshared features of different ideas (Baughman & Mumford, 1995). For instance, the description of a small dog suited to city life as an “apartment dog” (Cohen and Murphy, 1984, p. 30) creatively and succinctly conveys the idea. Although dogs and apartments have few shared features, the unshared features can be related creatively to communicate meaning more succinctly.

Baughman & Mumford (1995) found that providing instruction on feature mapping increased the creative quality of closely related re-combinations.

The other major technique of idea combination is metaphor and analogy development, which essentially means transferring relevant characteristics of one concept onto another topic (Holyoak & Thagard, 1995). Examples of metaphor and analogy idea combination would be such metaphoric expressions as “Children are sponges” (Sawyer, 2012, p. 119) or the analogy “Sound waves are like water waves” (Sawyer, 2012, p. 119). Holyoak & Thagard (1995) found that education in metaphor and analogy development increased the creative quality of unrelated re-combinations.

To summarize, training in either feature mapping or metaphor and analogy development improved creative outputs, and the type of training had an impact on the type of creative improvements seen. When participants were trained to map features, the creative quality of closely related re-combinations was enhanced. In addition, education
in metaphor and analogy development enhanced the creative quality of unrelated idea re-
combinations.

Select the best ideas.

Sawyer’s seventh stage of the creative cognition process is to “select the best ideas” (Sawyer, 2012, p. 129). At this point in the creative process, conscious, convergent thought becomes more important because the creator must evaluate all of the generated ideas in an attempt to determine the ideas of the most value (Sawyer, 2012). Often it is creators, not outside evaluators, who determine which ideas deserve further resources. Creators make idea evaluation decisions based on their perceived model of the domain and field, as well as on their evaluation of the expense/utility of the new creative idea (Bink & Marsh, 2000).

Research has shown that some creators believe the most effective way to generate exceptional ideas worthy of selection is to generate many ideas. Sawyer (2012) called this “Productivity Theory” (p. 131). Weisberg (1986) pointed out that even highly gifted individuals with great creative records fail to generate creative outcomes roughly the same percentage of time as those who are less gifted. Since these individuals generally develop more ideas, they tend to be unsuccessful creatively even more than less gifted people; the volume of their creative efforts is largely what guarantees that some creative ideas survive. Simonton (1988a,) found a strong correlation between productivity and the chance a creator developed significant work. Similarly, Huber (1998) found that patent holders with the most patents also tended to have patents on the most significant developments.
Externalize ideas.

Sawyer’s eighth stage of the creative cognition process is to “externalize the idea” (Sawyer, 2012, p. 133). In this eighth and final phase of Sawyer’s (2012) model, the creative idea is converted into a final and usable idea. It is at this point that many good ideas die because significant investments must be made to fine-tune, build, market, and produce a new, hence risky, product (Weisberg, 2006). Also at this point, further progress is dependent upon how others will react, whereas earlier in the process the creator was often making all of the decisions.

The creator must begin to think innovatively, or hire innovators, to make the creative idea final and usable. Innovation has been defined as “the implementation of creative ideas into practice” (Zhou & Shalley, 2008, p. 215). Innovation often entails entrepreneurship. Entrepreneurship has been defined “as an activity that involves the discovery, evaluation, and exploitation of opportunities to introduce new goods and services, ways of organizing, markets, processes, and raw materials through organizing efforts that previously had not existed” (Shane, 2003, p. 4).

Concluding comments on Eight-Stage Model.

It is important to note that while these stages have been presented linearly, there is likely some degree of parallel processing. For instance, a creator making the final picks of best ideas could easily also be considering entrepreneurial and innovation assistance to market and produce those best ideas.

Further, a true creator is always refining and re-inventing. Sawyer (2012) noted that after the eight stages are completed and the creative product is available more broadly, colleagues and experts in the field will often offer constructive and enhancing
feedback. A true creator will constantly be looking for that valuable information so he or she can fine-tune the creative idea on a continuing basis. Sawyer (2012) also pointed out that little research has occurred on this critical phase, identifying it as a promising area for future research. This dissertation research, both the literature review and research data, should help address this issue by exploring organizational theories that would encourage continual improvement.

*An alternative view of the cognitive creative process.*

Some researchers have suggested that creative thinking processes are the same as ordinary thinking processes and that they are essentially problem solving. Weisberg (2006) postulated that “creativity is based on ordinary thinking, which means the cognitive characteristics of individuals who produce world-class innovations are not basically different from those of the rest of us” (p. 598). However, if there is no difference between creative and ordinary thinking, why are some individuals serially creative and others are not? Joy (2004) found some correlation between an individual’s desire to be different and that individual’s creative tendencies, theorizing that those individuals may have chosen creative expression as a way to discriminate themselves from others. Weisberg (2006) explained that the motivation to be different might be what drives individuals to acquire the domain expertise necessary to develop creative concepts.

*Summary comments on cognitive process theories of creativity.*

Just as with research on personality traits/types of creators, the research on the cognitive processes of creators is individualistic and unitary in focus. Researchers are looking primarily at the individual and one variable. However, as mentioned, results of this type of research have been less than definitive and have not allowed for the creation
of a comprehensive, reliable theory of creativity cultivation (Amabile, 1996).
Researchers are developing evidence that creativity is clearly a social process, not an exclusively individualistic effort (Mumford, 2003). As a result, many researchers are recognizing the need to turn to socio-cultural, confluent examinations of creativity (Mumford, 2003).

**Socio-cultural confluence creativity theories.**

These socio-cultural, confluence-based theories of creativity, in various forms, presume a confluence of many factors, such as personal skills, cultural values, contextual impacts, and motivation in the process of creativity cultivation. The confluence theories recognize the complex interplay of many concurrent factors as impacts on creativity. Confluence theories fall into six major categories: (1) *Historiometry*, (2) the *Componential Model* (also referred to as *Social Psychology Theory*), (3) the *Socio-Cultural Systems Model*, (4) the *Investment Theory of Creativity*, (5) the *Darwinian Theory of Creativity* (Darwin, 1859), and (6) the *Flow Theory of Creativity*.

**Historiometry.**

Simonton (1975) was the first to argue for the coordinated development of a social psychology of creativity. Earlier researchers had addressed social and contextual influences on creativity, but only incidentally as part of the individually focused personality or cognitive research process. As early as 1869, Sir Francis Galton (1869) in *Hereditary Genius* discussed the need to consider the broader context when examining personal traits like genius, or presumably by extension, creativity. Murray (1938) wrote of two kinds of environmental press, alpha and beta, defining alpha press as objective influences of the context and defining beta press as the individual’s interpretation of the

What distinguished Simonton was his primary focus on social and contextual issues (Simonton, 1975, 1984, 1988a, 1988b, 1989a, 1989b, 1990, 1991, 1992). Simonton’s work relied upon extensive statistical analysis of historical records, and has thus been referred to as historiometry.

Amabile’s Componential Model (also Social Psychology Theory).

Amabile (1983, 1996) theorized that a set of components is necessary for creativity cultivation in any domain, hence a componential model. Specifically, Amabile hypothesized a three-component model consisting of: (1) domain relevant skills, (2) creativity relevant skills, and (3) task motivation to create.

Amabile (1983, 1996) developed the Componential Model after thoroughly reviewing all the personality and cognitive process trait tests used to assess creativity. She found that there was an implicit, participative bias in all the tests: researchers from different domains, different cultures, and different backgrounds were scoring the tests differently. This created significant issues with validity, and by extension, reliability (Amabile, 1996). Amabile felt her review of the previous research and creativity tests clearly demonstrated the need to consider socio-cultural contexts when studying creativity. Her Componential Model addressed that by bringing domain (a social system) specific skills into the analytical framework (Amabile, 1996). Amabile’s Componential Model is also widely praised as one of the first theoretical models to highlight the critical importance of motivation in the cultivation of creative ideas (Weisberg, 2006).
Nussbaum (2013) also credited Amabile as the one most responsible for “business’s love affair with creativity” (p. 21). While remaining primarily invested in experimental research, Amabile (1996) was also among the first in the field to see the value of using qualitative tools, such as interviews, to supplement quantitative work. Certainly, Amabile and the Componential Model have invited the participation of other disciplines in evolving creativity research.

**Socio-Cultural Systems Model.**

Feldman, Csikszentmihalyi, and Gardner (1994) also proposed a three-part model of creativity, the Socio-Cultural Systems Model. This theory concentrates on (1) domain, (2) persons, and (3) fields as elements of the creative equation. Feldman et al. (1994) recognized the relevance of much of the research that has been reviewed thus far about the individual’s crucial role in the creative process. However, they extended the discussion to include the domain and the field where the creative individual works. The Socio-cultural Systems Model (Feldman, et al., 1994) highlighted the fact that, while the individual may be the source of a novel idea, novel is not necessarily appropriate, therefore not creative. Creative ideas are both novel and creative (Amabile 1996). Feldman et al. (1994) defined *field* as the range of experts, retailers, regulators, and users of a particular product or concept (Feldman, et al., 1994). These authors explained that the field evaluates the product or concept to determine whether it is truly creative, not just novel but also appropriate. Only truly creative ideas should be admitted to the domain in which it can be widely disseminated and preserved. The domain is the professional or vocational body of research or of practically developed knowledge, one example being the professional standard of care in the medical community, another example being the
generally accepted building codes. The impact of the field and domain are thus clearly social factors in creativity development (Sawyer, 2012).

**Investment Theory of Creativity.**

Sternberg and Lubart (1995) used the analogy of the stock market to illustrate their model, titled the Investment Theory of Creativity. Sternberg and Lubart (1995) explained the theory as based on the observation that creative individuals are willing to be non-conformists, to go against the crowd. Specifically, creative people buy low (Sternberg & Lubart, 1995), investing ownership and loyalty in ideas that others do not value. Creative people then refine and develop the idea until the concept becomes attractive to others, making it possible for the creators to “sell high” (Sternberg & Lubart, 1995).

One of the Investment Theory’s most attractive features is that, because it recognizes social impacts on creativity, it serves to remind the individual that a creative life is a choice. Some individuals are uncomfortable championing non-conforming viewpoints. Thankfully, some will rise to the challenge and endure the social price of promoting divergent new concepts. As the philosopher Arthur Schopenhauer was quoted as saying: “All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as ‘self-evident’” (Fitzhenry, 1993, p. 248). Creative individuals often endure ridicule for “buying low,” yet without their sacrifice, we would not find our valuable, “self-evident” truths.

**Darwinian Theory of Creativity.**

Weisberg (2006) maintains that Simonton’s (2003) social psychology theory of creativity is the most influential of the confluence theories, a theory based on a
Darwinian (Darwin, 1859) viewpoint of creativity. Darwinian Theories of Creativity recognize that the individual is influenced by “natural selection,” so there is a confluence of individual and contextual environmental impacts on creativity and creativity cultivation.

As discussed earlier, the Socio-cultural Theory of Creativity is a three-part model incorporating the creative Person, the Domain as a gatekeeper for admittance, and the Field, which is the body of practice that can sustain or disseminate the idea. While not specifically identified as a Darwinian model by the primary theory developers (Feldman et al., 1994), the Socio-cultural Model also has some Darwinian characteristics. Sawyer (2012) notes that the model, at its core, describes a Darwinian evolutionary process for creative ideas: the individual generating creative ideas is introducing variation, the field is filling the role of natural selection by filtering out bad ideas, and the domain mimics the retention of good properties of genes in the biological evolutionary process by preserving good ideas.

*Flow as a theory of creativity.*

Csikszentmihalyi (1990, 1996) interviewed 100 eminent individuals from disparate fields in an attempt to better understand the creative process. If motivation were the crucial element to creative effort, as many researchers had suggested (Amabile 1983, 1996), then the joy of creating would be a powerful aid to the creative process. Csikszentmihalyi’s (1996) interviews isolated the “overwhelming joy felt by creators during the creative process” (p. 2). Expounding on the richness and depth that joy can bring, he offered:
…creativity is so fascinating…that when we are involved in it, we feel that we are living more fully than during the rest of life. The excitement of the artist at the easel or the scientist in the lab comes close to the ideal fulfillment we all hope to get from life, and so rarely do. Perhaps only sex, sports, music, and religious ecstasy—even when these experiences remain fleeting and leave no trace—provide as profound a sense of being part of an entity greater than ourselves. But creativity also leaves an outcome that adds to the richness and complexity of the future. (Csikszentmihalyi, 1996, p. 2)

Csikszentmihalyi (1996) also taught that creativity is generated from “the synergy of many sources, and not only from the mind of a single person. It is easier to enhance creativity by changing conditions in the environment than by trying to make people think more creatively” (p. 1).

Csikszentmihalyi introduced, as a primary research mechanism, qualitative methods to the study of creativity (1990, 1996). His theory of Flow as it relates to creativity not only highlighted the psychological and the social impacts on creativity, but also provided some crucial data on the conditions that effectively frame creative work.

**Summary comments on socio-cultural confluent theories of creativity.**

Rhodes (1987) taught that four categories of variables influence creativity: (1) the person, (2) the product, (3) the process, and (4) the environmental contextual press. In the individualistic creativity research approaches, both personal traits of the person and the cognitive process itself were closely examined. In particular, product output characteristics were often used as the measuring devices to analyze personal traits and cognitive process correlations with creativity. The confluence models allow researchers
to also consider the simultaneous impact of environmental contextual press factors on creativity cultivation.

**Final comments on this Creativity Literature Review.**

This work concentrates on the literature that specifically founds, explains, or develops concepts of creativity cultivation. As such, it is not an exhaustive review of all creativity issues. For the reader interested in that broader and more inclusive review of creativity, I recommend Sawyer (2012), Runco & Pritzker (2011), Weisberg (2006), Kaufman, J. C., (2009), and Runco (2007).

**Organizational Theory Research**

As has been discussed, the latest psychological theories on creativity are described as confluent research theories, which stress that creativity development is a factor of both individual and contextual social factors (Feldman & Gardner, 2003). Individual context is a factor of the organizations that the individual lives within, such as family, education, work, and culture (Weisberg, 2006). However, it has been primarily business and educational researchers—who typically have limited exposure to the most evolved theories of creativity—who have developed organizational theory research (Zhou & Shalley, 2008). In comparison, psychologically based researchers of creativity have only limited involvement in organizational theory (Amabile, 1996). It is critical that the most evolved theories of creativity cultivation be integrated with the most evolved theories of organizational theory because creativity development is a confluent process involving both individual characteristics and social organizational context impacts. Amabile (1983, 1996) noted that that has not yet been done comprehensively. The design of this dissertation research is intended to integrate the most evolved confluent creativity...
research and organization theories, informed by the lived experiences of serially creative individuals. This dissertation, therefore, also frames the research within an organizational theory literature review.

Unlike the relatively recent advent of creativity research, references to organizational theory extend back to the beginning of human history. In 1491 BC, Moses’ father-in-law, Jethro, advised Moses to create a hierarchical delegation of authority over the various tribes of Israel during the exodus from Egypt (Exodus 18:13-26, King James). Most scholars, however, view the Industrial Revolution as the developmental catalyst for extremely cohesive and comprehensive studies of organization theory (Shafritz, Ott & Jang, 2011).

Most individuals intuitively recognize that an organization is most simply defined as a group of individuals coordinated to pursue common goals. With such a definition, the concepts of coordinating leadership as well as motivation to pursue common goals are important elements of organizational theory. Since organizational theory is grounded in these ideas (Hanson, 2003), most textbooks begin with a discussion of these concepts—as does this literature review.

**Leadership.**

Schein (1985), using his consulting experience as data, distinguished leadership from management and administration, placing responsibility for the architecture and custodianship of organizational culture on leadership: “What the leader needs most is insight into the ways in which culture can aid or hinder the fulfillment of the organization’s mission and the intervention skills to make desired changes happen” [emphasis in original] (Schein, 1985, p. 320).
There is a great amount of academic research on leadership in both psychology and business. Almost all of the resulting theories emphasize leadership as dealing with people, processes, and systems (Hanson, 2003). Some studies address one topic, and others address some or all of the three topics in combination.

**Power and leadership.**

French and Ravens (1959) relied upon the empirical work of others, primarily quantitative work, to develop important conceptual theories of power and leadership. The authors pointed out that leadership and power are closely related concepts, and identified five types of power (French and Ravens, 1959). *Legitimate power* is conferred because of divine right, statute, or appointment. *Reward power* is derived from the ability to confer benefits on the subordinate. *Coercive power* is derived from the ability to inflict punishment for non-compliance on others. *Expert power* is conferred as the result of demonstrated competency, skill, or knowledge. *Referent power* stems from the charismatic qualities of a person’s attractiveness, worthiness, and personal appeal.

French and Raven (1959) also noted that all power is exhaustible but the level of exhaustibility does vary somewhat by type. The more an individual uses power oppositionally, the more power that individual loses, and the less potency the individual has remaining. Power is the capacity to influence others; when power is very high it is the capacity to control others (Hanson, 2003).

**Trait theories of leadership.**

Before World War II, most leadership theories focused on leader traits (Hanson, 2003). However, such an approach ignores the impact of interactions with varying environments and varying subordinates with varying personal characteristics. The trait
studies failed to predict leadership effectiveness. Gouldner (1950) reviewed the literature on trait theories of leadership and effectively wrote of the death of this academic viewpoint, “At this time there is no reliable evidence concerning the existence of universal leadership traits” (p. 36).

**Fiedler’s Contingency Model of leadership.**

Fiedler (1971) offered a conceptual theory discriminating between relationship (consideration) motivated leaders and task (initiating structure) motivated leaders. Fiedler (1971) shifted emphasis from personal traits to the study of leadership behaviors and pointed out that leaders have a natural disposition but effective leaders can modify approaches based on the situation. Fiedler (1971) built upon the earlier Leader Behavior Description Questionnaire (LBDQ) of Hemphill and Coons (1957) which was the first work to focus on leadership behaviors as opposed to leader’s traits.

Fiedler (1971) defined eight situations based on these two factors. While the author’s work was initially conceptual, he invited and considered empirical confirming reviews of his work. Fiedler (1974) noted that the basic findings of the Contingency Model are that task-motivated leaders perform generally best in very favorable situations, i.e., either under conditions in which their power, control and influence are very high (or, conversely, where uncertainty is very low), or they perform best when the situations are unfavorable, situations in which they have lower power, control, and influence. Unlike the task-motivated leaders, relationship-motivated leaders tend to perform best in situations in which they have moderate power, control, and influence.
McGregor’s Theory X and Theory Y leadership styles.

Theory X and Theory Y also reflect a dichotomous view of appropriate leadership style, based on two widely divergent views of human nature (McGregor, 1960). McGregor’s (1960) work is conceptual as opposed to empirical in nature, and it offers valuable distinctions between leadership styles.

Theory X, reflected in classical organizational theory, postulates that workers are indolent, averse to responsibility, essentially devoid of ambition, and prefer strong intrusive leadership (McGregor, 1960). Workers are also seen as disinterested in organizational needs, except for when such needs affect them personally. Finally, workers are seen to be resistant to change, of limited intelligence, and likely to be easily led by rabble-rousers. As a result, Theory X expounds management behaviors that stress controls, coercion, and close supervision.

Theory Y, in contrast, presumes that most workers are far more evolved (McGregor, 1960). It assumes, for example, that most workers have concerns for organizational needs, that they derive satisfaction from their work, that they desire and grow with responsibility, and that they are capable of self-management. As a result, management behaviors in Theory Y stress cooperation, worker development, open communications, and respect.

Lewin, Lippitt, and White (1939) proposed a very similar view of leadership. These authors, however, suggested three types of leadership: autocratic, democratic, and laissez faire. Their principal contribution was the recognition that some managers are simply missing in action—or laissez faire.
**Situational leadership.**

Hersey and Blanchard’s (1977) Situational Leadership Theory also taught that optimal leader behavior depended upon the developmental level of subordinates. Under this theory, development level is a function of motivation and skill acquisition, and thus it can change over time—for example, as employees gain skill mastery or grow weary. The range in leadership behavior goes from directive to coaching to supportive to delegative, and is predicated on the level of employee development (Hersey and Blanchard, 1977).

**Transformational versus transactional leadership theories.**

Transactional leadership is a negotiated arrangement between the leader and subordinates in which both are satisfied with what is exchanged—for example, acceptable pay for acceptable performance. In contrast, transforming leadership “occurs when one or more persons engage [emphasis in original] with others in such a way that leaders and followers raise one another to higher levels of motivation and morality” (Burns, 1978, p. 11). Burns (1978) saw transforming leadership as fostering positive change for both employees and the organization by providing an energizing vision and attractive goals.

**Servant leadership.**

Greenleaf (1977) argued that the most evolved and most worthy form of leadership is grounded in service to others:

The servant-leader *is* servant first…It begins with the natural feeling that one wants to serve, to serve first. Then conscious choice brings one to aspire to lead. That person is sharply different from one who is leader [emphasis in original] first, perhaps because of the need to assuage an unusual power drive or to acquire
material possessions. For such, it will be a later choice to serve—after leadership is established. The leader-first and the servant-first are two extreme types. Between them there are shadings and blends that are part of the infinite variety of human nature. (Greenleaf, 1977, p. 27)

Greenleaf also offered interesting perspectives on the source of a leader’s power, and in doing so extended the French and Raven (1959) discussion of five sources of a leader’s power. Greenleaf (1977) noted the need to legitimize power with the consent of those supervised. As opposed to coercion or manipulation, Greenleaf (1977) suggested the servant leader’s power originates in non-coerced persuasion and example. In short, the leader’s power derives directly from her/his service:

Servants, by definition, are fully human. Servant-leaders are functionally superior because they are closer to the ground—they hear things, see things, know things, and their intuitive insight is exceptional. Because of this, they are dependable and trusted… (Greenleaf, 1977, p. 42).

Greenleaf taught that the servant leader works to ensure that no one is powerless, that everyone has the right to confer power to a leader without losing her/his own power (Greenleaf, 1977). This implied that the central issue of effective leadership was gaining the trust of those led so that they imparted power to the leader, in essence accepting that person’s leadership (Greenleaf, 1977). Greenleaf suggested that there was only one way to gain that level of trust: to truly serve (Greenleaf, 1977). By extension, Greenleaf defined the only reason for an organization to exist:

The only real justification for institutions, beyond a certain efficiency (which, of course, does serve), is that people in them grow to greater stature than if they
stood alone. It follows then that people working in institutions will be more productive than they would be as unrelated individuals. The whole is greater than the sum of its parts. (Greenleaf, 1977, p. 104)

Motivation.

Amabile (1996) and Weisberg (2006) both wrote that motivation is crucial to creativity cultivation, and organizational theory offers considerable guidance on the subject of motivation (Hanson, 2003). Baron defined motivation as “the internal processes that activate, guide, and maintain behavior” (1991, p. 1). Psychologists speak of two types of organizational and/or leadership behaviors that are intended to motivate, Goal Theory and Control Theory (Baron, 1991). In goal theory, some favorable goal is provided as the catalyst to build motivation. In Control Theory, the organization controls behavior to effectively force motivation, often using a negative feedback loop.

Organizational theorists offer a number of theories of motivation, some combining Goal Theory and Control Theory (Hanson, 2003). These theories of motivation fall into two categories, Content Theories of Motivation and Process Theories of Motivation (Hanson, 2003).

Content Theories of Motivation.

Content theories of motivation are based on five crucial assumptions (Luthans, 1981). First, individuals have needs or drives that compel their behaviors. Second, the needs begin to motivate when there is a deprivation or inadequacy felt. Third, needs are prioritized. Fourth, when an inadequacy is filled, the need no longer motivates, but higher order needs as yet unfulfilled will still motivate. Fifth, all individuals share the same needs and prioritization of those needs.
Maslow’s (1943) seminal Hierarchy of Needs has been widely referenced as one of the first theories of motivation reflecting all elements of a content theory. Maslow suggested six levels of needs, the first four identified, as *deficiency needs*. First, Maslow (1943, 1971) noted *psychological* needs for basic survival, such as air, water, food, shelter, sleep, and sex. Second, he noted *safety* needs, such as protection from predators, illness, job loss, economic disasters, and any other serious unexpected danger. Third, came *social* needs, such as friendship, comradeship, belonging, and peer approval. The fourth level isolated *esteem* needs, such as self-esteem, knowledge, achievement, positive reputation, and independence. Maslow (1943, 1971) identified the fifth and sixth needs as *being needs*, the fifth need identified as *self-actualization*, which he defined as the drive to fulfill one’s purpose in life. Finally, Maslow (1971) identified the sixth need as *aesthetic understanding*, which he defined as the need for an understanding of one’s ideal role in the world. Self-actualization and aesthetic understanding needs are the highest order needs in Maslow’s (1943, 1971) Hierarchy of Needs Model. Maslow (1971) explained needs at this level as a desire “to become everything one is capable of becoming” (p. 46). These include needs such as continued self-development and the release of creative energies. Finally, he (Maslow, 1971) noted that satisfied deficiency needs are not motivators, and that lower-level needs must be met before higher-level needs can be addressed. Pursuit of air is not a motivator until one cannot breathe normally. Moreover, if a person cannot breathe, he or she will not be focused on higher-order needs, such as esteem needs. Under Maslow’s theory, being needs, such as self-actualization and aesthetic understanding needs, become even more effective motivators.
as self-actualization increases. Self-actualization and aesthetic understanding needs fuel the desire for more self-actualization and aesthetic understanding, so they become very durable motivators.

**ERG Theory.**

Alderfer’s (1969) ERG (Existence, Relatedness, Growth) theory also focuses on classes of needs, but it identifies three classes of need as contrasted to Maslow’s (1971) five. First, Alderfer (1969) delineated existence needs, which correlate with Maslow’s physiological and safety needs. Second, he described relatedness needs, which correlate with Maslow’s social needs. Third, Alderfer (1969) noted growth needs, which correlate with Maslow’s self-esteem, self-actualization, and aesthetic understanding needs.

ERG theory differs in two other crucial ways from Maslow’s (1971) Hierarchy of Needs. First, Alderfer (1969) taught that, to some degree, all three categories of needs could co-exist simultaneously. For instance, very poor people worried about securing food may still seek social relationships. Second, Alderfer (1969) recognized a frustration-regression process, which refers to seeking greater satisfaction of a lower-level need when a higher-order need cannot be fulfilled. As an example, some people will over-indulge in eating when social needs are not being satisfied.

**Criticisms of content theories of motivation.**

There have been three significant criticisms of content theories of motivation. First, through coded and quantified interviews of senior managers aimed at assessing hypothetical situations, Korman, Greenhaus, and Badin (1977) determined that there was little empirical evidence to support the intuitive teachings of these theories. Second, assuming that all people have the same needs with the same prioritizations seemed to
present clear issues with face validity (Hanson, 2003). Finally, Drucker (1954) noted that these theories might be theories on satisfaction more than on motivation, two very different considerations (Drucker, 1954); some individuals can be extremely satisfied and simultaneously not motivated at all to do exemplary work.

**Process theories of motivation.**

These criticisms of the content theories of motivation led organizational theory researchers to look elsewhere to explain motivation, in particular to the study of process theories of motivation (Gabris & Simo, 1995). Process theory rejects the assumption that all people have the same needs in the same prioritized order. Instead, process theories assume that individuals use rational, cognitive processes to determine the best actions, given their personal goals, values, and capabilities. Proponents of process theories of motivation reject the concept that individuals have a basket of needs that activate upon deprivation (Gabris & Simo, 1995).

**Expectancy Theory.**

Vroom’s (1964) *Expectancy Theory* is a conceptual theory based on the experimental work performed by Georgopoulos, Mahoney, and Jones (1957). Georgopoulos et al. (1957) studied 722 individual incentive workers in a unionized, mid-size manufacturer of household appliances. Through the use of a quantitative analysis of questionnaire responses, Georgopoulos et al. (1957) examined rational and conscious responses of employees to compare to high or low individual productivity performance ratings. Vroom’s (1964) Expectancy Theory was in turn based on four assumptions drawn from this work: first, behavior is determined by the interwoven combination of personal forces and environmental forces; second, individuals make conscious decisions
about their organizational behaviors; and third, each person has unique needs, goals, desires, and values; fourth, individuals will make decisions about which alternative behaviors to pursue based on their judgments (expectancies), of those behaviors most likely leading to their desired outcomes.

Expectancy theory predicts motivation if three situations exist (Vroom, 1964). The individual must first believe that high levels of effort will allow him/her to do quality work. The next belief,instrumentality, is the belief that high quality work will lead to the desired reward. And valence describes the individual’s belief that the reward is valuable and desired. People who feel that even high effort on their part will not result in high quality work, or who feel high quality work will not be rewarded, or who believe the reward offered is not valuable, will tend to be un-motivated people.

House (1971) proposed a Path Goal Theory of Leadership based upon the Expectancy Theory of Motivation. In the Path Goal Model, the leader’s role is to clearly define the goals, make the path more obvious, and help workers remove obstacles on the path to the goal (House, 1971).

Lawler-Porter Model of Expectancy Theory.

Porter and Lawler (1968) conceptually extended Expectancy Theory by pointing out that organizational theory is cyclical, with intervening events on each cycle. Under this theory, an employee who was sure that a brilliantly written research report would garner deeply desired personal rewards will not have the same motivation on the next research report if she or he did not find the first experience to deliver the benefits expected.
Criticisms of process theories of motivation.

Three primary criticisms of process theories of motivation have been raised (Gabris & Simo, 1995). The first criticism has rested on the observation that the process theory models of motivation presume individuals make rational decisions as to appropriate behavior. Many times that does not happen; for instance, an employee may have good results with one behavior so does not consider all possibilities, possibilities that may include an even better behavioral alternative. The second criticism has been that process theories relate only to voluntary and noticed employee behaviors; this criticism has pointed out that there are many required behaviors, such as those spelled out in a union contract or by professional standards, and often individuals work as part of a team so that individual efforts are hard to discern. Finally, as with content theories of motivation, a third criticism has been that little empirical evidence has been offered in support—that these are primarily only conceptually developed theories (Sawyer, 2012).

Organizationally descriptive theories.

Building upon the work in leadership and motivation, researchers have developed comprehensive organizationally descriptive theories. Hanson (2003) taught that there are three primary organizational theories: (1) classical, (2) sociopolitical, and (3) open systems. Additionally, Hanson (2003) discussed the comparative theories by focusing on 13 recommended organizational characteristics: (1) structure, (2) power distribution, (3) goals, (4) communication channels, (5) communication purpose, (6) control, (7) leadership, (8) power, (9) leadership style, (10) conflict attitude, (11) environmental view, (12) view of employees, (13) employee motivation, and (14) view of employee value estimation.
The preferred organizational characteristics prescribed by each theory, as well as a review of the relevant literature for each organizational theory follows. Table 1 provides a brief comparative organizational theory recap to ground that discussion. I used Hanson’s (2003) thirteen recommended categories of organizational descriptors to characterize the three current organizational theories he also identified. Descriptions within each category, for each theory, were drawn from the primary research data that are specifically detailed in the table and in the text following the table. Hanson (2003) also summarized details of each theory, but the descriptions below are mine, drawn from the original works.

Table 1
Comparison of Current Organizational Theories

<table>
<thead>
<tr>
<th></th>
<th>Classical</th>
<th>Sociopolitical</th>
<th>Open Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td>Rigid hierarchy (Smith, 1776)</td>
<td>Negotiating groups of sociopolitical coalitions, within the organization (Mayo, 1933)</td>
<td>Interacting sociopolitical groups, from organization and environment (Katz &amp; Kahn, 1966)</td>
</tr>
<tr>
<td>Power</td>
<td>Centralized at the top of the hierarchy, shared only as delegated (McCallum, 1856; Smith, 1776)</td>
<td>Diffused into sociopolitical groups (Mayo, 1933)</td>
<td>Delegated into sub-systems and balanced by the power of the environment (Katz &amp; Kahn, 1966)</td>
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<tr>
<td></td>
<td>Classical</td>
<td>Sociopolitical</td>
<td>Open Systems</td>
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<tr>
<td><strong>Goals</strong></td>
<td>Formal (Fayol, 1916/1949; McCallum, 1856)</td>
<td>Formal and informal, sometimes conflicting (Roethlisberger, 1941)</td>
<td>Informal, perhaps implicit and unstated, environmental needs and requests dictate goals and actions (Scott, 1981)</td>
</tr>
<tr>
<td><strong>Communication Channels</strong></td>
<td>Formal and one-way, top down, organizationally confined (Smith, 1776)</td>
<td>Two-way, both formal and informal, organizationally Confined (Gardner, 1945)</td>
<td>Two-way, both system wide and linking organizational groups with environmental stakeholders (Scott, 1981)</td>
</tr>
<tr>
<td><strong>Communication Purpose</strong></td>
<td>To transmit management commands (Fayol, 1916/1949)</td>
<td>To follow interests of groups (Gardner, 1945)</td>
<td>To draw organizational groups and environment together (Parsons &amp; Shils, 1962)</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>Established by firm rules (Taylor, 1911)</td>
<td>Established by group norms (Gardner, 1945)</td>
<td>Established by effectiveness of environmental linkages (Katz &amp; Kahn, 1966, 1978; Scott, 1981)</td>
</tr>
<tr>
<td><strong>Leadership power</strong></td>
<td>Legitimate, reward, or coercive (McCallum, 1856)</td>
<td>Expert (Shafritz, Ott, &amp; Jang, 2011)</td>
<td>Referent/Charismatic (Katz &amp; Kahn, 1966, 1978; Scott, 1981)</td>
</tr>
<tr>
<td><strong>Leadership style</strong></td>
<td>Trait Transactional (Taylor, 1911)</td>
<td>Contingency Situational (Roethlisberger, 1941)</td>
<td>Transformational (Carroll &amp; Hannon, 2000)</td>
</tr>
<tr>
<td></td>
<td>Classical</td>
<td>Sociopolitical</td>
<td>Open Systems</td>
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<tr>
<td><strong>Conflict attitude</strong></td>
<td>Conflict is inefficient and must be avoided (Gilbreth, 1948; Weber, 1922, 1964)</td>
<td>Conflict is inevitable, response determines whether it is positive or negative (Mayo, 1933)</td>
<td>Conflict is necessary for continuous positive change (Katz &amp; Kahn, 1966, 1978; Pfeffer &amp; Salanckik, 1978)</td>
</tr>
<tr>
<td><strong>Environmental view</strong></td>
<td>Hold environment at bay, prohibiting environmental influences as they can produce inefficient conflict (Gilbreth, 1948)</td>
<td>Tolerate environmental influences, as they are inevitable (Gardner, 1945)</td>
<td>Embrace environmental influences to bring organizational views into agreement with environmental views and needs (Scott, 1981)</td>
</tr>
<tr>
<td><strong>View of employees</strong></td>
<td>Theory X, employees are lazy, requiring close supervision (Fayol, 1916/1949)</td>
<td>Theory X/Y, employees will self-manage but not inherent to do so, thus some management needed (Roethlisberger, 1941)</td>
<td>Theory Y employees have inherent desire to environmentally assimilate, which works to organizational advantage (Scott, 1981)</td>
</tr>
<tr>
<td><strong>Employee motivation(s)</strong></td>
<td>Money and working conditions are main employee motivators, Maslow’s Hierarchy reliance (McCallum, 1856)</td>
<td>Employee motivation extends beyond economic and working conditions, ERG theory reliance (Gardner, 1945)</td>
<td>Employees are intrinsically motivated if supported, Expectancy theory reliance (Scott, 1981)</td>
</tr>
</tbody>
</table>
Classical Sociopolitical Open Systems

| Employee value          | Employees are interchangeable (McCallum, 1856; Smith, 1776) | Employees bring unique skills to their jobs (Mayo, 1933) | Employees bring unique skills to their jobs (Scott, 1981) |

(Hanson, 2003)

**Classical Organization Theory.**

The advice from Moses’ father-in-law (Exodus 18:13-26, King James) was an example of Classical Organization Theory. Military organizations are often examples of Classical Organization Theory (Hanson, 2003). So what defines Classical Organization Theory?

**Definition of Classical Organization Theory.**

Hanson (2003) explained the crucial characteristics of classic organizational theory. These characteristics include the following: rigid hierarchies, centralized power, formal organizational goals, and one-way formal communication from the top down for transmission of orders and commands. In a classical organization, control is firm and legitimate. Reward or coercive leadership is typically employed. This control and leadership are based on organizational position. Conflict is avoided as inefficient. Theory X is relied upon, and the assumption is that employees require close supervision because they are inherently lazy. Proponents of Theory X embrace transactional leadership practices and presume employees to be motivated by money and working conditions only; they also consider individual employees essentially interchangeable. Classically organized systems are closed to their environments, because inviting the environment in
would be disruptive and inefficient. For some missions, a classical theory of organization may have advantages since it allows quick response (Hanson, 2003). As noted above, most military organizations are classical organizations, and they of course depend on quick response.

Classical organizational theory is based upon four principles (Shafritz, et al., 2011). The first principle holds that organizations exist for only one reason, to economically produce goods. The second principle argues that there is one and only one best way to produce, and that way can be isolated through scientific investigation. The third principle is that specialized division of labor will increase productive output. And the fourth principle is that organizations and individuals behave in accordance with rational economic principles.

A number of seminal researchers helped shape the details of Classical Organization Theory. Smith (1776), the Englishman credited as being the first to academically study economics, published *An Inquiry into the Nature and Causes of the Wealth of Nations*, in which the crucial tenets of classical theory were identified as division of labor, centralization of power and machinery, and advantages of worker specialization to a small part of the productive process. McCallum (1856) was the general manager of the New York and Erie Railroad when he wrote his famous *Superintendent’s Report*. In that report, he summarized some general business practices inherent in classical theory that he considered “settled and necessary” (McCallum, 1856, p. 3), calling for divided responsibility, delegated power commensurate with delegated authority, and timely performance feedback. Weber (1922) embraced the same characteristics of classical or bureaucratic theory suggested by Smith (1776). Weber
(1922, 1964) taught that affective attitudes, emotional involvement, and personal feelings interfered with efficiency. Just as military organizations discourage fraternization between enlisted members and officers, Weber (1922, 1964) argued for large inter-personal distances between workers and managers. Weber (1922, 1964) also emphasized the need to routinize problem solving so that incoming questions could be handled in a proven, systematic, and predictable way. Developing unique solutions would require inordinate amounts of planning, whereas standard operating procedures make the process more efficient. Weber (1922/1964) also provided the still much-used definition of authority, as “the probability that an individual’s instructions will be followed by others” (p. 325).

Taylor (1911) powerfully advocated the application of scientific methods to the planning and operation of the factory floor. Apostles of the scientific methods developed various methodologies to facilitate the execution of these scientific principles, and many of these tools are still in use today. Gilbreth (1948), working with his wife, pioneered time and motion studies. Gantt developed the now ubiquitous Gantt Chart to track project progress and output (Alford, 1932). It is difficult to overstate the revolutionary influence that Taylor provided:

Whatever his limitations, and shortcomings and he had many—no other American, not even Henry Ford, has had anything like Taylor’s impact. “Scientific Management” (and its successor “industrial engineering”) is the one American philosophy that has swept the world—more so even than the Constitution and the Federalist Papers. In the past century, there has been only
one worldwide philosophy that could compete with Taylor’s, namely Marxism.

In the end, Taylor has triumphed over Marx. (Drucker, 1999, p. 82)

Fayol (1916/1949) applied many of Taylor’s teachings but concentrated on administrative duties of planning, organizing, commanding, coordinating, and controlling. Fayol’s (1916/1949) work, therefore, was more easily applicable to non-manufacturing organizations such as service industries than was the work of other classical theory researchers (Burke, 2011).

*Researcher orientation and methods.*

Without exception, these classical organization theorists based their theories upon their own work, their military experiences, or their family experiences. The work was conceptual as opposed to empirical (Shafritz, Ott, & Jang, 2011).

*Espoused versus actual organizational theory orientation.*

Classical bureaucratic organizational theory began to wane in the 1930s (Shafritz et al., 2011) but is still widely used and influential. My own personal experience is that many organizational leaders who maintain they espouse a more contemporary theory of organization actually tend to operate in bureaucratic ways that are more classical, especially during times of crisis. Why this might be so is easy to understand:

The chief merit of bureaucracy is its technical efficiency, with a premium placed on precision, speed, expert control, continuity discretion, and optimal returns on input. The structure is one that approaches the complete elimination of personalized relationships and non-rational considerations (hostility, anxiety, and affectual involvement). (Merton, 1957, p. 196)
**Sociopolitical Organization Theory.**

Classical theory presents the world as a very rational and predictable place. The top manager rationally moves her or his organization toward the best future, relying on singular authority to manipulate pay rates and working conditions (Tomasco, 2010). Sociopolitical Organization Theory, however, posits that rationality is not the sole determinant of organizational and personal actions.

*Hawthorne experiments.*

In 1924, a research team from the National Academy of Science’s National Research Council arrived at the Western Electric Hawthorne Plant in a suburb of Chicago (Shafritz et al., 2011). The team’s goal was to find ways to increase productivity utilizing the principles of the Classical Organization Theory. The work was one of the first experimental tests of the Classical Organizational Theory. The research concentrated on varying environmental working conditions to see the impact on productivity and worker contribution. The predicted results, suggested by organizational theory, did not materialize; and the research team was stymied. General Electric invited Mayo, a professor of industrial research at Harvard, to take a team in to examine the situation (Shafritz et al., 2011). Mayo’s team eventually included researchers Roethlisberger, Humans, and Whitehead, who helped define the Sociopolitical Organizational Theory (Shafritz et al., 2011). Mayo’s team found that results were not as predicted because the individual workers were not responding to the varying stimuli as individuals, they were responding as members of informal sub-groups (Roethlisberger, 1941). Further, the researchers found that the attitude of the sub-group to the organization’s goals could be
influenced if the organization listened respectfully to the group’s concerns and needs (Roethlisberger, 1941). Since Classical Organization Theory posits that motivation is derived entirely from pay and working conditions, the Hawthorne studies caused a major rethinking of organizational theory, and the emergence of Sociopolitical Organization Theory (Hanson, 2003).

*Defining Sociopolitical Organizational Theory.*

Sociopolitical Organizational Theory has significant philosophical differences with Classical Organizational Theory (Hanson, 2003). The sociopolitical theory relies upon elements of both Theory X and Theory Y viewpoints, and leadership style is seen as typically situational and/or contingency based. The sociopolitical organizational theory recognizes that much work occurs through sub-groups within the organization negotiating roles and rules with one another (Mayo, 1933). Power is organizationally sanctioned but recognized as being diffused through the various sub-groups (Mayo, 1933). There is also a recognition that both the organization’s formal goals and the sub-group’s informal goals exist, and that those goals can be at cross-purposes (Mayo, 1933). Communication is two-way, both formal and informal, and filtered by sub-groups’ respective self-interests and attitudes (Mayo, 1933). Control is most clearly established by group norms, implying the need for situational leadership to adjust to the particular circumstances of any particular issue (Roethlisberger, 1941). Conflict is seen as inevitable, and not necessarily negative if managed properly (Shafritz et al., 2011). Sociopolitical system managers often rely on the ERG motivational model. The presumption is that employee motivation can and should be nurtured, extending beyond simple equations of pay and
working conditions (Mayo, 1933). Employers recognize workers for bringing their unique skills to the workplace (Mayo, 1933). Finally, Shafritz et al., (2011) noted that environmental intrusion is inevitable and tolerated. Sociopolitical theory maintains that the employee and the organization (Roethlisberger, 1941) must mutually value goals. Employees should have a feeling that the company’s goal is worth their effort: they should feel themselves part of the company and take pride in their contributions to its goal. This means that the company’s objectives must be such as to inspire confidence in the intentions of management and belief that each will get rewards and satisfactions by working for these objectives. (Gardner, 1945, p. 283)

In summary, Sociopolitical Theory teaches that the most satisfying organizations would also be the most efficient (Hanson, 2003). Effective managers recognize that influential sub-groups will always exist, and bringing sub-group goals into line with organizational goals is far more likely to be successful than trying to defeat sub-groups (Gardner, 1945). Open, two-way channels of communication can help employees structure their work environment and offer constructive suggestions (Roethlisberger, 1941). The Human Relations Organizational Theory teaches that this democratization of the work environment will help management and workers resolve disputes in a respectful, cooperative way (Hanson, 2003).

*Researcher orientation and methods.*

Sociopolitical organization theorists, informed by the Hawthorne work, have relied heavily on the experimental model to test conceptual theories (Hanson, 2003). That experimental work, however, often must rely on self or peer categorizations of the
impact of changes, and as such is influenced by individual perceptions and cultural conditionings (Runco, 2008)

**Open Systems Organization Theory.**

Open Systems Organization Theory is unique in that it recognizes the interdependencies between an organization and its environment (Katz & Kahn, 1966). Open systems theory views interdependence as a basic construct of an organization.

The most general and fundamental property of a system is the interdependence of parts or variables. Interdependence consists of the existence of determinate relationships among the parts or variables as contrasted with randomness of variability. In other words, interdependence is order in the relationship among the components, which enter into a system. (Parsons & Shils, 1962, p. 107)

**Defining Open Systems Organizational Theory.**

Open Systems Organizational Theory envisions organizational structures as having porous boundaries with the environment at large (Hanson, 2003). Power is centered in organizational sub-systems and is balanced by environmental power (Hanson, 2003). Environmental needs dictate goals. Communication channels are system wide, extending into the environment (Scott, 1981). The purpose of communication is to draw the organization into closer synergy with the environment (Katz & Kahn, 1966, 1978). The effectiveness of environmental linkages determines control (Katz & Kahn, 1966, 1978). Theory Y teachings guide many leadership behaviors. Since the environment’s needs can change quickly, transformational leadership styles are often particularly effective (Scott, 1981). Conflict is necessary and welcomed as a positive contribution to continuous positive change (Katz & Kahn, 1966, 1978). Expectancy theories of
motivation are often relied upon by open systems’ managers. The open system organization views employees as offering unique contributions, and as inherently motivated if provided support (Hanson, 2003). One of the most basic differences between Open Systems Theory and the Classical and Sociopolitical Organizational Theories is Open Systems Theory’s embrace of the environment as part of the organization (Parsons & Shils, 1962).

*Institutional Theory.*

*Institutional Theory* offers important caveats for open system theorists, and rests on the belief that socially accepted norms of what is proper and valuable has, in part, formed the world environment. These socially accepted norms become “rationalized institutional rules” (Meyer & Rowan, 1977, p. 340). Institutional theorists further teach that an organization’s conformity to the socially expected and accepted environmental norms enhances its survivability (Meyer & Rowan, 1977). When socially expected norms and organizationally demonstrated norms align, the environment can provide validation and support for the institution. However, there can be tensions between social norms and typical business organization goals for efficiency and effectiveness (Hanson, 2003).

*Resource Dependency Theory.*

Resource Dependency theorists provide important support for open system theories, and teach that serving environmental needs is a condition for organizational survival (Pfeiffer & Salancik, 1978). The environment provides the necessary inputs for the organization to sustain itself in return for desired outputs. These authors taught that
as a result you could not understand organizational behavior and structure unless you also understand the environmental context in which the organization operates.

Organizational Ecology Theory.

Organizational Ecology Theory also supports open system organizational theories, and explains the organizational life process using Darwinian biological terms (Carroll & Hannan, 2000). The Organizational Ecology Theory focuses on populations of organizations in order to explain why some types of organizations survive and some do not. Carroll and Hannan (2000) taught that environmental selection is the primary reason for organizational change, as opposed to internally selected and generated organizational adaption. The environment discriminately selects to support organizations based on the fit between organizational form and environmental needs. The higher the internal or external pressures, which occur because of an organizational environmental mismatch, the more organizational resources must be consumed addressing the pressure; therefore, fewer resources are available to be devoted to internal adaption. When there is no or minimal internal or external pressure, there is organizational and environmental congruence and no need for internal adaption. Thus, environmental selection is always favored over internal adaption.

Researcher orientation and methods.

Open system organization theorists have relied heavily on conceptual, non-experimental work (Hanson, 2003). The difficulty of influencing and controlling environmental inputs makes experimental modeling exceedingly difficult (Hanson, 2003).
Organizational Creativity Research

There is also some limited research on organizational creativity. However, there is no comprehensive structure mirroring the Hanson (2003) framework used to describe the Classical, Sociopolitical, and Open Systems organizational theories (Amabile, 1996).

Recognizing the need for organizational creativity.

Steiner’s (1965) *The Creative Organization* provided the first major examinations of organizational designs to facilitate creativity. The book summarizes a seminar of “16 eminent scientists, scholars, and executives” (p. 1). These individuals were involved in creativity research as psychologists or sociologists, administered educational institutions that developed creators, or had either founded or nurtured creative organizations. The McKinsey Foundation for Management Research funded the seminar, which was held in February 1962 at the University of Chicago Graduate School of Business. The work was valuable because it focused attention on the vital need to adapt organizational theory based upon the pressing evolving social needs for accelerating creativity.

Theory Z.

Maslow’s (1971) Theory Z described organizations where self-actualization is or can become transcendent, which directly facilitates creativity. While Maslow’s work on Theory Z was theoretical rather than research-driven, it is interesting that later research reinforced many of his observations. Theory Z clearly anticipated organizational impacts on creativity and self-actualization.

KEYS: The work environment for creativity.

Amabile, Conti, Coon, Lazenby and Herron (1996) made a seminal contribution to creative systems organizational theory: the KEYS instrument for assessing the climate
for creativity within organizations. To isolate the conditions for creativity “stimulant scales” (Amabile, et al., 1996, p. 1158) or on creativity “obstacle scales” (Amabile, et al., 1996, p. 1158), these researchers began with a review of existing literature. The researchers then interviewed 120 research and development scientists, asking them to describe a high-creativity work experience and a low-creativity work experience. Existing literature suggested typical areas for which to code in the transcription and coding of these interviews for recurrent themes. The most frequently coded themes constituted the creativity stimulation and creativity obstacle scales used in the continuing research (Amabile, et al., 1996). Amabile et al. (1996) tested the validity of the KEYS creativity stimulant and creativity obstacle scales with work at a 30,000-employee firm dubbed “High-Tech Electronics” (Amabile, 1996, p. 1159). Researchers drew managers from four of the firm’s divisions and asked them to complete a Likert scale questionnaire. The questionnaire utilized questions designed to describe the manager’s perceptions of KEYS-identified organizational conditions that were part of the creativity stimulations and creativity obstacles scales. Each manager was asked to complete a questionnaire on a project that he or she felt provided high-creativity outputs and to complete another questionnaire on a project that he or she felt provided low creativity outputs. Amabile et al., (1996) then used quantitative analyses of these personal and peer evaluations of the organizational conditions to verify that the nine KEYS-identified organizational characteristics either cultivating or inhibiting creativity cultivation were valid characteristics. The researchers identified that work group supports, encouragement of creativity, freedom/autonomy, sufficient resources, and challenging work had positive impacts on creativity (Amabile et al., 1996). The researchers also identified that
insufficient resources, workload pressure, and organizational impediments had a negative impact on creativity (Amabile et al., 1996).

**Interactional Model of Creative Behavior.**

Woodman, Sawyer, and Griffin (1993) offered one of the first multilevel organizational views of creativity, based on the conceptual review of previous theories. They based much of their analysis upon the *Interactional Model of Creative Behavior* (Woodman & Schoenfeldt, 1990), which is also conceptual in nature. The interactional model taught that simultaneous and interactive personal and situational forces influenced creative behavior. Building on Amabile’s (1996) work on the importance of motivation to creativity, Woodman et al. (1993) taught that individuals have predispositions to think creatively or predispositions not to think creatively, but also that cross-level factors can influence those predispositions. These authors noted that dynamics at the individual, group, and organizational level interact and influence one another. They noted that this complex interplay has powerful impacts on creative behavior at all three levels.

The multi-level organizational studies of creativity are also confluence theories because they theorize multiple causes of creative behavior (Woodman et al., 1993). However, these theories also offer uniquely valuable information from an organizational theory perspective by concentrating on the interplay of hierarchical influences between individuals, groups, and organizations.

**The individual, the group, and the organization as creative players.**

Mumford (2000), in a review of existing work, also pointed out that human relations and management behaviors must address individual, group, and organizational levels in order to cultivate creativity. He pointed out that each level needs different
actions and monitors, and that those actions often must be fine-tuned for the particular situation.

**Theory of Creative Action in Multiple Social Domains.**

Similarly, Ford (1996) argued that organizations have powerful impacts on individual creativity, and by extension, on group and organizational creativity. He believed that any study of creativity must therefore include multi-systems analysis of group influences, and especially of organizational influences. Ford (1996) taught that creativity and habit are competing tendencies and that the very nature of organizations typically reinforces habitual, non-creative individual and group behaviors. Ford’s point is supported when we consider the control and standardization implicit in the very definition of *organization*:

A social unit of people that is structured and managed to meet a need or to pursue collective goals. All organizations have a management structure that determines relationships between the different activities and the members, and subdivides and assigns roles, responsibilities, and authority to carry out different tasks ("Organization," 2013).

**Attraction-Selection-Attrition Framework.**

Ford (1996) noted that one of the most critical features of individuals within organizations are the common frames of reference, habits of thought, and habits of action that the culture rewards. *The Attraction-Selection-Attrition Framework* (Schneider, 1987) posited that organizations behave the way they do because each organization attracts, selects, and retains certain types of persons who act in common ways. Hence, organizations have a strong tendency over time to become more homogenous. Habits and
limited frames of reference narrow the range of behaviors and creative expressions. Ford (1996) noted that even in circumstances that clearly call for creative action, individuals cultured within an organization would likely pursue familiar behaviors based on relative ease, conformance reinforcements, past successes, and certainty of outcomes. Another researcher made similar points:

Once particular sets of social arrangements are in place, they embody sunk costs—economic and psychological—that cannot be recovered. Shared expectations arise that provide psychological security, reduce the cost of disseminating information, and facilitate the coordination of diverse activities. Efforts at change are often resisted because they threaten individuals’ sense of security, increase the cost of information processing, and disrupt routines. Moreover, established conceptions of ‘the way things are done’ can be very beneficial; members of an organizational field can use these stable expectations as a guide to action and a way to predict the behavior of others. (Powell, 1991, p. 94)

**Groupthink.**

Janis (1971) studied decision making that resulted in major fiascos: the Bay of Pigs invasion, the Titanic, the Johnson administration’s escalation of the Vietnam War, and the failure to anticipate an attack on Pearl Harbor during 1941. Janis (1971) reported that horribly flawed decisions were made in all of these instances because of an overarching desire for conforming concurrence-seeking in a cohesive organization at the expense of an intellectually rigorous evaluation of all alternatives. Janis (1971) referred to the phenomenon as Groupthink, and pointed out the tendency was habitually natural, often subliminal, and extremely powerful. It is obvious that Groupthink will have dire
consequences for an organization, leading members to overestimate their capabilities and depriving them from the full environmental feedback needed to determine the best future directions and decisions strategically.

**Adaptive capacity.**

Ford (1996), using an exhaustive review of existing research, delineated three organizational processes that encourage habitual actions conforming to the organizational culture; (1) mimetic imitation based on previous successful scripts, (2) coercive political pressure, and (3) normative rules of professionalization. Because of this, Ford (1996) noted that creative actions must carry a clear relative advantage to conforming actions or those within organizations will not pursue them. A crucial way to do that is to build the organization’s *adaptive capacity* to recognize the value of new ideas, internalize them, disseminate them, and utilize them, which can only happen in conjunction with tolerance for risk (Ford, 1996). Acquiring adaptive capacity is cumulative and becomes easier with practice (Cohen & Levinthal, 1990). An organization that foregoes adaptive capacity as soon as it is available in a particular domain may never be able to cost effectively catch up (Cohen & Levinthal, 1990). An organization that does not develop adaptive capacity is also likely to miss emerging opportunities (Ford, 1996). Taken together, it is easy to see that a firm without adaptive capacity skills may never recover. In contrast, acquiring absorptive capability can lead to higher organization aspirational levels (Ford, 1996). The level of aspiration or decision criteria can modify the organization’s degree of risk tolerance. Accepting more risk simultaneously means having greater chances of failure and having greater chances of not foregoing opportunities that could have been fruitful. Organizations must eventually find an equilibrium state where they are comfortable with
the risk of failure and the amount of foregone opportunities (Ford, 1996). As important as absorptive capacity is for organizational survival, even organizations that actively pursue absorptive capacity will face tremendous obstacles actually acquiring it. Shapira (1995) interviewed over 700 managers and found they reported almost universal imbalances between the personal benefits of successful creative activities and the extremely negative personal consequences of a single failure. Over time, these imbalances encourage individuals to favor conservative approaches over more risky creative ideas even if their espoused values are pro-creativity (Ford, 1996).

Senge’s Learning Organization

Senge’s (1990) *The Fifth Discipline* outlined a plan for developing and supporting learning organizations based on his consulting work with many businesses. In the broad sense, learning organizations are the precursor to creative organizations. Organizations must learn in order to extend knowledge creatively. As a result, Senge’s (1990) five learning organization prescriptives mirror the type of creative organization guidance offered by the other creative organization researchers previously discussed. Firstly, systems thinking is critical (Senge, 1990). Organizations are systems with inter-related parts. Everything affects everything else; the full system must be the basis of all problem analysis. Secondly, personal mastery is also required (Senge, 1990). Personal mastery is the commitment to perpetual learning in order to refine and focus perceptions and to sharpen observational skills. Thirdly, understanding mental modeling is also a crucial part of creating learning organizations (Senge, 1990). Mental models or ingrained assumptions serve as filters that affect the interpretation of “reality” and structure reactions (Csikszentmihalyi, 1990). Those mental models and filters are essential to
prioritize the barrage of often extraneous inputs assualting the mind during every second of consciousness. However, these filters can become unconscious blinders that prevent the exploration of new and promising concepts (Csikszentmihalyi, 1990). Fourthly, building shared vision within the organization is also very important (Senge, 1990). Shared vision binds people in common purpose, informs individual actions, and motivates all parts of the organization (Senge, 1990). Fifthly, team learning offers important advantages while forming learning organizations (Senge, 1990). Dialogue generates team learning, which encourages synergistic learning based on individual contributions and shared understandings (Senge, 1990).

**Multiple level theorizing about creativity in organizations.**

Drazin, Glynn, and Kazanjian (1999) offered a multilevel model of creative processing in longer term, major organizational projects. A conceptual review of earlier literature was the basis of their model. The researchers found that the initial project phase is one of social negotiation, where the groups within the organization effectively divide creative project responsibility. Intervening crises such as production delays or cost over-runs reallocate responsibility to the organizational group with responsibilities in the crisis area. When the crisis is addressed the process returns to the negotiated relative division of responsibilities. Repeated crises in the same areas will eventually lead to a renegotiation of relative division of creative responsibilities between organizational groups. Drazin et al.’s (1999) work is uniquely valuable since it is one of the few theories that addresses creative processing (as opposed to output studies) within large multilevel organizations.
Impact of social ties strength and centrality.

Perry-Smith and Shalley (2003) made some interesting points conceptually applying social network theory to organizational creativity. These researchers demonstrated that weaker social ties allow the expression of divergent viewpoints necessary to creativity. Perry-Smith and Shalley (2003) also noted that a peripheral position in the organizational social network encourages more diverse linkages outside of the organization and those divergent viewpoints can encourage creative thinking. Finally, they taught that as individuals generate creative work they tend to spiral toward centrality, decreasing diverse contacts, and all too often developing a blinding investment in the status quo.

Corporate control and firm innovation.

Mergers and acquisitions have become increasingly common (Steinmetz, 1995). Hitt, Hoskinson, Johnson, and Moesel (1996) utilized Standard & Poor’s COMPUSTAT Annual Data Tape reporting to isolate firms in the industrial manufacturing sector with reported research and development expenditures and total assets of at least $25 million dollars. For the isolated 250 firms, the researchers drew information on divestures and acquisitions from the Wall Street Journal Index, Compact Disclosure filings, and the popular business press. Hitt et al. (1996) also attempted personal contact with the firms’ CEO or CEO designee and solicited firm information through the use of a survey instrument. The researchers were able to receive that additional information from interviews and/or completed surveys for 36.9% of the identified firms; however, elimination of some responding firms from the study was necessary due to the unavailability of other needed data. Eventually 130 firms were included in the
correlation and regression analysis. Hitt et al. (1996) found that as a firm’s intensity of efforts in mergers or acquisitions increased, they emphasized financial controls and de-emphasized strategic controls, the result being a decrease in internal innovation. Additionally, they found that these firms tended to pursue the acquisition of external innovation in an attempt to gain competitive advantage (Hitt, 1996). Unfortunately, as the acquired innovative firms were socialized into the acquiring firm’s finance and strategic controls, creativity levels tended to equalize over time at the lower level of the acquiring firm (Hitt, Hoskinson, Johnson, & Moesel, 1996). These researchers noted that firms with an active portfolio strategy must recognize that the strategy influences innovation; they advised that acquisition and divestment activities must include an assessment of innovation and creativity impact.

**Creativity, innovation and the external environment.**

Mumford, Scott, Gaddis, and Strange (2002) reviewed existing literature and found that three crucial variables stimulate creativity and innovation within organizations -- available new technology, market demand, and environmental turbulence. This implies that the more open the organization is to the environment, the more likely the organization will be aware of and responsive to new technologies, new demands, and environmental turbulence that can reveal new opportunities. Current business environments offer a dizzying pace of new technologies. The market is voracious for those new developments, and globalization has created economic turbulence of an unprecedented scope. Mumford (2012) theorized that these exact external environmental conditions are the reasons that creativity and innovation have become such highly prized business skill sets.
**Employee role and value.**

The demand for creative solutions has caused many organizations to focus not on cheap workers, but instead on hiring individuals with “brainpower both natural and trained, and especially the ability to think creatively” (Fymire, 2006, p. 1). Similarly, Baer & Oldham (2006), based on a review of existing literature, reported that considerable evidence now suggests that the creativity of employees can have a significant impact on an organization’s competitiveness and survival.

**Organizational collaborations for creativity.**

Hargadon and Sutton (1997) utilized qualitative methods such as interviewing and ethnographic analysis to study the organizational structure of IDEO, the legendary creative design firm. They reported huge advantages when the organization rewards and values collaborative assistance. IDEO expected engineers to ask for help as needed, and to enthusiastically provide help when asked. Engineers delivering failed projects were not penalized if they had sought out advice from as many sources as possible. However, there was a poor view of engineers delivering failing projects not characterized by technology outreach.

Supporting the value of collaborative behaviors in creative organizations, Hargadon and Bechky (2006) also used qualitative techniques to study six consulting organizations that specialized in “generating novel solutions to novel problems” (p. 487). They determined that momentary collective creativity processes often prove very effective as diverse individuals contribute unique linkages to propel the process (Hargadon and Bechky, 2006).
Minority dissent: creative organizations are inefficient.

Some writers take issue, at least under certain conditions, with the predominant view that creativity, and hence creative systems organization, offers strong advantages in the evolving economic circumstances. Considering these objections allow us to see some of the reasons that many organizations resist creativity.

Levitt (2002) pointed out that organizations are designed to promote stability, order, and pre-defined responses in the interests of efficiency. Levitt (2002) noted that some creative types fail to realize that revolutionary changes also mean that there must be marked organization changes. However, organizations are self-preserving and naturally resistant to change. Organizations are designed to encourage predictable actions, and vast systems are in place to pursue specific goals. The organization exists to limit action options, and to enforce conformity in order to accomplish a particular job. By channeling the actions of all players in a standardized way, systems do not degrade. Inflexibility is a requirement imposed on all players, and there are significant penalties for non-conformance. For those reasons, many organizations are extremely inhospitable to creative efforts, and the amount of energy necessary to transform the organization would be cost prohibitive.

Miles and Snow (1978) taught that not all organizations are pursuing a strategy where innovation will improve organizational effectiveness. For instance, some organizations may compete purely on cost, and the cost of innovating would decrease organizational effectiveness.

Other researchers noted that organizations are refined interactive systems, where members and sub-groups develop specialized expertise and serve unique roles. Creative
ideas can change needed expertise and roles, and the resulting realignment can cause the organization to lose focus (Katz & Khan, 1978).

Dean and Sharfman (1996) pointed out that the realities of the firm may argue against innovative changes. For instance, if a firm has made large infrastructure investments in current technology, pursuing new technology could be economically disadvantageous.

Finally, creativity and innovation can be incredibly expensive (Nohria & Gulati, 2006). Expenses derive from the direct costs of the experiments themselves, paying the individuals involved, and supporting costs. In addition, there are indirect costs in organizational disruption, foregone investments, and reduced focus on current markets.

As discussed previously, the escalating rate of change in today’s world essentially guarantees that all organizations will find themselves facing dynamic uncertainties such as new competitors, changing market demographics, and globalization. In times like these, innovation has always been the way to adapt and prosper (West & Richter, 2008). While these arguments to resist creative re-organizations may have some legitimacy, it is important to consider the offsetting costs of not developing creatively. To prosper, organizations must balance the safe, comfortable status quo of existing routines, existing mind-sets, and existing structures against the creative behaviors that will allow ongoing organizational refinements to meet evolving environmental needs.

**Organizational creativity research overview.**

While no over-arching, organizationally descriptive theory on creative organizations has yet emerged, clearly more creativity research is occurring on a multi-level and organizational basis to reflect the complex interplay of individual and social
influences on creativity. As the discussions above suggest, researchers are beginning to consider the organizational impact on creativity cultivation. Puccio and Cabra (2010) offered a review of major ideas in the field for those interested in further information.

I have recapped the major theories related to organizational impacts on creativity in this literature review. Other researchers have taken a multi-level, organizational approach to more specialized elements of creativity cultivation such as management or strategic planning. Leading works of this nature are reviewed or included in several texts, most notably *Multi-Level Issues in Creativity and Innovation* (Mumford, Hunter, & Bedell-Avers, 2008), *Handbook of Organizational Creativity* (Zhou & Shalley, 2008) and *Handbook of Organizational Creativity* (Mumford, 2012).

**Gaps in the Research**

This literature review suggests several gaps in the literature that the dissertation research attempts to address. I discuss these gaps by research area.

**Creativity research.**

While Csikszentmihalyi (1990, 1994, 1996), Amabile (1983, 1996), Hargadon and Bechky (2006), and Hargadon and Sutton (1997) did utilize some qualitative methods, the vast majority of the creativity research work to date has been quantitative in nature (Zhou & Shalley, 2008). Qualitative research is the ideal vehicle to explore, describe, and illuminate complex phenomena (Krathwohl, 2009) such as creativity cultivation under real world conditions (Denzin & Lincoln, 2011). The qualitative research presented here thus offers important supplemental information to the primarily quantitative research previously done on creativity cultivation.
Despite the fact that creativity is a social process, most creativity research has concentrated on the individual in isolation (Zhou & Shalley, 2008). Researchers have largely ignored the impact of social processes in creativity research. The research plan in this dissertation includes an exploration of the impacts of social processes on creativity as noted by serially creative individuals.

Most creativity research has also focused on creative outcomes rather than processes. It is through understanding the creative process, however, that we can most directly optimize creative outputs (Sawyer, 2012). The research I conducted specifically addresses this gap, focusing on the creative process as lived by serially creative individuals.

**Organizational theory research.**

Creative persons function in the context of various organizations, such as family, culture, and work environment, yet very little research has integrated organizational theory and creativity research (Zhou & Shalley, 2008). Researchers have tended to study creativity cultivation and organizational life as separate fields. I configured the research described here to allow the integration of creativity cultivation and organizational impacts.

Similarly, little research has concentrated on the need for continual creative improvement after an idea has been externalized (Sawyer, 2012). Organizational structures can be a prime motivator for such continual improvement (Burke, 2011), a critical element of both continuing creativity and optimizing organizations. My research helps isolate the organizational characteristics that could encourage continual creative
improvement because it explores the perceptions of serially creative individuals about organizational impacts on their creativity.

Organizationally descriptive research has evolved over the years, but has failed to offer a fully developed theory describing organizational characteristics that would maximally support creativity cultivation (Amabile, 1996). I organized this research effort to isolate data that could assist in developing a creative organization theory reflecting the characteristics normally addressed by organizational theorists.

**Organizational creativity research**

As noted, a descriptive Organizational Creativity theory has not been developed (Amabile, 1996; Zhou & Shalley, 2008). However, important work has been done to explore an integrated field of study encompassing both creativity and organizational theory. These include the complex web of multiple level organizational influences on creativity (Drazin, Glynn & Kazanjian, 1999; Ford, 1996; Mumford, 2000; Woodman et al., 1993), organizational resistance to creative endeavors (Ford, 1996; Janis, 1971), employee organizational positionality and creativity (Perry-Smith & Shalley, 2003), impacts of merger and acquisition strategy on organizational creativity cultivation (Hitt et al., 1996), external environmental orientation and organizational creativity (Mumford, 2012), organizational employee attitudes and creativity cultivation (Fymire, 2006), and organizational collaborative valuation and creative behaviors (Hargadon & Sutton, 1997).

There have been some notable efforts that addressed a more fully featured review of organizational creativity. Senge’s (1990) *The Fifth Discipline* outlined a plan for developing and supporting learning organizations. Senge (1990) noted that a learning organization is a necessary precursor to creative organizations because creativity is
applied learning. However, Senge’s (1990) work concentrated on employee and management behaviors rather than on the organizational design that this dissertation addresses.

Of all of the work in this field, Amabile et al.’s (1996) KEYS instrument, designed to assess creativity climates within organizations, most closely approximates the research described in this dissertation. The KEYS work (Amabile et al., 1996) proposed a model of organizational characteristics to encourage creativity cultivation. My work offers additional research features that distinguish the work from Amabile et al.’s (1996). Amabile et al. (1996) highlighted one of the key limitations of their work, a potential “halo effect” (p. 1177). Amabile et al. (1996) asked participants to describe organizational conditions during a project of high-creativity output and to describe organizational conditions during a project of low creativity output. The researchers (Amabile et al., 1996) noted that this potentially caused participants to develop favorable assessments of all elements of a project with favorable results and unfavorable assessments of all elements of a project with less favorable outcomes due to the halo effect. My research avoids this potential limitation by asking serially creative individuals to discuss their general experiences and perceptions of the creative process, tied to neither successful nor unsuccessful efforts. A related issue is that Amabile et al.’s (1996) participant observations were correlated with the individual’s personal assessment of high-creativity and low-creativity projects. No assurance was provided that those assessments were accurate. In this research, I establish creativity independently through repeated U.S. Patent Office validation of creativity, avoiding that potential bias. Amabile et al.’s work did employ qualitative methods, such as interviews with 240 research
scientists, to assess potential categories of creativity stimulants and obstacles. However, when tentative categories of creativity stimulants and obstacles were isolated, the separate validation phase with differing participants was quantitative in nature. The research process did not allow these new participants in the validation phase to extend the discussion to include their particular life experiences, a discussion that might have suggested other creativity stimulants and obstacles and/or have allowed more nuanced personal explorations of suggested discriminators. Using the Amabile et al. (1996) research-required questionnaire, the participants in the validation phase could respond only on the creativity stimulants and obstacles that others had defined during the earlier phase of the research project. I designed this research plan to include an emergent research design in which major issues develop from, and are explored by, participants through the issues that they themselves raise. Finally, while Amabile et al.’s (1996) work did propose a more fully formed model of creative organizations, it did not address the integration of established organizational theories, nor did it address the typical organizational characteristics that organizational theorists consider key. I have designed my research to integrate the exploration of those organizational theory concepts.

Chapter Summary

In this chapter, I provided a recap of existing literature in creativity theory research, organizational theory research, and the more limited literature in organizational creativity research. I also explored a minority dissent position that creative organizations are inefficient. Finally, I summarized gaps in the research and highlighted how my research design addresses these gaps.
CHAPTER 3
METHODOLOGY AND METHODS

Introduction and Overview

This chapter details the research rationale as well as the research methodologies and methods utilized in this study to serve the purpose of better understanding what encourages and discourages creativity cultivation. The research addresses identified gaps in the previous research base.

In this chapter, I begin with a discussion of research approach, overview of information needed, the research design overview, ethical considerations, issues of trustworthiness, and the discussion of positionality, I conclude with the anticipated outcomes of the research and the chapter summary.

Research Approach

The characteristics of the research problem and purpose informed the choice of my research approach. Following Creswell’s (2013) guidance, I aligned the research problem, research purpose, and research approach to provide congruence. My research problem was that, in spite of the intimate relationship between social, contextual, and organizational factors and creativity cultivation, little research had integrated the social, contextual, organizational research and creativity research. Without the integration of those disparate fields of research, it is hard to imagine that
we can most effectively understand the process of creativity cultivation. The purpose of my study, thus, was to gain a clearer understanding of the social, contextual, and organizational factors that encourage and/or discourage the cultivation of creativity. The fact that there was little existing information in this field steered me to the emergent and qualitative research approach utilized, as well as guided almost all other research design decisions. This research employs a constructivist, phenomenological methodology and a qualitative, semi-structured interview method. Psychological, organizational, and creativity theories were the foundation of my work.

Because little research has been done on the process of creativity cultivation, I designed the research to be emergent in nature. With the paucity of earlier work on the creativity cultivation process itself, I designed the study to allow free exploration of the lived experiences of the interviewees. Now that this research has isolated key supports and inhibitors of creativity cultivation, it will allow future work to quantitatively test some of these findings.

**Methodology.**

Methodology is the overarching philosophy guiding the research approach (Creswell, 2013). Philosophy relates to the abstract ideas and beliefs that the researcher brings to the research, as well as those that inform that research (Creswell, 2013). Lincoln and Guba (1985) referred to methodologies as paradigms. Other researchers categorize methodologies as worldviews (Jones, Torres, & Arminio, 2014). This dissertation employs a constructivist, phenomenological methodology.
Constructivist methodology.

This dissertation employs a constructivist/interpretivist methodology because the purpose is to understand better what encourages and/or discourages creativity cultivation by exploring the lived experiences of serially creative individuals. With that purpose, a constructivist approach is an ideal research methodology because it highlights the voices, analysis, meaning-making, experiences, and perceptions of the participants (Jones, Torres, & Arminio, 2014).

Constructivism challenges the positivistic and post-positivistic perspective that reality is a singular concept, reducible to component parts (Patton, 2002). The essential tenet of constructivism is that reality is socially, historically, and culturally constructed (Lincoln & Guba, 1985). This implies that research must analyze the phenomenon being studied within the context(s) of the participants’ life experiences. Ontologically, “relativism is the basis of constructivism” (Lincoln & Guba, 2013, p. 39). Reality exists only in the minds of people considering it. Those realities can be different, and individuals’ lived experiences and social interactions inform the reality perception. Epistemologically, “transactional subjectivism” is the basis for constructivism (Lincoln & Guba, 2013, p. 40). Perceptions of reality are formed by highly personal and context-specific interactions and hence are highly subjective based upon differing past personal experiences. Methodologically, constructivism is based primarily on “hermeneutic/dialecticism” (Lincoln & Guba, 2013, p. 40). Constructivism rests on understanding the meaning-making or sense-making processes of all the individuals interacting. Interaction is a two-part process. Interaction begins with an understanding of each individual's own constructioning.
The second part of an effective interaction process is then comparing that personal constructioning with the constructions of the others interacting. That message has clear application here for the interactions of participants and researcher. Creswell (2013) specifically recommended that a constructivist worldview is best served by “Use of an inductive method of emergent ideas (through consensus) obtained through methods such as interviewing, observing, and analysis of texts” (p. 61).

Axiologically, constructivists believe “values inhere in every human project; objectivity is a chimera” (Lincoln & Guba, 2013, p. 41). The researcher and research participants work together to co-create new meanings, informed by each other’s perspectives. The values of each individual participating in meaning-making and the values embedded in the context or social environment inherently influence constructed realities. Creswell (2013) noted that individual values are honored and that the overall value environment is negotiated between the researcher and research participants.

Lincoln and Guba (2013) pointed out that constructivism is particularly suited to the educational mission and educational research:

An important feature of constructions is that they can be manipulated and modified (by interrelating, interpolating, extrapolating, or metaphoric leap) into new and unexpected configurations, resulting in possibilities not directly encountered in experience, that can give rise to creative and innovative formulation that extend human thought and appreciation, or, additionally extend social justice.
In fact, that is what most of education is about: the creation of critical capabilities, and the rich extension of interiority, emotional intelligence, and creative and compassionate capacity. (Lincoln & Guba, 2013, p. 48)

As a constructivist researcher, I strove to guide my work with the recognition that the understanding of any phenomenon rests in the negotiated meaning developed between the researcher and participants, and it is rooted within the contexts of the participants’ lived experiences. There is no one reality; there is the personal reality of one’s experience built over time through interactions with others.

**Phenomenological methodology.**

My research intent is to understand better what encourages and/or discourages creativity cultivation by exploring the lived experiences of serially creative individuals. Phenomenological studies concentrate on exploring the essential meaning of a lived experience. As Creswell (2013) explained, “a phenomenological study describes the common meaning for several individuals of their lived experiences of a concept or phenomenon. Phenomenologists focus on describing what all participants have in common as they experience a phenomenon” (p. 76). Van Manen (1990) also asserted that phenomenology is ideally suited to the exploration of essential themes that constitute the nature of a lived experience, a “grasp of the very nature of the thing” (p. 177). In phenomenological research, researchers ask participants two broad, general questions (Moustakas, 1994): What is your experience of the phenomenon? What are the contexts that have influenced or affected your experience of the phenomenon? Creswell (2013) made the same point that a phenomenological study explores both what was experienced and how the
phenomenon was experienced (i.e. context): “A phenomenology ends with a descriptive passage that discusses the essence of the experience for individuals incorporating ‘what’ they have experienced and ‘how’ they experienced it” (p. 79). Because the purpose of this dissertation is to have a better understanding of what encourages and/or discourages creativity cultivation, a phenomenological approach including searching for the essence of the creative lived experience is particularly well suited to the research purpose.

Stewart and Mickunas (1974) discussed four philosophical perspectives underlying phenomenology in particular, perspectives that are also reflected in this research project. Firstly, phenomenology represents a rejection of scientism and returns to the traditional Greek view that philosophy is best defined as the search for wisdom through examined experience. Secondly, phenomenologists reject presuppositions of reality, called “epoche” (Stewart & Mickunas, 1974, p. 26). Thirdly, phenomenologists believe consciousness is always directed toward an object(s); hence, reality is related to consciousness (Stewart & Mickunas, 1974, p. 26). Finally and fourthly, phenomenologists reject the subject-object dichotomy, maintaining that the reality of an object is in its meaning to the individual(s) perceiving it (Stewart & Mickunas, 1974). This implies that reality can only be perceived within the particularistic experiences of individuals.

These phenomenological assumptions informed the exploration of the research purpose—what encourages and discourages creativity cultivation—by suggesting that examining experiences has value, that it was critical that I worked to suspend presuppositions as I approached the research, that I recognized that human
perspectives are grounded in consciousness, and that I recognized that “reality” is the meaning an individual assigns to a perception based on her or his past experiences. Those lessons guided this research effort.

**Methods**

Methods are the tools used to gather data. In the broadest sense, those methods are either quantitative or qualitative (Krathwohl, 2009). Quantitative methods include descriptive statistics, correlation analysis, and causal analysis (Krathwohl, 2009). Qualitative methods include interviews, document review, observations, and art/artifact examination (Creswell, 2013). This dissertation research utilized qualitative, semi-structured interview methods.

**Qualitative research methods.**

Krathwohl (2009) suggested four questions to consider when deciding upon the appropriate research method to employ. First, what is the type of knowledge being sought? Is the research an attempt to corroborate a hypothesis? Alternatively, is the research attempting to develop enough knowledge on an evolving issue to eventually permit development of a hypothesis or theory? Are we in a much less developed knowledge state on the issue being examined, and trying to develop a theory? Second, what is the best study design? Is the research purpose best served by a fixed research plan to test a pre-developed hypothesis deductively, or is it best served by an emergent research plan inductively informed by the ongoing research data collected? Third, is the most valuable data to address the research problem expressed in numbers or words? Fourth, what is the best way to get the information
desired? Can the phenomenon best be broken down with elements manipulated for analysis, or is it best to examine the phenomenon holistically?

Krathwohl (2009) summarized what the answers to these questions mean in terms of the appropriate choice of paradigm and method:

Thus corroborating an explanation, ability to take apart or simplify the phenomenon, describing in measures, a maniputable treatment, and a top-down approach tend to go together. Researchers commonly characterize this approach as *quantitative*.

Similarly, describing or exploring for an explanation, a holistic approach, describing in words, and a bottom-up frame of reference form another type of approach to problems. This is a *qualitative approach*.

(Krathwohl, 2009, p. 30)

There is no clear-cut, generally accepted knowledge base on what factors impact creativity cultivation, nor is there a commonly accepted theory of creativity cultivation (Amabile, 1996). As such, this research attempts to provide better understanding of what factors impact creativity cultivation through an exploration of the lived experiences of serially creative individuals. This work is an exploration that uses inductive reasoning, takes a holistic viewpoint, and relies on the life experiences of these serially creative individuals. Such a qualitative method of research is best suited to the research problem being examined and thus was utilized in this research.

Creswell (2013) characterized four types of philosophical assumptions made by researchers undertaking a qualitative study: ontological, epistemological, methodological, and axiological. Ontologically, there is no one reality; there are
multiple realities based upon the perspectives and perceptions of the individuals living the experience. Epistemologically, the life story and reported experiences of the serially creative individuals are the research evidence. Further, the personal relationship between the researcher and interviewees is important for understanding and so had an impact on the data generated. Methodologically, the research is emergent in design, is inductive, and is studied within the context it is experienced. Axiologically, the values of the researcher and participants being interviewed inevitably channel the flow and narrative, and so these must be consciously considered. Practically, this means that, as the researcher, I must be cognizant that I function as the instrument for data collection, but I also function as an instrument of the data generation itself. As such, I recognized the powerful impact I have on the narrative flow and consciously attempted to encourage the natural and faithful emergence of participant data within their lived context.

**Semi-structured interview method.**

I selected interviews because of their unique ability to isolate the essence of the creative experience for individuals who have demonstrated serially creative achievements, as well as their ability to isolate the meaning participants make of those creative experiences. Understanding the essence of their experience and resulting meaning-making should inform practice in order to improve creativity cultivation.

Dexter (1970) defined an interview as a conversation, but “a conversation with purpose” (p. 136). As Patton (2002) observed, the purpose of an interview is to gain information that is not available from observation alone, often to gain
information about what another person internally feels or what issues are of concern to that individual.

We interview people to find out from them those things we cannot directly observe…. We cannot observe feelings, thoughts, and intentions. We cannot observe behaviors that took place at some previous point in time. We cannot observe situations that preclude the presence of an observer. We cannot observe how people have organized the world and the meanings they attach to what goes on in the world. We have to ask people questions about those things.

The purpose of interviewing, then, is to allow us to enter into the other person’s perspective. (Patton, 2002, pp. 340-341)

The interviewing process is intended to reveal insights into the experiences and attitudes of others, because such experiences and attitudes are of value (Seidman, 2006). The individuals who agreed to these interviews for this research are valued interviewees. Seidman (2006) pointed out that there is value in resisting the urge to codify participant interviewees’ responses one-dimensionally, as through numbers. Interviewees’ stories have value in their complexity and uniqueness, something the interviewing researcher is uniquely capable of discovering, exploring, and sharing. Van Manen (1990) offered a thoughtful analysis of the “lived experience” (p. 35) and taught that exploring lived experiences of phenomenon is crucial to understanding the essence of the phenomenon. Van Manen (1990) noted that the respectful interview process is often the best way to explore those lived experiences. Dilthey (1985) taught that lived experiences reflect the essence of an experience because they are
essentially pre-reflective consciousness, and that interview research is the most effective way to isolate such critical, unfiltered information.

**Overview of Information Needed**

Since the intent of this dissertation research is to explore the socially supported or inhibited process of creativity development, interviews were conducted with creative individuals who have “lived” the creativity development process and can thus share the essence of that lived experience. To fulfill that research purpose, I explored the following research questions:

1. What source(s) of support or inspiration have influenced multiple patent holders’ creativity/creative process?
2. What experiences have positively affected their creativity cultivation?
3. What experiences have negatively affected their creativity cultivation?

The information needed to explore these questions tended to fall into three general categories: “perceptual, demographic, and theoretical” (Bloomberg & Volpe, 2008, p. 81).

**Perceptual.**

The perceptions of serially creative individuals about their creative experiences, specifically their perceptions about what supported or inhibited their creative efforts, constitutes important research data. Since human beings exist in social organizations such as culture, family, educational institutions, and work
environment, creative individual perceptions should also extend to the impact of those organizations on the creative process.

**Demographic.**

Demographic information was also needed to ground the study and frame potential limitations of the research data. I drew demographic information primarily from a questionnaire, attached as Appendix A. Demographic information includes age, address, race, gender, marital status, number of children, number of patents, general area of patents, date of earliest patent, date of latest patent, number of patents commercialized, highest degree earned, discipline/major, and employment history including occupation and entrepreneurial experience.

**Theoretical.**

An ongoing examination of the literature, begun in the literature review portion of this dissertation, served as the theoretical grounding of this research project. The theoretical framework “links the unsettled question to larger theoretical constructs” (Jones et al., 2014, p. 22). I augmented this literature review as any new research emerged, and I used the literature review for analysis of findings. Thus, the creativity and organizational theory research shared in the literature review informed my research and implications for its application.

**Research Design Overview**

Summarized below is the multi-step research process. The research design encompasses five distinct research steps: (1) literature review, (2) Institutional Review Board (IRB) submission, (3) participant selection, (4) participant interviews, and (5) analysis of findings.
Literature review.

As a prelude to data collection, I conducted a literature review. My intent was to highlight the contributions of researchers in the broad areas encompassed by this study, and to isolate areas of gaps in the research.

IRB submission.

I incorporated my doctoral committee’s input from the proposal defense and other conversations. The adjusted proposal was submitted to the University of Dayton’s Institutional Review Board, and was approved without further modification.

Participant selection.

This study utilized a purposeful participant selection approach (Creswell, 2013) since it is important that all interviewees have lived the experience of being serially creative. The criterion for inclusion as a serially creative participant was the award of at least two U.S. Patents, since those individuals with at least two patents have exhibited a pattern of creativity, whereas a single patent may reflect only a fortuitous stroke of good luck. Clearly, it is possible that good luck could strike more than once, but it is far less likely that two concepts survive the rigorous patent examination winnowing process by luck alone. Practically, it would also be extremely difficult to isolate a sufficient quantity of interviewees with more than two patents as the pool of such individuals is very small. Only 4.5% of U.S. residents hold patents, only 2.6% of U.S. residents hold more than one patent, and less than 0.5% of U. S. residents hold more than two patents (United States Patent Office website, 2015). Initially, I had difficulty locating individuals with two or more patents, but creative people seemed to be drawn to other creative people. I asked
interviewees if they could refer me to other individuals with two or more patents, this snowball sampling (Stewart & Mickunas, 1974) proved especially effective in isolating my purposeful sampling.

As much as I could, I consciously searched for interviewees that held a varying number of patents, some with two, some with an intermediate number of patents, and some with very many patents, as individuals with either very low or very high numbers of patents tended to be a more homogenous grouping than patent holders overall. For instance, individuals with a very high number of patents tend to be clustered in applied research. The 16 interviewees held a total of 184 patents, with an average of 11.5 patents each. There was a wide variance in the number of patents held per individual with a low of two and a high of 87. Those 184 patents were held in 45 distinct fields; on average interviewees held patents in 2.8 distinct fields. There was a strong pattern of interviewee patents being held in fields outside the area of interviewee academic specialization. Academically, interviewees held a variety of academic degrees:

- 6 BS in Mechanical Engineering
- 4 Ph. D.s in Electrical Engineering
- 3 MBAs
- 1 Ph. D. Science and Metallurgy
- 1 BS Electric Engineering
- 1 BS Computer Science
- 1 BA Education
- 1 Associates Business
Note: There are 19 degrees and 16 interviewees because I included two interviewees’ MBAs as well as their highest technical degrees, and another interviewee had two BS technical degrees.

Interviewees ranged in age from 28 to 67, with an average age of 54. They held patents that issued from 1984 to 2015. Interviewees had 25 children in total, 14 of 16 interviewees were male, and 12 of 16 interviewees were married. Of the 16 interviewees, seven had always been employees, one had always been self-employed, and eight had been both employees and self-employed.

The value of using a purposeful sample of individuals with at least two U.S. patents was the advantage of insuring that I was interviewing only individuals that an impartial, rigorous process had identified as serially creative. However, while offering the important advantage of isolating independently verified, serially creative, individuals, I found that pool of individuals holding at least two U.S. patents was not as gender diverse as I had assumed. While the patent office does not maintain ethnicity data on patent holders, they do have some information on the sex of patent holders. The (2015) office website indicates that slightly less than 5% of patent holders are women. I was deeply committed to a racially and gender diverse pool of interviewees. I was able to include four interviewees of color in my pool, but even with intensive effort I found it difficult to isolate willing women with at least two U.S. patents. I was only able to isolate and interview two women (12% or 2 of 16 interviewees). To secure the second female interview, I even found it necessary to travel to Florida. While my interviewees were 12% female as compared to the 5% of
females in the general patent pool, I would have preferred even more gender diversity. The female interviewee comments, however, were consistent in essentially all manners with the comments of male interviewees. I have identified this gender imbalance as a potential limitation of this work. Obviously, follow-up work would ideally be done with a more diverse participant sampling.

Creswell (2013) noted that the number of participants in a phenomenological study can range widely from one (Dukes, 1984) all the way to 325 (Polkinghorne, 1989). Dukes (1984) recommended studying anywhere from three to 10 participants. I interviewed 16 participants in order to garner enough data to locate viable patterns among their perspectives.

I identified and contacted criterion-qualified creative individuals by using U.S. Patent Office published data on patent holders and via Patent Office qualified local patent attorneys (United States Patent Office website, 2015), as well as through personal contacts with the patent law community and patent holders. I also contacted various agencies and organizations in the Dayton, Ohio area who are heavily involved in patented innovation to aid in identifying individuals holding multiple U.S. patents. The Dayton area offers a wide variety of patent resources to assist in the process of isolating individuals with at least two U.S. patents. Military resources include the Center for Unmanned Aerial Vehicles Exploitation and the Air Force laboratories headquartered at Wright Patterson Air Force Base. Governmental resources include the Entrepreneurial Signature Program, Tech Town, the Entrepreneurs’ Center, the National Air and Space Intelligence Center, and the Nano Materials Center. The University of Dayton Research Institute and Wright State University’s Patent and
Trademark office are easily accessible educational resources. Finally, a number of commercial firms in the area are heavily involved in patenting products, research, and/or processes such as Cornerstone Research Group, Detection Innovations, GE Aviation Systems, Lexis/Nexis, Proctor and Gamble, Reynolds and Reynolds, Spinetech Ventures, Teradata, X-spine, and YSI.

I provided pseudonyms, after consulting with interviewees about any pseudonym preferences they had. Any identifying information (including invented product description, when necessary) was not connected to individuals in reports or presentations.

This research report provides pertinent participant demographics, but only to the extent that it does not reveal the identity of individuals. I individually reviewed every demographic detail and determined whether any specific demographic details could suggest the identity of individual participants and any such details were eliminated.

I initially contacted potential participants by phone and/or email. Attached, as Appendix B, is the guiding script for that contact. For those who agreed to participate, I scheduled the interview time and place on the initial call. I located meeting space on the UD campus if possible, my office or the library meeting rooms or a meeting site convenient for the participants. Prior to the interview, I emailed or mailed the confirmation letter attached as Appendix C to those individuals that agreed to participate as a co-researcher interviewee.
Participant interviews.

I conducted semi-structured, in-depth interviews. I audio taped these interviews to allow verbatim transcription of participant comments. Standardized questions with an open-ended interviewing technique characterize semi-structured interviews (Patton, 2002). Thus semi-structured interviews assured all participants addressed the same questions most relevant to addressing the research questions, but each participant was able to explore the topics that he/she felt were most germane to those questions. I also utilized follow-up questions to encourage participants to explore the issues they brought to the discussion, and to allow participants to flesh out their feelings about those issues. Where practical, I used participant terminology and references to assist in framing follow up questions.

As Jacob and Ferguson (2012) advised, I first test interviewed various sets of questions to insure that the interview length was not too long. Jacob and Ferguson (2012) taught that interviews should normally not extend beyond 60 minutes as participants tire and the quality of responses tends to decline. I developed an interview protocol of nine primary and one summarizing question that was test interviewed routinely in 45 to 60 minutes.

The interview questions were designed to address the research questions. My initial list of questions was:

1. Tell me about your patents. Do you think of your patented work as being creative?

2. Is your patented work different from your non-patented work? Why?

Please explain.
3. What experiences or associations supported the development of your creativity?

4. What experiences or associations inhibited the development of your creativity?

5. Have your creative processes evolved over your life?

6. What have you enjoyed most about creative activities?

7. What have you enjoyed least about creative activities?

8. Is being creative a choice for you or is it something that happens unconsciously?

9. Do you have any advice you would give to others about cultivating their own creativity?

10. Is there anything that I did not address, that you would like to say about supports or inhibitors to creativity or the creative process?

Over time, as interviewees spoke frequently of childhood and organizational experiences, I supplemented and modified these questions with open-ended follow-ups focusing on early life and organizational life.

**Analysis of findings.**

A research problem may be grounded within multiple theoretical frameworks; the choice of a particular framework provides a type of lens the researcher uses to address the problem (Merriam, 2009). The very choice of a particular framework, however, initially excludes other potential frames of reference. Merriam (2009) noted that when coding, “The framework of your study will draw upon the concepts, terms, definitions, models, and theories of a particular literature base and disciplinary
orientation” (p. 67). I relied upon the developed literature and theories in creativity research and organizational theory research. Moustakas (1994) similarly cautioned that the framework chosen could essentially be a researcher pre-judgment of the best approach to data analysis. To form new and more accurate pre-judgments and theoretical frameworks as the research continues, he suggested the value of closely listening to participant data (Moustakas, 1994). Moustakas (1994) referred to the process as a hermeneutic circle where researcher pre-judgments are set aside, leading to a truer understanding of the phenomenon being studied and a more accurate theoretical framework. Therefore, I assured that as my research data emerged it informed coding changes and expansions.

I transcribed the taped participant interviews verbatim and then coded them, being careful to let participant remarks inductively lead the coding process. I utilized NVivo software to track transcripts and coding inputs. I entered data and code using the qualitative software system to allow easy, iterative, and discriminative sorting. I did all the coding personally; there was no automatic or word coding. I used the NVivo software as a searchable and instantly reconfigurable “file cabinet.” Initially, I coded primarily by using key words and concepts provided by the interviewees. I made no effort to limit the coding categories, and allowed connections to emerge inductively. Over time and with increasing numbers of interviews, the individual codes began to coalesce around thematic findings.

**Ethical Considerations**

Trust between the researcher and participant interviewees is the core of the research process, and maintaining that trust is critical to meaningful and reliable
research (Alberts & Shine, 1994). Stake (2005) noted, “Qualitative researchers are guests in the private spaces of the world” (p. 459). Participant-granted access imposes heavy ethical burdens on the researcher. Lincoln and Guba (1985) wrote that ethical issues align closely with the integrity of the relationship between the researcher and participant co-researcher. The U.S. Department of Health and Human Services provides clearly stated ethical guidelines for researchers:

- **Respect for persons** involves recognition of the personal dignity and autonomy of individuals, and special protection of those persons with diminished autonomy. **Beneficence** entails an obligation to protect persons from harm by maximizing anticipated benefits and minimizing possible risks of harm. **Justice** requires that the benefits and burdens of research be distributed fairly [emphasis from original]. (Penslar, 2001, p. 2)

In addition to guiding responsible concern for the participants, ethical behavior is also critical to the integrity and value of the research product itself. Merriam (2009) argued that to a great degree the trustworthiness of a qualitative study is dependent upon the ethics of the researcher. Lincoln and Guba (1985) also pointed out that trustworthiness is actually an ethical question; only the respected participant will share appropriate information, and only the ethical researcher will adequately relay those truths. Thus, the research work cannot be maximally valuable without the strong ethical foundation that lets participants contribute candidly and the researcher report adequately.

Punch (1994) noted that most ethical concern “revolves around issues of harm, consent, deception, privacy, and confidentiality of data” (p. 89). Patton (2002)
offered an ethical issues checklist intended to minimize the possibilities of ethical problems. I utilized Patton’s (2002) ethical issues checklist to help guide the research design. The paragraphs below address the main elements of Patton’s (2002) checklist, and describe how my research design mirrors the best practices reflected in that checklist.

I clearly and fully explained my purpose for the research during the initial phone call, in the pre-interview packet, and before the interview begins. During the initial call and as part of the pre-interview packet, I explored with participants the growing need for creativity, and thus the growing need to understand what factors can help cultivate creativity. I ensured that the interviews did not proceed until informed consent forms were discussed and signed by the participant being interviewed. Further, I made sure to fully and completely address any of the participants’ questions.

I was certain to honor any promises I made, such as agreeing to provide copies of interview transcripts. Further, I defined the personal benefits for the participants. Specifically, I explored how their contribution to creativity cultivation benefited their society, their country, their world, and their family’s future.

I assessed the risks that my participants may be facing. In particular, I had concerns that speaking of the supports and especially the obstacles to creativity that they have encountered may expose them to negative feedback from the individuals and organizations that they directly or implicitly reference. I also recognize that others may disagree with their assessments of aids and deterrents to creativity, and may react oppositionally. I have done everything possible to protect the participants
from psychological stress, legal liabilities, ostracism, jealousy, or any other negative outcomes.

I assigned pseudonyms for all participants to guard their identity. Electronic storage was used to safeguard transcripts and research records with identifying material, and was accessible only through advanced password keys. I redacted materials and transcripts available to others to remove any identifying material. I pro-actively asked interviewees to review their quotations that I planned to use in this final report to insure that nothing in the quote would allow their identification. I found this very helpful, since I was redacting liberally out of caution and it often made the quote incomprehensible, impairing thick, rich description and the effective transmission of the interviewee’s own voice. As a result of my review of the interviewees’ quotes with them, I was both able to insure that necessary redactions had been made and that unnecessary redactions were avoided. I did quiz each interviewee until I was assured that the quotes did not reveal their identity. I also deleted any identifying references in the results discussion. And in all possible ways, I have striven to preserve participant confidentiality. In the event that desired participant confidentiality could not be reasonably guaranteed, perhaps due to the unique nature of a particular invention, I suggested the co-researcher not participate. At the conclusion of the research, audiotapes of all interviews will be destroyed.

After committee approval of my research proposal, I applied for IRB approval and complied scrupulously with IRB requirements. I monitored my own psychological reactions and stresses, I consulted my advisor and committee for peer review of crucial ethical points. Participants set data collection boundaries that
reflected their particular comfort levels. My personal moral code offered ethical
guidance, and I would not have hesitated to turn to my advisor, the committee, and
my spiritual resource community if it had been necessary (without breaching
confidentiality).

I am deeply aware of the huge responsibility that is implicit to the intimate
exploration of the feelings and attitudes of others. A daunting burden must be
continually considered.

Although researchers can turn to guidelines and regulations for help in dealing
with some of the ethical concerns likely to emerge in qualitative research, the
burden of producing a study that has been conducted and disseminated in an
ethical manner lies with the individual investigator. No regulation can tell a
researcher when the questioning of a respondent becomes coercive, when to
intervene in abusive or illegal situations, or how to ensure that the study’s
findings will not be used to the detriment of those involved. The best a
researcher can do is to be conscious of the ethical issues that pervade the
research process and to examine his or her own philosophical orientation vis-à-
vis these issues. (Merriam, 2009, pp. 234-235)

**Issues of Trustworthiness**

The basic issue in relation to trustworthiness is simple: How can an inquirer
persuade his or her audiences (including self) that the findings of an inquiry
are worth paying attention to, worth taking account of? What arguments can
be mounted, what criteria invoked, what questions asked, that would be
persuasive on this issue? (Lincoln & Guba, 1985, p. 290)
As previously discussed, the philosophical assumptions of the naturalist, constructivist, interpretive methodology I employed in this research effort differs substantially from the philosophical assumptions of the positivist methodology. Lincoln and Guba (1985) developed a set of criteria for assessing the trustworthiness of naturalistic research efforts: (1) credibility, (2) transferability, (3) dependability, and (4) confirmability. Guba and Lincoln (1986) also suggested practices that would help ensure each element of trustworthiness.

**Credibility.**

Lincoln and Guba (1985, 2013) suggested credibility is a key element of trustworthiness. The authors define credibility as research activities “that make it more likely that credible findings and interpretations will be produced” (Lincoln and Guba, 1985, p. 301). The authors suggest strategies, which were employed in this work, to maximize credibility such as member checking, peer checking, and the active search for discrepant cases. Member checking refers to involving the participants in the review of evolving categorizations or reported lived experiences to ensure that the researcher has adequately grasped and reported the data (Merriam, 2009). Interviewees reviewed their own transcribed interviews as well as selected findings pages to verify that my summary was consistent with their messages. Peer checking is the process of reviewing details of the research with trustworthy and research capable colleagues, so that their evaluative input of the research design and findings can be considered to further refine the research work being done (Lincoln & Guba, 1985). This research was peer reviewed with several other individuals holding Ph.D.s. The active search for discrepant cases allows the researcher to assess unique
characteristics or conditions that might challenge emerging observations (Patton, 2002). Given that my findings were relatively consistent, I very actively searched for discrepant cases and individual inventors.

**Transferability.**

Lincoln and Guba (1985, 2013) also suggested that transferability is an important element of trustworthiness. They defined transferability as research practices that increase the probability that others can accurately assess whether the research data generated is applicable to issues within their own contexts. The authors suggest strategies, which were employed in this work, to maximize transferability such as purposeful sampling and thick, rich descriptions. Purposeful sampling refers to the conscious selection of *information-rich cases.* “Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry” (Patton, 2012, p. 230). The concept of thick, rich description describes the need for the researcher to provide adequate, relevant detail so that others can assess the applicability of the work to their particular situations (Lincoln & Guba, 1985). Both purposeful sampling and thick rich description have been used in this research. In Chapter 4 of this dissertation, I rely heavily on the verbatim remarks of the purposely sampled interviewees so that the findings of this work are framed as much as practical by the participants’ own remarks.

**Dependability.**

Lincoln and Guba (1985, 2013) identified dependability as an important element of trustworthiness. They defined dependability as research practices that would allow the development of the same results with the same participants at the
same point in time. The authors suggested strategies to maximize dependability such as clear audit trails, peer reviews (defined above), and multiple level coding strategies. I have employed these strategies in this work. This allows other researchers to assess the fairness of the research design and the accuracy of reported results (Lincoln & Guba, 1985). I have provided detailed descriptions of the multi-step research process and I have tried to include as much primary data as possible. My coding scheme was suggested by interviewee comments, and initially was extremely large and dis-jointed. My initial codes were suggested directly from interviewee remarks. I isolated every new concept or viewpoint and established a coding category for that item. I made no attempt, initially, to order or relate independent and differing codes. As interviews continued, interviewee remarks linked concepts and highlighted the key findings. In all, over 60 coding categories were developed but ultimately those disparate, initially un-connected codes melded into the main findings. Over time, with more and more interviews, four clear themes developed and I could aggregate groups of similar codes to develop final findings. The pattern of interviewee stories eventually allowed these four clear themes to emerge. Those four themes were (1) early supports and encouragements of creativity cultivation, (2) experiences that positively affected creativity cultivation, varied interests and exposures, (3) experiences that positively affected creativity cultivation, organizational impacts, and (4) experiences that negatively affected creativity cultivation, organizational impacts. Multi-level coding allowed the nuanced and emergent discovery of accurate patterns and data relationships to analyze new information most clearly (Patton, 2002).
Confirably.

Finally, Lincoln and Guba (1985, 2013) suggested confirmability as an important element of trustworthiness. They defined confirmability as the ability of other researchers to follow the research process and replicate the research design. In order to maximize confirmability, I have utilized tools that Lincoln and Guba (1985, 2013) suggested such as self-reflexivity, direct participant quotations, and the use of a researcher journal. Self-reflexivity is the process of critical self-reflection to isolate researcher biases and pre-suppositions that could interfere with the most accurate analysis of emerging research data. I concentrated on self-reflexivity throughout this work. I have had extensive personal background in patenting, in great measure my success in business can be traced to those patents. I was aware that such a powerful personal experience could serve as a filter imposing my attitudes while I analyzed interviewee remarks. To combat that potential problem, I consciously tried to monitor any such tendencies. While the self-reflective effort was mostly intellectual, there were some purely practical parts of the effort. For instance, when I opened NVivo to code, I had the program configured to prompt me: “Remember this is not YOUR story.” The outline I used to guide the interviews also began with the same caution in an attempt to pro-actively promote self-reflexivity. I found by focusing on the need for self-reflexivity I was able to let the voices of the interviewees speak through my work. Similarly, the use of direct co-researcher quotes provides the least filtered voice for the participants in the research (Denzin & Lincoln, 2011). Finally, the use of a research journal prompted and recorded reflexive self-analysis. Denzin and Lincoln (2011) taught that journaling encourages researcher recognition of any
personal filters in place that could be muting the most direct transmission of participant views. I personally saw what Denzin and Lincoln (2011) noted during the chaotic, dis-ordered, uncomfortable phase when I was drowning in thousands of pieces of, as yet, thematically disconnected pieces of data. I detected from my journal notes that there was some tendency on my part to impose a connected framework of my own development on the data. I was, unconsciously, letting my filters suggest an ordering of the data. With that insight, I was able to back away and let the themes eventually emerge from interviewee remarks. The thematic findings that emerged from that restraint on my part, were markedly different and far more valuable than if I had influenced the path toward specific thematic findings.

**Positionality**

As noted previously, I hold close to 300 U.S., Canadian, and international patents, and have come to academia after a long business career. Those patents are the primary reasons our firm was able to build a very profitable business that eventually employed close to 600 people and generated in excess of $130 million in annual sales. While those experiences allow nuanced understandings and crucial insights into the creative process, I am also aware there may be temptations to form judgments based on an over-reliance on personal experience, thus effectively discounting the information provided by interviewees. With such strong and positive experiences as to the value of the creative process, it is possible the researcher expectancy effect could challenge the work. Rosenthal and Rubin (1980) defined the *researcher expectancy effect* as the inadvertent encouragement of the researchers’ beliefs from the participant interviewees. I exerted great effort to ensure that I am
hearing the experiences of my participants without influencing aspects of those experiences. Member checking and peer review of coding schemes and evolving data patterns assisted me in remaining focused on the essence of the lived experience of the interviewees, and not allowing my experiences to shape the outcomes.

**Anticipated Outcomes of the Research**

The results of this research project provide information that can be used to refine and facilitate the cultivation of creativity demanded by business and society. Specifically, the results could assist educational institutions, especially institutions of higher education, individuals, the business community, the American nation governmental units, and the global community in developing creativity cultivation processes, supports, and organizational structures.

**Chapter Summary**

In this chapter, I provided a detailed description of the research methodologies and methods used in order to better understand what encourages and/or discourages creativity development. A constructivist, phenomenological methodology, a qualitative, semi-structured interview method, and a theoretical framework informed by creativity, organizational, and organizational creativity research were defined and defended. Additionally, I presented a co-researcher participation plan and provided an overview of the information needed from participant interviewees. I delineated a research design to lay out the process in total, and I provided extending remarks for each research stage. I explained and explored the interview approach selected and detailed the data analysis and synthesis plans I used. Finally, I discussed ethical
considerations, issues of trustworthiness, researcher positionality, study limitations, and the anticipated outcomes of the research.
CHAPTER 4
FINDINGS

Introduction

The purpose of this study was to gain a clearer understanding of the social, contextual, and organizational factors that encourage and/or discourage the cultivation of creativity. A better understanding of these questions will allow various organizations, including educational institutions, business organizations, and families to better tailor the environment to support creativity development.

This chapter presents the key findings obtained from 16 in-depth interviews with serially creative individuals. The work was guided by the exploration of the three research questions:

1. What source(s) of support or inspiration have influenced multiple patent holders’ creativity/creative process?
2. What experiences have had a positive impact on their creativity cultivation?
3. What experiences have had a negative impact on their creativity cultivation?

The patterns of interviewee remarks shed light on each of these research questions.
I begin this chapter with an overview of findings. In this section, I note that interviewees spoke of both contextual and experiential factors influencing their creativity cultivation. I also tie the key findings to the relevant research question to preserve clarity of narrative.

I then offer a more detailed discussion of findings, organized around the three research questions. I used direct interview quotes as relevant and appropriate for this extra detail.

This section concludes with summarizing comments on the major findings. Those summarizing comments are offered in preparation for the analysis and recommendations of Chapter 5.

**Overview of Findings**

In addressing the first research question, focusing on what sources of support or inspiration have influenced their creativity, the interviewees spoke primarily of childhood contextual circumstances. The interviewees characterized these contextual circumstances as either (1) the encouragement or support of creative efforts from influential others such as family and friends, or (2) essentially negative conditions that compelled the interviewee to creative efforts in order to thrive and survive.

Whether the interviewee reported being encouraged or compelled toward creativity, they uniformly noted that the childhood orientation toward creativity evolved into a durable lifelong pattern of creative behaviors that they still find richly satisfying.

In contrast, interviewees tended to speak much more experientially when addressing the issues outlined in the second and third research questions. Research question two focused on experiences that had a positive impact on their creativity
cultivation while research question three focused on experiences that had a negative impact on their creative development.

Interviewees expressed two dominant types of experiences that exerted a positive impact on their creativity cultivation: (1) personal experiences and (2) organizational experiences. First, a clear majority of interviewees offered that personal exposure to a rich diversity of fields and information was a primary catalyst for their creative thoughts. Interviewee remarks were supported by the fact that a large majority of the interviewees had patents in diverse fields, and most of the interviewees had patents in fields that differed from their academic backgrounds. For instance, 67 year old Herb has an associates degree in business but has patented in fields as diverse as mechanics, larvae management, 3D printing, and bio-chemical containment. Second, a large majority of interviewees reported that organizational factors were key positive factors that had an impact on their creative performance. In particular, many interviewees reported that organizations were the best vehicles to allow collaboration, mentoring, team supports, rewards and formalized encouragement, which they identified as key supports for creativity.

However, organizational factors were also identified by almost all of the interviewees as the key inhibitors of their creativity cultivation because of issues such as bureaucracy, risk aversion, imbalance of creative rewards and penalties, and focus on standardization. A very large majority of interviewees also reported leaving organizations that had inhibited their creativity cultivation. Further, most interviewees reported their successful establishment, or plans to establish, their own
organizations to insure that creative efforts were always supported as much as possible.

More Detailed Discussion of Findings

The interviewees themselves best explain these findings and provide the best evidence for the findings. Thus I have summarized key interviewee comments by quoting them directly, in the hope of providing “thick description” (Denzin & Lincoln, 2011, p. 311) for a more intimate understanding of the participants’ experiences and hence a better determination of the relevance and application of these findings to other situations. Again, these more detailed findings discussions are organized around the three research questions.

Source(s) of support or inspiration.

The first research question focused on the sources of support or inspiration that serially creative individuals found. The overwhelming majority of interviewees reported that early childhood provided important sources of support and inspiration for creative behaviors and influenced their creative processes. Further, the interviewees reported that once those creative tendencies were developed, they became natural patterns of behaviors throughout the remainder of their lives. These early influences tended to be of two types: (1) encouragements of creative pursuits, and (2) difficulties that compelled creative pursuits.

Encouragements of creative pursuits.

Nine of the interviewees (Bella Rose, Carl, Chad, Henry, Herb, Liam, Paul, Phillip and Sid) had particularly powerful comments on early childhood encouragements toward creativity cultivation.
Bella Rose is a bubbly mechanical engineer, who at 28 was the youngest interviewee. After receiving her BS, she went to work and almost immediately landed two patents. Bella explained the important creative lessons she learned from her father at a very young age:

My dad is—he’s the jack of all trades—mechanic, electrician, cook. So I grew up fixing cars. I grew up doing electrical work. You know, I grew up watching my dad fix any type of problem, and so in that essence I’ve always had this type of curiosity or problem solving. You know, if my dad couldn’t solve it with this tool, he would go and try to figure out some contraption and fix it another way. So my dad kind of instilled in me you can be creative. . . . So I’ve always tried to, you know, why should I waste more time doing something if there’s a quicker way to do it? Yeah, there is a process. I understand and it makes things standard, but there can be a more optimal approach. So I’ve always had that thinking, like what can I do to make it more optimal. . . . “How would my dad solve this problem?” you know. . . . after I got my first patent, I told my dad. . . . “Dad, . . . when I solved the problem, I thought of how you would solve it.”

In a similar manner, Carl noted that his father’s support for early entrepreneurial and creative efforts was key to the development of his pursuit of creativity. Carl was the only interviewee who did not have a college degree, but at 40 years of age, he had three patents in two distinct fields and owned a successful entrepreneurial business. As the following quote shows, his entrepreneurial bent was evident even when he was a child.
It was sixth grade, which is a wonderful time in that it is the first time that you are allowed to write with a pen. . . . And it takes a couple of weeks before . . . . some sixth grade boy figures out that if you take a BIC ballpoint pen apart you can use it as a spitball shooter. And then it takes about a week and a half for that knowledge to propagate through the whole of the sixth grade. And then the teachers get kind of upset and they realize that this is going on, and so the solution that my sixth grade teachers had was that, if they saw anybody with a BIC pen that had been taken apart, they would break it so that it couldn't be used as a spitball shooter.

And so, my solution to this was to go down to the hardware store and get some tubing and tie and wrap the tubing together with wire and tape and start selling double-barreled unbreakable spit wad shooters to my classmates. And school lunch cost $2.00. Okay. And so I sell my unbreakable, double barrel spit wad shooter for $2.00 apiece. . . . I got hauled off to the principal's office and was facing a suspension. My father comes, you know, the principal calls my father in and asked, “Are you aware of what your son was doing?” and he goes, “Wait a second. So he identified a need in the market space. He determined how to fulfill that need. He got his raw materials. He manufactured a product and he sold product, making a profit . . . . to a set of customers that wanted to buy it. This is the sort of behavior that we should be encouraging in our students.”

Chad has a Ph. D. in Science and Metallurgy, but is also keenly interested in Biology. He is married, 44 years old, and has two children who are showing his same
creative bent. Chad, too, reported that his family was an important support to his creativity cultivation. They tolerated his pronounced, sometimes destructive, and always messy tendency to dissect family appliances and garage sale finds to see how they worked:

I…played a lot with Legos, Erector Set stuff, building things; I took a lot of taking things apart. I used to frustrate my mom and dad but I'd go to garage sales, and stuff, I'd buy, like, old radios and I'd pull them apart, and just see what's inside. . . . This was always sort of an entropy maximizing exercise. I'd try and get it down to the smallest number of pieces that I could, so I'd end up with shoeboxes full of stuff, like old radio tubes, voltage regulators, low chassis stuff, so you wouldn't want to put it back together again, you'd probably electrocute yourself.

Henry holds a Ph. D. in Electrical Engineering, is married with three grown children, and held three patents in three distinct fields (two of which are outside his area of academic training). When Henry was asked, “Did you ever think of why you tend toward new ideas, while others don’t,” his response also highlighted the importance of childhood supports to the development of creativity:

Always I think about that, because it started quite a long time ago when I was a kid on following my father’s thinking, you know. So he always was so creative . . . . Whenever he comes across a problem, he thinks ahead and then tries to resolve it. You know… it started there and all the time he trained us in such a way that this should be the way. You need to think with creativity
and then move forward, find new, something new, which you could be able to make and contribute.

Herb holds an associate degree in business and has no technical education, yet he holds six technical patents in four distinct fields. Herb had no formal education in any of the four fields where he has patented. Herb also made it clear that his toolmaker father was an important inspiration and support for his creative efforts:

I think as a child I was always making things, just always thinking about, “How can I make something better or different?” …Well, my dad’s a toolmaker, so he, at an early age, encouraged us to build things. We would build soapbox derbies or add something onto a bicycle, and I even made a little boat. . . . and Dad helped make that paddle wheel – weld it up and everything at the shop.

Liam holds a business BS and an MBA, yet he holds 87 patents (more than any other interviewee). He has patented in five distinct fields, none of which reflect his academic concentration. Liam pointed to an uncle who taught him how to think creatively and the value of thinking creatively:

I had an uncle who was very creative. I mean, this guy . . . was always doing something that was different. I mean, even as simple as working his garden, he would go out, and he would actually grind the hoe a different shape so that it would be more advantageous and faster for him to work his garden. And he was always doing something—you know, taking the tools that were at hand and making them, well, not necessarily better tools, but better for his application that he was working for. If he had a problem, he would take a
look at what he had around him and adapt them to make his job either more efficient or easier or faster or what not.

While Liam was encouraged toward creativity by the active example of his uncle’s approach to daily life and problems, others, including Paul, only needed access to certain resources to grow creatively. Paul holds a Ph.D. in Electrical Engineering, and holds 15 patents in six distinct fields. Five of those patented fields are outside Paul’s area of academic specialization. Paul’s family supported his creative development by giving him free range on available discarded family items:

I remember when I was, I don't know, seven or eight years old, my grandmother had an old TV, and it wasn't working and it wasn't worth fixing, and it was an old TV... so that whole set went down to the cellar. And I basically spent probably the better part of that winter taking things apart and fooling around and. And eventually… I actually was able to receive Channel 2. I actually got the picture working.

Other interviewees, such as Phillip, highlighted early influences on thinking processes and risk tolerance. Phillip is 65 years old, a married father of two, with two patents and a BS in Mechanical Engineering. Phillip noted that his parents taught him to experiment with bold new ideas: “And you know, my parents and my family have all, I think, they've all, first of all, given me role models of people who are very independent. People who felt like they didn't need to take the safe path.”

Many interviewees, among them Sid, noted the value of early cultural influences and exposures, Sid is a 54 year old, married man with no children, a BS in Mechanical Engineering and two patents. Sid saw his first-generation immigrant
status and his culturally diverse community during his youth as important aids to his creativity development:

I'm a first-generation American. I have very unusual parents, not that all people don't have unusual parents.

I mean, it was different and it wasn't. I grew up in . . . a culturally rich community. My parents were holocaust survivors. They lived in England before the war. My mother . . . studied with Anna Freud in England, and my father was a graphic designer. They were just interesting…. But I mean, we could—my sister took music lessons and did stuff, and we weren't – my father was a graphic designer, I mean, and so I was brought up and around, so I certainly developed appreciation for art and design and even design thinking.

**Difficulties that compelled creative pursuits.**

Others interviewees were more compelled by challenging circumstances or situations toward creativity rather than encouraged toward creativity. Four interviewees (Clark, Fred, Mae and Woody) offered particularly relevant comments on early childhood circumstances that compelled them to creative pursuits.

For instance, Clark talks of being a shy, introspective child whose immigrant parents found him difficult, making him turn to creative work as an escape. Clark is today a confident and assertive 35 year old with a BS in mechanical engineering, four patents, and an adoring fiancé, but early in life creativity was his refuge, and how he coped with sometimes tough social family conditions. Clark noted his family
identified him as “different.” He became aware his different path was fulfilling to him but escalated the already evident tensions with his family.

Throughout my life, I’ve always opened things up and played with things. Legos were a big thing for me. I always made things with Legos that was my big thing. It’s weird. I always buy a contraption for different reasons. So, I’d buy a night-light, but I’d open it up and take the light sensor out or do something else with it. I’d just buy things because I knew the concept of what it does. I was like, “I need that for this.” I see the concept of things and I do the mechanical part of it. So, most people see a night-light. I see that it’s a light with a diode with a sensor that I can use to put on this, this, and this….My parents could not understand that type of thinking and my behavior frustrated and irritated them.

Clark pointed out that his parents did let him play with tools and explore new concepts, however reluctantly. But his creative work exacerbated already tense family dynamics, as he used and requested further family resources.

My dad would hate it when I used his tools. My dad always hated me using tools. When I'm learning, I’d break tools. I’d burn them out. I’d burn motors out. I’d break drill bits, and stuff like that. My dad hated when I’d use his tools. . .

Even my mom was like that. I was building a wood model plane. I was like eight. I remember using the wood glue. In the instructions, it said, “Use a nail file to file the wood.” I went to my mom and said, “Can I have a nail file?” She said, “Do you know how much a nail file costs? You can’t
have a nail file.” I grew up my whole life thinking that nail files were like $40 a piece. I remember that I went to Wal-Mart when I was 16, and I saw a box of 200 for like two bucks. I was like, “What? I thought these things were $100! Mom! Are you serious?” She did that with Q-Tips. She said, “Do you know how much Q-Tips are?” I'm like, “No.” She tricked me pretty good.

Nonetheless, Clark doggedly pursued more and more creative pursuits. His older brother appeared to be far more valued in the family, and the creative work was a salving outlet for Clark. He found the validation and satisfaction, not often found in his home, in his creative work. Even today, he feels those creative outputs distinguish him and serve to silence the nay-sayers.

As I look back to my childhood, I realize I was very isolated. I hid in my creative pursuits. Those pursuits engaged me and made me feel good when I solved problems I was looking into.

Here is the weird part—my brother was always the good kid. I was always seen as the bad kid. I was very hyper. I had ADD big time. I never went to school. I had straight F’s in school. I was a horrible student. Yeah. But I was in the top 1% at college. I remember my whole life—even when I was in high school—what my parents didn’t realize is that school was boring for me. They didn’t realize I’d skip school all day and go in on Friday, take the test, ace it, and leave. I’d do the bare minimum just to pass. They didn’t realize that. My whole life, my parents have been like, “Why can’t you be like your brother? Why can’t you just go to college and graduate one day?”
My brother is as straight as could be. My brother was always social and outgoing. I kept to myself. I was very quiet and isolated. . . .Today I can say, kind of like, “Ah-ha! Look at me now!”

Clark’s quotes explore a number of important points. First, he chronicles a pattern of early, somewhat un-informed, but enthusiastic early experimentation. His father’s irritation at his behavior arises, somewhat understandably, from the trail of broken tools during those early experiments. His mother’s refusal to provide simple and inexpensive nail files and Q-Tips also revealed her level of discomfort with Clark’s creative work. Certainly, the comparative parental evaluation of Clark’s brother as following a better and safer road than Clark was a burden for a young child to bear. But none of that prevented Clark from aggressively pursuing creative efforts. He showed the same independence by rejecting school when it constrained him. Clark effectively summarizes and demonstrates what so many interviewees noted, that the drive to create is intrinsically fulfilling, compelling, and rewarding. Clark concludes by succinctly communicating what value and satisfaction that creative work has given him: “Ah-ha! Look at me now!”

Some interviewees, among them Fred, came from economically challenged families. Fred had a more actively supportive family than Clark, but poverty and a dearth of available resources presented some challenges, and effectively mandated his creative path. Fred is a 67 year old, married, father of two with BS degrees in both mechanical and electrical engineering. He holds two patents in two distinct fields and credits some of his early life challenges as encouragements of his creative development.
And so time moved on and probably the technical influences in my life was one, was television because when I was born, we didn’t have television. We built our own antennas. We could only pick up Pittsburgh stations and so we had to build some pretty high gain antennas. My dad and I actually built a small cable system, if you will, the open wire feeders. So I learned to solder and I learned a little bit about that. Likewise, my dad used to tinker around with cars and I would tinker around with cars.

I mentioned I grew up in a coal camp. We were, I wouldn’t say poor but we certainly weren’t rich by any stretch of the imagination. And so my need to do things, my need to want things that I didn’t have caused me to make these things. So I think that the desire to want things and couldn’t get them, so I made them.

Next to Liam, Mae held more patents (32) than any other interviewee did. Her academic background was in education, yet her patents were technical in nature in two distinct fields. She is actively nurturing her two young grandsons to pursue creative endeavors. Mae was born into a family that needed her to step up to the plate creatively—and a family that supported her doing so.

We did all of the home improvement on the rental properties which my family owned. My brother was born with a disability, and I wasn’t. I was fine, so I was my dad’s right-hand man. We did wall papering and painting. . . . I can remember laying floor tile as a kid. I figured out to do it a better way, and my dad was thrilled. It was a confidence builder to try doing all of those different
things. Even the missteps taught me something. You’ll buy a vanity, and it
doesn’t fit. You learn to do a lot because you have to. As I said, growing up
my parents owned a business. They owned rental properties. We had to be
very creative all the time. Things didn’t work, so this had to happen. . . . As I
look back, I was always creative. My parents encouraged it. My mother
worked a second shift. My dad would tell us that if there was anything we
wanted to make or do, as long as the mess was cleaned up when my mother
got home, we could do it. If we wanted to cook something, we gave him the
ingredients. If we wanted to sew something, we’d tell him we need three
yards of fabric. We never had plans for anything. We just did it.

Of all the interviewees, Woody tells the story of perhaps the most challenged
childhood. Woody has two patents in two distinct fields. He holds a BS in Computer
Science and an MBA. Both of the fields where Woody patented are outside the areas
of his academic work. He is married with four children, and he finds it frustrating
that he has to really push his children toward creativity. Woody lost his Dad very
everly in life, and he turned to creative pursuits to help the family survive the real
challenges they faced:

My dad was killed when I was seven, and I think that has something to do
with it, because you kind of grow up but at the same time life is more on your
shoulders and so you just do it. And this idea of just—well, just do it, you
know.

When my dad died, my mom had to…start working—there was three
of us kids, and my mom actually lost her father and her husband within a
month. And so Grandma and Mom kinda teamed together and were cleaning houses and my brother and I would mow the yards and do everything. And so…from the age of seven on, if I wanted to go do something I just went and did it. So I didn't have—nobody painted me into a box with all sorts of rules that really may not be real.

There was also, though, there was like, I don't know, a sense of urgency is not the right word, but there was realism into it, because there were some days where if my brother and I didn't go out and catch fish, we didn't have very much to eat. So there was—it wasn't play, it was . . . we got to go make money . . . I need to do this so I can do this, so I can do this, and start putting together something. So we need to catch fish, so you become real good at catching fish because then you could eat and you wanted to eat…and stuff like that. So there was reality, it wasn't like all just a game; there was reality to it at eight years old, nine years old.

In summary, the interviewees clearly and powerfully indicated that there were important sources of support or inspiration for creativity cultivation in their childhood. Specifically, they identified that those important sources of support or inspiration fell into two categories: (1) encouragements of creative pursuits, and (2) difficulties that compelled creative pursuits. The interviewees did not, meaningfully, point to any other important sources of support or inspiration for creativity cultivation.
Positive experiences.

The second research question focused on positive experiences that supported the creativity cultivation of the interviewees: “What experiences have had a positive impact on their creativity cultivation?”

Interviewees expressed two dominant types of experiences that served as positive impacts on their creativity cultivation. First, a clear majority of interviewees offered that their personal exposure to a rich diversity of fields and information was a primary catalyst to their creative thoughts. Secondly, a very compelling majority of interviewees reported that organizational factors were key positive factors that had an impact on their creative performance.

Exposure to a rich diversity of fields and information.

Of the 16 interviewees, a significant majority had patents in divergent fields. Further, most interviewees held patents in fields that were outside their academic majors. Clearly, their work reflects a wide diversity of interests, and their remarks supported the same point. Five interviewees (Bella Rose, Chad, Clark, George and Liam) had powerful remarks emphasizing the positive experiences they had by being exposed to diverse ideas and fields. They indicated those broad exposures were powerful supports to their creativity cultivation.

Bella Rose noted, for example, that learning new things is a mandatory daily experience for her:

I guess that’s the beauty of being human and being an engineer. Right? We’re always learning and like, I don’t know, I guess I make it a goal to learn something new every day. Sometimes I learn more than one thing.
Sometimes it’s like, all right, I need to go read to learn . . . . I think yeah. I mean my dad always helped, let me work in the garage or helped me, let me work like on motorcycles or doing electrical stuff in the house. So I guess, you know, in that essence I’ve always been curious. I want to learn. I want to use my grey matter for good, right?

Also, I guess interacting with other cultures is one of my favorite things to do to see what are your needs? Why did you move to the states or when you were there, in the other country, what were some problems that you had? And seeing how that relates to other cultures or other people.

I asked Chad, “If you could talk to a younger individual or person starting their career, either starting school or starting their business career or their professional career, what would you tell them is important in developing their creativity, in exercising those creative muscles, and learning to be skilled in those areas? What advice would you give them?” He made a similar point about the need for diverse exposures:

I would—you used a nice phrase there, “exercising those muscles.” I think the creative process is a very active thing. Maybe you’re thinking about stuff, but you should also be doing things, all sorts of things. So, one of the things I would encourage is to kind of play around with stuff….Because in that act of doing, you are making these connections that you wouldn’t have if you sat down and said, "Okay, I need a book on electronics projects," start with number one, go down through the recipe. That's not really creative, you're following a program, but if you buy all the stuff and say, "Ooh, I can hook this
into here and hook this into here," and you will start creating, so I think the sort of the play aspect is important and don't necessarily have a goal other than I'm going to spend the next two hours fiddling around with this stuff, see if I can make something useful.

Clark also pointed out that, often, the truly creative leaps come from people not wearing the blinders of “expertness” but instead from people working in diverse areas outside their comfort zone:

Don’t listen to the negative people. I’ve learned through experience that the reason they’re telling you that is they want to feel like they know more than you in that sense. I get that a lot. When I talk to an expert about something, they are usually the ones who say, “No.” When I talk to someone that it’s outside of their field, they’re the ones that try it. The experts are so focused on their world: “I'm an expert in this and only this. I know this so well that nothing else will work.” That’s what I realized. These guys that have been there for 40 or 50 years are experts in their field. I asked them about the design that they’ve been doing forever. They’ll tell you all about it. When you throw a curveball at them, they’re like a deer in the headlights: “That’s crazy! That’s not going to work.” It’s outside of their comfort zone.

Similarly, George is a powerful advocate for the value of diverse experiences as strong supports for creativity development. He has a Ph. D. in Electrical Engineering and holds 10 patents in four distinct fields, three of which fields are outside the area of his academic education. George had little chemical background when he was asked to contribute to a foundering project on electro-optic modulators.
He found his very divergent background in electrical engineering was exactly the skill set needed to solve the problem:

Most of the work being done there were to be done by chemists and so, as they had to stack various materials on top of each other and they’re applying a voltage. Then I have to worry about the impedances of those different layers and where the voltages dropped and the voltages won’t have dropped across a certain layer. And in order to do that, you need to figure out what the impedances are of all the various layers and then adjust those so that you drop the voltage in one. It is a simple voltage division problem that an electrical engineer would see, but as a chemist, no. And so, I was surprised that no one had thought of that.

To be really creative, I believe you have to be continually exposed to new things. If you aren’t, then you have a hard time coming up with new things to do . . . . I’ve always been open to going to different seminars, attending conferences, where you’re exposed to new things. You see something you hadn’t thought of before and say, “Well, I can put that with this.” Or, I can team people with people.

Liam perhaps put it most succinctly: “I’m interested in everything….I like to experience a lot of things . . . . and I enjoy asking, “Why not?” about anything and everything."

The interviewees overwhelmingly noted that exposures to rich and varied stimuli were critical experiences that positively influenced the cultivation of their
creativity. They spoke of the need to step out of one’s comfort zone, and explore new fields in order to develop creative skills.

**Organizational Factors.**

As noted, a large majority of interviewees indicated that organizational factors were key positive factors impacting their creativity cultivation. Eight of the interviewees (Bella Rose, Glenn, Clark, Vincent, Chad, Sid, Phillip, and Mae) made particularly powerful comments on key organizational factors that positively affected their creativity cultivation.

Uniformly, the interviewees discussed a compelling need to be allowed to be creative in their organizations. Bella Rose expressed this need clearly:

So I mean I still remember every day vividly while working on this technology that I patented. I mean I was so excited to go to work and I didn’t even care that I was staying late, you know. It was just, it was fun. . . . but I have never been so—I haven’t felt it since, like engaged or so motivated or excited to use my brain in like a huge, meaningful purpose. I haven’t felt it. I still have not; it is like my body is longing for it. Not adrenalin, but I don’t even know how to explain it. It’s my body was just so full of joy and excitement and it’s like I would feel my connective tissue throughout my body just feel strong and I don’t know. That’s the only way I can explain it . . . .

It’s like literally I felt my body glow with excitement and the sense of joy of getting to solve a problem.

Glenn is a senior manager in the defense industry, with experience both in the Armed Services and in military contracting. He was one of three interviewees who
held an MBA, he also holds a BS in Mechanical Engineering, and had two patents in
two diverse fields. Perhaps because of his business education, Glenn had spent
considerable time considering how to actualize creativity in the workplace. Glenn
reported that the primary reason for his considerable success, in both the armed
services and military contracting, was that he studied organizations and tried to
consciously manage in ways that encouraged creativity.

Creativity is a huge adjustment strategically. A good example was the
resistance to airplanes that were stealthy. There are huge doctrinal and
organizational antibodies that oppose such a paradigm shift. There are huge
amounts of personal credibility and careers and monies on the line that would
want to sustain the status quo. Because we already knew how to make
airplanes that were visible to radar. The major manufacturers make much
more money not having to learn how to process those new technologies. They
were not in a big hurry to make airplanes in a completely different way that
was invisible to radar. And they were already making huge amounts of
money, and they would make more money if they didn’t have to learn,
possess, change everything. And the users would also not have to revise their
doctrine and their strategy and their tactics and everything they learned
coming up. So there are huge impediments to change….

You simply cannot have creativity if you have not pro-actively
designed the organization to support that creativity. And it takes pre-
planning, laying [sic] in wait until the opportunities present themselves,
having the right resources at hand to seize those opportunities.
Glenn also made it clear that if someone really wants to be a manager who builds a creative organization, he or she has to be willing to wear battle scars proudly, because that person will definitely have battle scars:

In general, for the organizations I was in charge of . . . I was responsible for failure. My subordinates were responsible for success. I tried to take personal responsibility for any failures and I tried to make sure my subordinates received tremendous credit for successes. There was no one in the room prouder than me when a subordinate was honored—not the wife or husband, not his or her mother, no one. Because I knew I had made his or her great work possible, I find that tremendously gratifying.

My job was to get my people resources. You find ways for them to use facilities, but you focus their energy in ways that you eventually assemble a killer argument for why their creative agenda should be supported.

When you did that, you got real progress. You got creative people begging to join your team. And once they joined your team, they performed incredible feats of creativity that represented phenomenal leaps forward. They felt safe and appreciated when their boss behaved in this way. I never had to ask them to go above and beyond. They were personally motivated to do so.

Similarly, Clark recounted that, even when the organization is not ideally designed for innovation, the provision of appeal or alternative review processes can act to preserve creativity that would perish otherwise:
I said, “Look at this theory.” I showed it to my boss at the time. He didn’t say a word. He just looked at me and said, “Let me show my boss.” He showed his boss, and his boss said, “We already did that in the 80’s.” He explained what he did in the 80’s, and it was nothing like the concept I was proposing. My boss’s boss didn’t understand the concept. He just brushed it off. . . . I showed the data. I had a lot of naysayers. At that point, everyone stayed quiet. When I first made the prototype without testing it, it was on my desk. I’d say about 6-10 engineers that had been with the company for 40 years looked at it and said, “It’s not going to work. . . . I tested it with the data. I showed everyone, and they were like, “Oh, cool.” They liked it, but nothing happened.

Still, even with the hard data, my boss’s boss did not change his position. This guy had been with the company for 42 years. If he says, “No,” it means, “No.” It was kind of annoying for me. My boss knew I had something, too. But if this guy, my boss’ boss, said, “No,” then everyone agreed with him even if I had hard data in hand.

But I had the right to present any new idea to our patenting committee. It was probably not a good political decision for me to do so, but I decided to do so and my boss supported me. We went to the patent meeting. . . . Once a month, all of the heads in those departments of the R&D side meet. Anyone is allowed to come up with a concept, and they go through this patent committee. My boss’ boss’ boss sits on this committee, so we decided to give it a shot. I explained the concept with the data. Within 5-minutes of the
meeting, every single person on the patenting committee said, “We need to put a patent in right away on this. I want it in by this week” . . . Within six months, we had patents. And within a year, we won major contracts based on this new technology—we made a fortune, and saved our clients more.

Just as Clark’s organization had a process that helped dismantle creative obstacles, other interviewees including Vincent spoke of organizational designs that supported creative work. Vincent holds a Ph. D. in Electrical Engineering. He holds three patents in three distinct fields, two of those fields are outside the area of Vincent’s academic concentration. He is married with two children, whom he actively encourages toward creative work. Vincent noted, with gratitude, that the organizations he stayed with gave him freedom and support to run his own agendas:

It is kind of odd. I have been really lucky in this—and some people say no, you’ve just shown a lot of talent—but I feel very lucky because of the fact that I had been recognized for my talents, and I was put in positions where I was allowed to make decisions, and they were respected by the management. . . . I LOVED being able to run my own show and was glad to be responsible for the results. They were very pleased with my outcomes, but of course managers move on and I eventually got a manager who wanted meetings, constant reporting, and total oversight in spite of my good results. I started shopping my résumé immediately and I had takers.

In my new job, I’ve been moved over the past—well, I’ve worked there for over five years. So when I was three years into my tenure there, I had moved into positions just like that, where I’m thinking outside the box
and coming up with a really wacky way of solving a problem, and they let you go.

Vincent spoke of organizations that gave individuals the freedom to behave creatively. Interviewees also pointed out that correctly designed and administered organizations are the ideal vehicles to encourage teamwork and collaboration; many of the interviewees made it clear that collaborative teamwork is a tremendous support for creativity cultivation. As Chad noted “I do think that people feed off of each other—creative people—because everyone tends to see things from a slightly different perspective, and those differing perspectives can spark insights.” Paul pointed out, “Learning a process and problem solving from a multi-disciplinary perspective, you need to work with someone or for someone who does that, because otherwise, you’ll find your own little comfort zone. And that’s not good, that’s not good.” Sid said organizations are about making creative people more creative: “It is about bringing people together who wouldn’t normally be together to see what kind of magic can happen, and creating some context to allow that magic to take place, and to me none of this is rocket science.” Woody also made a strong case for the importance of the organization in bringing creative teams together:

Creativity only begins with the idea . . . if you think of the idea, it could only be like the toe or the bone of the little toe. To make it into final form, you have to add the rest of the whole body, and that’s other people with differing skills and differing ideas and differing backgrounds.

Phillip made the point that, to foster creativity, organizations must have open lines of communication and involve all team members in open discussions and
collaborative problem solving. He specifically discussed the importance of open communication between management subject matter experts and accomplished performer workers.

The SME, the subject matter expert, is very useful to have effectively involved in work management and strategy because they can help you to assess some of the judgments of the accomplished performer. But that accomplished performer, somebody who does an outstanding job, should also be deeply involved in managing and strategizing the work. Everyone should be studying what it is that the accomplished performers do, how they do it, the skills that they need to do it, the environmental conditions that are necessary for it to happen and so forth.

Chad said that the organization with a good boss or good co-workers could be a critical source of support for the creator. He spoke, with clear appreciation, of others that supported him and his creative supports.

I mean there’s been numerous examples of that, and people that I know, and people who have mentored me, who have sort of put everything on the line for what they believe was a good idea, win or lose. And often these people did not have support or a safety net or anything like that.

Mae noted that free-range work conditions also encourage creativity. She told the story of an idea she had had that would have generated big savings but that would have required changes in a department that did not report to her. The boss in that department had longer tenure, and resisted Mae’s suggestion because it was not her
idea. The other manager even went to Mae’s supervisor to complain about Mae’s “meddling.” The supervisor heard both sides of the argument and Mae quoted her as saying:

The way I calculate things, the annual savings from this idea will be greater than $250,000. In this organization, whenever anyone has an idea that offers that type of savings, there are no boundaries; IT BECOMES THEIR AREA TO BE CONCERNED ABOUT.

The interviewees made a strong case that organizational characteristics, as well as varied exposures, can have a powerful positive impact on creativity cultivation. They provided explicit examples of organizational factors that helped develop their creativity.

In summary, the interviewees made the case that there were two primary types of experiences that positively impacted on their creativity cultivation: (1) personal exposure to a rich diversity of fields, and (2) organizational experiences that supported creative work. The interviewees did not, meaningfully, point to any other important experiences that exerted a positive impact on their creativity development.

**Negative experiences.**

My third research question focused on negative experiences that inhibited the creativity cultivation of the interviewees, the question specifically being “What experiences have had a positive impact on their creativity cultivation?”

Almost all of the interviewees identified organizational factors as being the key inhibitors of their creativity cultivation. Fifteen of the interviewees (Fred, George,
Herb, Bella Rose, Clark, Vincent, Carl, Liam, Mae, Chad, Paul, Sid, Woody, Phillip, and Glenn) provided specific examples of organizational inhibition of creativity cultivation. Further, a compelling majority of the interviewees indicated that they had voluntarily left organizations when those organizations failed to support their creative endeavors.

Fred noted, “If I don’t like the environment I’m working in, I’ll leave and go someplace else.” And he did; over a long career, he moved five times to more and more senior positions. But each move was largely motivated by factors that he felt limited the flexing of his creative muscles, such as penny-pinching venture capitalists, increasing bureaucracies, or increasingly distracted management.

George made essentially the same point, making it crystal clear that if he could not function positively and creatively within the organization that he would move on:

It’s got to be fun. If it’s work, you’re not going to come up with anything. You’re just going to punch the clock. I would say when it stops being fun, then you do something else. Now, unfortunately, our organization has changed over the course of my career, and it is more rigid, harder to try new things, generally just less fun. However, you find ways around it, though. You know, I’ve always said that when the time comes that I can’t outthink the management, then I’ll retire. [Laughter] I’ll retire long before I have that problem. So, at this point in my career, for me, I try to help the younger workers and . . . try to help them build the contacts that I would see would help them, or aid them in their career.
Similarly, Herb noted he would not stay if the organization did not support his creativity cultivation. He characterized the organizations where he did stay:

…were very supportive. There was just a lot of freedom, very open to ideas, very much the same, as I think, as I was. We were all of the same cloth, so to speak, I think. When that would change, due to new management or new ownership or whatever, I moved on. I couldn’t breathe or be happy in a different atmosphere, which I saw as stagnating.

In discussing the positive organizational supports for creativity, interviewees effectively also isolated the inverse organizational characteristics that would tend to inhibit creative growth. Bella Rose found an organization that eventually facilitated creative expression, and hence an organizational lack of tolerance for creative expression would have been a negative for her. Glenn built his success on strategic design of the work force and organization to facilitate creativity cultivation; he would not have been comfortable in an organization that would not allow that pro-active work. Clark’s creative work was saved because he had a way to circumvent obstacles within his organization; hence, he establishes he would be dissatisfied without those organizational resources. Vincent noted that the freedom to build his own agenda, as well as the support for doing so, was key to his success in creativity cultivation; clearly, he would have been dissatisfied in an organization that failed to do so. Chad, Paul, Sid, and Woody found organizations that encouraged teamwork and collaboration, pointing out that organizations that did not do so would effectively inhibit creativity cultivation. Phillip noted that open lines of communication within an organization facilitated creativity cultivation, and that narrower or restricted lines
of communication would impair creativity cultivation. Clark noted that organizations and bosses that support creativity encourage creativity; organizations that do not support creativity will see creativity restricted. Mae spoke of removing boundaries to promote creativity, and she provided an example in which an effort to impose an artificial boundary would have restricted creativity cultivation.

While recognizing the positive impact of good organizational support, a strong plurality of interviewees, reported either their plans for, or their success in, establishing their own organizations. These 10 interviewees reported feeling compelled to establish their own organizations, after often seeing formerly creative organizations tend toward non-creative behaviors over time. Liam noted, “Success can be a powerful foe of creativity. Big success can make a creative organization begin to turn non-creative, trying to protect their now more valuable status quo.” These new, self-generated, organizations were often seen as necessary to insure that creative behaviors were effectively supported not inhibited organizationally, over time and/or with success. Unfortunately, some of the interviewees who established, or were trying to establish, their own organizations reported that financial issues often became critical problems and were continuing concerns. Carl, Herb, and Vincent expressed extreme frustration that excellent ideas of theirs were not being developed simply because of financial difficulties.

Liam and Phillip had experience working in big and small companies. They agreed that creativity can prosper in each kind of organization but noted that larger corporations tend to be systems driven. As Liam noted, “a system is a repetitive process for handling something, it is by nature an avoidance of the different, and
creativity comes from different.” Liam and Phillip both pointed out that getting system over-ride on new and better ideas could be prohibitively time consuming and expensive. Phillip noted:

I can invent these wonderful things but the bureaucracy for getting them approved to go to the shop floor or market is horrible . . . the politics and the bureaucracy to make things happen, chances are these great ideas will either never see the light of day or this cutting edge stuff that I came up with will be old hat and no longer a competitive advantage by the time I have permission to implement.”

Phillip also talked about a new management concept, matrix management, which some larger corporations have tried. In matrix management, individuals have at least two supervisors. One is a functional supervisor, such as a VP of Engineering, and the other supervisor is the manager responsible for a product line or business unit. The engineering VP is judged on keeping reasonable such engineering costs as testing expenses; the operational manager is judged on product profits. If there is a technical problem restricting sales or increasing warranty costs, the operational manager will wish to spare no expense to resolve the matter, but the engineering VP will be driven to not make extra testing investments. Everyone is caught in the middle trying to meet conflicting supervisory goals. No one feels safe, and creativity prospers in safe environments where failure is tolerated and supports are available (Amabile, 1996). Phillip spoke of his personal experience working in a matrix managed organization and the impact it had on his creativity:
It was a matrix system where . . . every project that needed to be done was
driven by this process . . . . There was a project management organization that
was given a very large political hammer to run the operational end . . . . The
technical integrator on the project was the product tech. But he had to be—he
or she had to be very, very careful not to step on somebody else's territory
because they were all peers around the table. The person who was not a peer
around the table was the project manager. Now, the project manager didn't
attend all the meetings but attended enough of them. The project manager
was in charge . . . but the project engineer was always there; he was the peer
among peers. But he was the peer that could ruin your career, okay. And
typically, he would interact with you as a peer, and if there were heavy
politics afoot, the project manager would be in the room and then would
swoop in, okay, after the project engineer would set things up. Meanwhile,
the architecture group, the civil engineering group, the design engineering
group, the instrument, the electrical power and control, et cetera, et cetera,
all—and the product tech, all of these folks were in different organizations
that didn't match up to the operational vice president, they all had their own
agenda and any one of them could kill you. Your chief goal had to be to keep
your head down. Put forward a new creative idea, you get noticed, and you
ger get punished if it does not work, maybe you get punished if it does work
because you made powerful others that did not think of it look bad.

What insane political agendas, I mean it's horrible with conflicting
goals, conflicting agendas. And really, human nature is at the heart of all of it.
It's the fact that for each person to succeed they have to please their functional boss, but at the same time, the project needs to be a success for the business. Their boss' agenda is the opposite of the agenda of their other boss’ agenda over there. And the conflicts that this sets up, and the games that this sets up, are so counterproductive and so expensive for the company.

I mean it was not surprising to me that this whole dynamic drove people literally insane. There were people who went crazy. Oh, we had nervous breakdowns. Yeah. We had some guy—I remember he was wandering around out in the hall and he was charting lines on the floor. Had other folks who were right at the verge of attacking each other in the room.

I simply had to leave, I wasn’t being creative and it was damaging my health.

An overwhelming percentage of interviewees reported that there seemed to be increasing drives, often fueled by misguided applications of the latest management trends that can often re-configure organizations in ways that inhibit creativity cultivation. George indicated:

They’re cutting back on the research. They’re cutting back on conference participation. They’re cutting back on travel as it is, and they’re thinking that a—they can’t tell the difference between a convention and a conference, a technical conference. And most of the ideas and most of the collaborations have come from being exposed to those different environments. And on top of that, what helps is that, by teaming with people from different countries or even different gender, everybody approaches a problem differently, and so if you work on your own, there might be ways you didn’t see. But, if you bring
in several different people together, different cultures, different viewpoints—
put those together and you can get to new things much faster than you could
before because you’re bringing to light things that you hadn’t thought of
before. That is being cut out. It’s much tougher to collaborate overseas than
it was just because you can’t travel. You can’t collaborate with someone
unless you visit them, unless you see them in their culture, otherwise you’re
banging your head against the wall. Why are you doing things that way?
That’s not good. If you visit and you see how everybody lives and say, “I
understand where you’re coming from now,” and then it’s much easier to
work with a lot of different people . . . . I feel sorry for the younger people
coming in to the . . . system right now . . . . The opportunities are not there
for them that were there for me in my career.

Vincent made a similar point about changing organizational policies that he
felt were discouraging creativity:

There is a little bit of a war within engineering in the fact that some engineers
are called Edison engineers—they do non-applied experimental work to
develop new concepts. Edison did hundreds, even thousands, of experiments
before he developed a workable light bulb. I have noted that organizations
today tend to have far less tolerance for that type of experimentally driven
research. You can’t have paradigm-busting progress with only applied
research, you are just going to have incremental innovation with wholly
applied research. It is a real shame that we are designing our work to make
big strides almost impossible to get.
Glenn also noted that some misguided applications of newer Lean principles, applications emphasizing short-term performance inappropriately, could lead to incentivizing the wrong behaviors:

I believe, especially in my experience in corporate industry, we incentivize the wrong behavior . . . . And so the things that are easy to measure, therefore the things that people think are fair to measure, get used in rewards systems. But those easy to measure things are generally not the things that will produce breakthroughs and capability and such. So . . . corporate successes measured in quarterly profits, well, what would you do to get high quarterly profits is not what you get, usually do to maintain long term market share and corporate sustainability. But . . . people are very clever, if you incentivize them to achieve quarterly profits, they will do that, okay. You may not get what you desire as a result in the long-term performance and capability and profitability of your organization. So, we incentivize the wrong behavior.

Bella Rose also pointed out that dogmatism, sexism, and elitism can mire creative efforts:

I was teamed with two Ph. D. chemical engineers that are patented, they’re smart. They’re geniuses, right? Obviously, there’s a lot of work that goes into that degree. So I’m just a bachelor chemical engineer, you know. So what I thought was neat was we brainstormed independently. You know . . . as a team we said we are going to think differently, come together and then share our ideas.
They said . . . “Well, we know the limitations of this. We know the limitations of this” . . . And then my approach was well, okay, I understand that maybe there’s a limit here, but there’s not a limit here. So I was using multiple theories of chemical engineering but also this creativity that I knew that I’d experienced before in the past. And so they laughed at my idea actually. These guys, these two guys were just like, you know, that’s impossible. There’s no way.

So at first I was like, okay, well, I feel like I’m an idiot. They think I’m stupid. And so we agreed that we’d try their ideas first. . . . So we tried their ideas first. Their ideas weren’t consistent performers.... So my ideas incorporated both goals, micro-toxin isolation and water economy. And so they laughed. They’re like, “There’s no way—you can only do one.” Okay. So their ideas, we tested them but they weren’t accurate. They weren’t precise either when it came to just trying to separate the corn. And so, you know, we went through the first guy’s. We went through the second guy’s, and then I was like, “Okay, guys, you know, we weren’t able to solve it. Why don’t we use mine? You know, it’s not going to hurt anything. We should just try it.” So not only was it accurate, it was precise and it solved both problems.

They were floored. I mean they were just like, like their jaws dropped. Their eyes were kind of like oh, my God, like this five-foot, one inch-inch girl these guys were huge, you know. I think one guy is six feet, three
inches. and the other guy was six feet so you know, just five-feet, one-inch. They were floored.

Bella Rose’s immediate supervisor had a Ph.D., and in Bella Rose’s performance review, this supervisor told Bella Rose that she found it hard to take Bella Rose’s suggestions too seriously since Bella Rose had only a bachelor’s degree. In fact, the supervisor actively worked to avoid giving Bella Rose new research agendas, especially if those agendas would give Bella Rose exposure and background in other departments. Bella Rose quoted her supervisor as saying Bella Rose’s patented breakthroughs were simply a case of “even a blind dog finds a bone sometimes.” Bella Rose has since left this employer to return to school. She described her feelings toward her supervisor’s attitude:

I hope that’s not what you’re saying because then you’re saying you’re better than me in everything, you know. And we all have the same human needs. We all need water. We all need food. We all need to go to the bathroom, and we all need human companion, some sort of human companionship. So what makes you—like literally these are thoughts that I had. I was like, “What makes her better than me? Is it a degree?

Carl, Liam, and Mae also shared that they had left organizations that became excessively bureaucratic. Carl explained one particular incident in these words:

I understand checks and controls, and I understand live versus development databases. But if there is inarguably only one small piece of bad in one particular record, my organization began to insist I go through nine days’ worth of proceduralized steps to make a one-second change. I had the original
database, I never had a problem, no one knew exactly who made this change in procedure . . . but I was stuck doing it. Day after day, week after week, I had gone from being phenomenally effective to a drudge. There was no time for the creative work with all this new drudgery. It was illogical and there was no appeal, no one took responsibility for the change, but management sure took the initiative to enforce it. It was sayonara for me.

**Chapter Summary**

This chapter presented the three main findings from my research in a manner that mirrors the three research questions. First, interviewees spoke of childhood contextual circumstances that were important sources of support for their creativity cultivation. Those contextual childhood circumstances were of two types: (1) the encouragement of creative work from significant others, or (2) essentially negative situations that compelled the individuals to creative behaviors. Secondly, interviewees identified two types of experiences that supported creativity cultivation: (1) personal exposures to a rich diversity of fields, and (2) organizational experiences that supported creativity. Thirdly, interviewees identified organizational experiences as major inhibitors of creative work. These findings were first presented in summary form, and then the summaries were supported with more detailed discussions that used participants’ verbatim remarks as much as practical.
CHAPTER 5

ANALYSIS OF FINDINGS AND RECOMMENDATIONS

Introduction

This dissertation research is intended to allow better understanding of what encourages and discourages the cultivation of creativity. To shed light on the overall problem and to fulfill the research purpose, I have explored the following three research questions.

1. What source(s) of support or inspiration have influenced multiple patent holders’ creativity/creative process?

2. What experiences have had a positive impact on their creativity cultivation?

3. What experiences have had a negative impact on their creativity cultivation?

I begin this chapter with a discussion of the themes in the findings, and tie those themes to the relevant research question. I then provide an analysis of the findings that connects to key references in the literature review. I follow with recommendations for practice and research. Because organizational factors were cited so clearly and strongly as being both important supports and inhibitions for creativity cultivation, I then offer an integrative template as a vehicle to merge some
of the now primarily insular work in creativity research and organizational theory for my future work and that of other researchers. I include the results of this dissertation research in that discussion. This integrative template is based upon the standard template that most organizational theory researchers now use to describe organizations (Hanson, 2003). Finally, the chapter summary recaps the findings, reviews how the work addressed the identified research gaps, discusses study limitations, and suggests areas for further research.

**Themes**

Four major themes became evident in the interviewee remarks. First, and related to the first research question, a compelling majority of interviewees cited contextual childhood supports and inspirations for their creativity cultivation. Second, and related to the second research question, a clear majority of interviewees reported that diverse personal exposures and experiences supported their creativity cultivation. Third, and also related to the second research question, a significant majority of interviewees discussed important organizational experiences that supported their creativity cultivations. Fourth, and related to the third research question, a large majority of interviewees also referenced important organizational experiences that inhibited their creativity cultivation.

**Analysis.**

**Childhood supports and inspiration.**

First, the overwhelming majority of interviewees reported that early childhood provided important sources of support and inspiration for creative behaviors and influenced their creative processes. Further, the interviewees reported that once those
creative tendencies were developed, they became natural patterns of behaviors throughout the remainder of their lives.

These early influences tended to be of two types: (1) encouragements of creative pursuits and (2) difficulties that compelled creative pursuits. Interviewees did not report any other sources of support or inspiration that rivaled the impact of their various childhood experiences.

None of the previous research suggested such an early and strong connection between contextual childhood supports and challenges to creativity cultivation, perhaps because the focus of that earlier work was not on the process of creativity cultivation. I was surprised that the interviewees would so strongly and almost uniformly trace their creative behaviors to conditions of their childhood. Many researchers have noted that our periods of childhood and adolescence have changed considerably in only one generation (Sawyer, 2012). A. S. Kaufman (2009) noted today’s children have far less free time, far less unsupervised play time, far less unscripted play time, and far more passive time with electronic devices. Similarly, Lum (2006) wrote that helicopter parenting has fundamentally changed the childhood and adolescent experience. She pointed out that educators report it is routine now to have parents of college-age children call educators in order to manage the most intimate and personal aspects of every phase of their children’s experiences. Lum (2006) has even fielded calls from parents asking for help in getting their college-age children into romantic relationships, as well as the more routine calls asking where the parents should direct their children to get their laundry done or buy their typing paper. She noted that such calls were an extension of the hovering, constantly-in-
communication style of parenting that has characterized baby-boomer parenting of their millennial children and later generations. The interviewees in this study overwhelmingly reported being encouraged or compelled into self-sufficiency and pro-active problem solving. In contrast, today’s evolving adults are much more likely to be coddled in a life devoid of challenges and full of aggressive supports. Given the independent and empowered early life experiences of the serially creative individuals in this study, the implications of changing play behaviors, coddling, and over aggressive supports may suggest dire implications for creativity cultivation in the future.

**Diverse personal experiences and exposures.**

Secondly, a majority of interviewees noted that personal exposure to a rich diversity of fields and information was a primary catalyst to their creative thoughts. These remarks were reinforced by the fact that a majority of the interviewees held patents in divergent fields, and most of the interviewees held patents outside their academic field of study. As was discussed during the literature review, a number of creativity researchers have also taught of the importance of varied exposures on creativity cultivation. Koestler (1964) noted, “All decisive advances in the history of scientific thought can be described in terms of mental cross-fertilization between different disciplines” (p. 230). Other researchers pointed out that narrowed frames of reference encourage dogmatic thinking which precludes creative breakthroughs (Ambrose & Sternberg, 2012). Furnham et al. (2009) and Silvia et al. (2009) both wrote that openness to new experiences is the personality trait most closely associated with creative individuals. MacKinnon (1978) taught that openness to new
experiences and fields is characteristic of the creative personality. Nussbaum (2013) noted that many creative acts are the insightful recognition of advantageous linkages of ideas from diverse fields.

The No Child Left Behind (“NCLB”) legislation became law in 2001 and required standardized testing in specific areas of study, and this law has fundamentally changed how elementary and secondary instruction is organized (Jennings & Bearak, 2014). These researchers reported that far more classroom time is now spent on the discrete specific topical areas that the tests address. The depth of coverage in those discrete areas has intensified, almost certainly at the expense of more varied topical instruction (Jennings & Bearak, 2014).

The situation of narrowing focus has also occurred in institutions of higher education. The percentage and number of students pursuing vocationally directed majors over the past several decades has risen sharply, while those pursuing liberal arts majors that focus on preparing students to develop critical thinking skills and widely informed interests have declined (Bok, 2006). The interviewees in this study reported that diverse exposures and a wide variety of interests were important experiences that aided in their creativity cultivation; these changes may, therefore, also have negative implications for future creativity cultivation.

Organizational factors and creativity cultivation analysis.

Positive organizational supports for creativity.

I was not surprised to find that organizational experiences and characteristics would be cited by the serially creative interviewees as supports for creativity cultivation. As discussed during the literature review, a number of creativity
researchers have taught of organizational impacts on creativity cultivation. Steiner (1965) first demonstrated that the organization could have positive impacts on creative work and creativity cultivation. As Amabile (1983) noted, individuals exist in organizations that frame, hence influence, individual actions. Amabile et al. (1996) found that work group supports, creativity encouragement, employee freedom, employee autonomy, sufficient resources, and the provision of challenging work were powerful aids to creativity. Woodman et al. (1993) also taught that the organization exerts multiple level impacts on individual behaviors, especially individual creative behaviors. Mumford (2000) found that organizational impacts on creativity cultivation are dynamic and multi directional.

**Negative organizational inhibition.**

I also anticipated and found that organizational experiences and characteristics were cited by the serially creative interviewees as inhibitors for creativity cultivation. As we discussed during the literature review, a number of creativity researchers have taught of organizational impacts on creativity cultivation. All of the researchers cited above, during the discussion of organizational characteristics that support creativity cultivation, also noted that inverse organizational characteristics could have strong negative inhibitory impacts on creativity cultivation. Other researchers extended that work to focus on the somewhat natural tendencies of organizations to be inhibitors to creativity cultivation as a default, thus arguing for conscious management of those organizational tendencies. Ford (1996) noted that organizations by their nature encourage repetitive actions that generate consistent not creative outcomes. Ford (1996) also taught that organizations tend to attract and select individuals with a
common frame of reference and outlook, then socialize those individuals further into a homogenous culture that minimizes the chance of new idea acceptance or attention. Janis (1971) wrote of Groupthink, which she defined as flawed decision-making based on concurrence seeking at the expense of rigorous analytical examination of new and potentially better ideas. Clark’s experiences clearly illustrated a number of situations of groupthink in his work life. He spoke of engineers that would not look at new ideas if the Chief Engineer refused to actively consider the idea, and he spoke of managers that rejected ideas simply because they were different than currently relied upon assumptions.

Of the 16 interviewees, the vast majority identified organizational factors as being the key inhibitors of their creativity cultivation. They spoke of a variety of organizational behaviors that imposed controlling constraints on potentially creative individuals such as risk intolerance, rigid bureaucratic rules, unalterable systems of operation, lack of support for pure research, lack of support for collaborative efforts, and dogmatism. While a large majority of interviewees identified organizational factors as key supports for creativity, the same large majority of interviewees also reported leaving organizations that had inhibited their creativity cultivation. Further, most of the interviewees reported their successful establishment of, or plans to establish, their own organizations to insure organizational supports for creativity are maximized.

What was surprising was the interviewees’ clear understanding and conscious recognition of the critical impact of organizational experiences in supporting their creativity cultivation. Essentially every interviewee spoke of powerful organizational
factors that both supported and inhibited their creativity cultivation. Organizations were noted as being powerful supports for creativity when they encouraged teamwork, fostered collaboration, were risk tolerant, used supportive management practices, had systems to circumvent creative road blocks, encouraged active cross-functional communication, allowed substantial employee freedom, and actively encouraged creativity. Conversely, organizations that emphasized bureaucratic controls and were risk intolerant were characterized as strongly inhibiting creativity cultivation.

**Recommendations for Practice and Research**

**Childhood supports and inspirations.**

Kim (2011) has clearly documented recent creative performance declines on the *Torrance Tests of Creative Thinking*, and the majority of U.S. patents are now awarded to foreign inventors. The research data from this work raise the question of whether parenting styles, and changes in those parenting styles, might be having an impact on creativity cultivation. Today’s parents have delegated babysitting to electronic devices, modified play conditions and actively coddled their children (A. S. Kaufman). There is no significant research literature exploring the relationship between parenting styles and childhood experiences with creativity cultivation. This may suggest the value of future studies exploring parenting style and correlating that style with the eventual creative performance of children. The eventual work on parenting styles could be extended to explore the quasi-parental role that educators sometimes have thrust upon them. The parenting research could suggest further research in exploration of alternative pedagogical methods to support creativity in the
classroom. The methods to be studied could include in particular: structure of assignments, available learning resources provided, methods of instruction, and patterns of interaction with students.

**Diverse personal experiences and exposures.**

The findings of this research suggest that varied experiences are strong catalysts for creativity cultivation, yet educational experts report a move toward more narrow subject studies in primary/secondary education and a move to vocational studies and away from the broader liberal arts curriculum in college (Bok, 2006). There is little substantive research literature exploring changes in creative activity as NCLB and the move to more vocational college majors has developed. This suggests that future studies exploring the impact of educational curriculum concentrations on creativity cultivation might be helpful. This finding also suggests the potential benefits of diverse viewpoints, exposures, and types of material in the classroom.

**Organizational factors and creativity cultivation.**

Educational institutions are organizations. As discussed in chapter one of this dissertation, educators have clearly established the need to foster creativity development (Welkener, 2004). The findings of this research suggest organizational characteristics that creative individuals have identified as both supporting and inhibiting creativity cultivation. These specific characteristics are discussed later in this chapter within the mostly commonly referenced organizational theory evaluative template. These findings could be used to help shape an educational organizational culture and structure that aids in creativity development. The organizational outlines of what the interviewees suggest as being important for creativity cultivation is
perhaps best summarized in the integrative template offered in this paper and introduced below.

Given the clear understanding of interviewees as to both the importance of organizational design to creativity cultivation and the powerful role that organizations can play in inhibiting creativity cultivation, the paucity of integrative work in creativity research and organizational theory research is startling. These findings may indicate that more involved future studies may prove very valuable in helping us understand the type of organizations that most efficiently cultivate creativity.

I feel an integrated analytic template that considers key organizational theory teachings, the developed creativity research, and the lived experiences of serially creative individuals could be helpful in that future work. I thus propose one tentative template for doing so. This integrative template is based upon the organizational characteristics template that most organizational theory researchers now use to describe organizations (Hanson, 2003).

**Integrative Template**

If the interviewees are correct and the organization is key to the creativity cultivation process, an analysis of the key organization descriptors used in organizational theory research should be a promising way to organize the analysis of these research findings. Future researchers could use this template to explore organizational differences in each discriminating category to determine any links with creativity support or inhibition. As that research is pursued, organizations can be consciously designed to support creativity cultivation based on eventual research findings.
There are currently three widely accepted organizational theories: Classical Organization Theory, Sociopolitical Organization Theory, and Open Systems Organization Theory (Hanson, 2003). Each of these organizational theories is discussed in the organizational theory literature based upon a template of 13 discriminators: (1) structure, (2) power distribution, (3) goals, (4) communication channels, (5) communication purpose, (6) control, (7) leadership power, (8) leadership style, (9) conflict attitude, (10) environmental view, (11) view of employees, (12) employee motivation, and (13) employee value. In this analysis and recommendation, I try to integrate the existing organizational theory research based on these 13 discriminators with the creativity research literature teachings, and the lived experiences of the interviewees. I hope that integrating the results of this research into a discussion format that has categorized the organizational theory discussion historically will add value to my future work, as well as to the work of other future researchers and practitioners. In particular, I feel this tool could be very valuable to educators, as they will face some of the most intense pressures to both reform their own organization and to also teach others how to reform their organizations in the support of creativity cultivation.

**Structure.**

Classical Organizational Theory is characterized by a rigid hierarchical structure (Hanson, 2003). Sociopolitical Organizational Theory is characterized by a structure of groups of sociopolitical coalitions negotiating within the organization (Hanson, 2003). Open Systems Organizational Theory is characterized by a structure
of sociopolitical groups from within and from outside the organization interacting and negotiating (Hanson, 2003).

The interviewees’ remarks indicated that none of these structures would be ideal for Creative Organizational Theory. They painted a picture of an ideal organizational structure that is much more individually focused than those described in any of these earlier theories. Interviewees cited the most important supports and encouragements to their creativity cultivation as being self-directed embrace of challenges. While an organization must impose some order, the interviewees did not necessarily rule out some structure, in fact, they pointed out challenges often were important aids to creativity development.

Glenn noted that the challenge to put a man on the moon within a given time frame allowed the creation of a NASA organizational structure that was widely embraced and extremely effective. However, Glenn noted that the success of the NASA organization was a direct reflection of individual employee acceptance of the common mission.

Similarly, Clark raised the point that the individual should ideally have options to circumnavigate organizational roadblocks. Without the patent committee within his organization, his tremendously valuable invention would have died at one of those roadblocks.

Glenn also noted that a single powerful individual, the “800-pound gorilla”, needs to be nurtured and supported since that singular leadership is often necessary to make change. In other words, some individuals need to have a structural presence
that allows them to demand attention and present what Glenn called “the unopposable killer argument” for creative change.

There is support in the creativity research literature supporting the interviewees’ remarks which suggest that a more individually focused organizational structure would be a strong support to creativity cultivation. Maslow’s (1971) Theory Z recommended organizations where self-actualization can become the norm, which directly facilitates creativity. Amabile et al.’s (1996) work cited worker freedom and worker autonomy as two important factors for the support of creativity cultivation. Senge (1990) taught organizations should themselves learn, a form of creativity, and recommended the encouragement of individual personal mastery and effective utilization of mental modeling as two key tools to encourage organizational learning.

**Power distribution.**

Power distribution is heavily influenced by the structure of the organization (Hanson, 2003). Therefore, the discussion of power distribution and organizational structure are somewhat inter-related.

Classical Organizational Theory is characterized by power centralized at the top of the hierarchy, and this power is shared only as formally delegated within the organization (Hanson, 2003). Sociopolitical Organizational Theory is characterized by the sanctioned diffusion of organizational power into sociopolitical groups (Hanson, 2003). Open Systems Organizational Theory is characterized by the sanctioned diffusion of power throughout the organization and is balanced by the power of the environment (Hanson, 2003).
The remarks of this study’s interviewees do not support that these power distribution strategies would be ideal for Creative Organizational Theory. Again, those interviewed painted a picture of an ideal power structure that is much more individually distributed, as opposed to organizationally or sub-group distributed. Vincent discussed the fact that he loved work positions in which he was delegated the power and authority to meet his responsibilities. Mae talked about the imposition of artificial boundaries that limit the creative individual’s power to innovate.

The antithesis of delegated power is bureaucratic control, and the interviewees clearly identified bureaucratic behaviors as being extremely negative for creativity cultivation. Liam and Phillip cited specific examples of bureaucratic behaviors that stifled creative expression: time delays, multiple layers of oversight, matrix management, rigid procedures, political fiefdoms, over-lapping chains of command, and undocumented power channels. Similarly, Carl talked of bureaucratic, excessive, illogical, time-consuming, and rigidly enforced new protocols that turned his challenging, creative work into drudgery. A majority of interviewees (88% or 14 of 16) left organizations that became bureaucratic and their creative ideas left with them.

There is support in the creativity research literature to support interviewees’ remarks that power must be delegated so the creator can experiment and innovate. Amabile et al.’s (1996) work advocated freedom and autonomy for workers to support creativity. Maslow’s (1971) teachings that self-actualization fuels creativity also supports this finding, since self-actualization is internally driven and requires the individual power to make personal choices and priorities. Power is what allows personal choice and priority assignations (Maslow, 1971).
Goals.

Classical Organizational Theory is characterized by formal organizational goals (Hanson, 2003). Sociopolitical Organizational Theory is characterized by the recognition of both formal and informal goals, which are sometimes conflicting (Hanson, 2003). Open Systems Organizational Theory is characterized by the belief that environmental needs and requests dictate goals and actions (Hanson, 2003).

The interviewees’ remarks do not suggest that any of these goal strategies would be ideal for Creative Organizational Theory. The interviewees almost uniformly credited the rewards of the creative process as being an extremely positive goal. Goals and challenges were seen as having value because they could work to encourage creativity, whether it was the formation of NASA, the launch of Sputnik, or family challenges and goals. With that background, Glenn’s point is well made that mutually agreed upon goals can improve motivation, which Amabile (1983, 1996) identified as a key element of creativity cultivation.

There is very little investigation of goals in the creativity research literature, so this may an especially rich field for future research. What are available are almost always tangential discussions during investigations of motivation and creativity research. Motivation and creativity cultivation is discussed separately below.

Communication channels.

Communication channels are formal, one-way, and top-down (Hanson, 2003). Sociopolitical Organizational Theory describes communication channels that are two-way and that are both formal and informal (Hanson, 2003). Open Systems
Organizational Theory is characterized by communication channels that are system-wide, linking the organization with the environment (Hanson, 2003).

The interviewees’ remarks do not support that these views of communication channels would be ideal for Creative Organizational Theory. Without exception, interviewees made the point that open, two-way, cross-domain communication is critical. Mae spoke of the need to interface with people of different backgrounds and cultures. Phillip spoke of the critical importance of including all team members in the communication channels. George decried the declining support for conferences, which represent a key communication channel for him across domains and cultures. Sid felt this communication channels issue was so significant to the development of creativity that he directed me to a particular quotation from *Creativity Inc.: The Story of Pixar*:

> Because making a movie involves hundreds of people, a chain of command is essential. But we had made the mistake of confusing the communication structure with the organizational structure. Of course, an animator should be able to talk to a modeler directly, without first talking with his or her manager. So we should be able to talk to anyone else, at any level, at any time, without fear of reprimand. Communications would no longer have to go through hierarchical channels. The exchange of information was key to our business, of course, but I believed that it could, and frequently should, happen out of order, without people getting bent out of shape. People talking directly to one another, then letting the manager find out later, was more efficient than trying
to make sure that everything happened in the “right” order and through the “proper” channels.

Improvements didn’t happen overnight. But by the time we finished *A Bug’s Life*, the production managers were no longer seen as impediments to creative progress, but as peers—as first class citizens. We had become better. (Catmull, 2014, p. 64)

The creativity research literature does not address communication channels in any meaningful way. This suggests that this may be a very productive research area for future work.

**Communication purpose.**

In Classical Organizational Theory, communications are intended to transmit management commands (Hanson, 2003). In Sociopolitical Organizational Theory, communication purposes tend to follow the interests of the sociopolitical sub-groups (Hanson, 2003). In Open Systems Organizational Theory, the communication purpose is to draw groups and the environment together (Hanson, 2003).

The interviewees’ remarks suggested these views of communication channels would not be ideal for Creative Organizational Theory. It is clear from the remarks of Mae, Phillip, and Sid that the purposes of communication in Creativity Theory organization should be the encouragement of creativity by identifying problems, raising new possibilities, sharing information, promoting cross-domain linkages, and allowing collaborations.

Sawyer (2012) also taught that for the creative idea to be actualized it must be communicated, and hence that becomes a critical communication purpose. There is,
however, very little research literature exploring potential linkages between communication purpose and creativity cultivation. This suggests that future research in this field could prove very valuable.

**Control.**

Classical Organizational Theory is characterized by firm rules to exert hierarchical control (Hanson, 2003). Sociopolitical Organizational Theory is characterized by the imposition of control through group norms (Hanson, 2003). Open Systems Organizational Theory is characterized by achieving control through the effectiveness of environmental linkages (Hanson, 2003).

The interviewees’ remarks indicated that none of these views of control would be ideal for Creative Organizational Theory. Interviewees suggested that the effective pursuit of creativity imposes its own controls, carefully nuanced to the task and the creative actor. Bella Rose reported being compelled to finish her creative inquiries. Carl needed little imposed control to effectively pursue his double-barreled, unbreakable, spitball shooter. Herb had no need of control as he pursued his diverse inventions from boats to mechanical openers. Clark pursued his creative ideas even against obstacles, and certainly without being controlled to do so. Mae pursued a wide variety of creative pursuits without any compelling control. Essentially all the interviewees commented on the draw of the creative work self-imposing the most effect of controls, and commented on the often disruptive impact of excessive externally imposed controls.

As discussed previously, bureaucratic practices tend to conserve power at the upper levels of the organization, which enhances higher-level control of operations as
well. Vincent, Mae, Carl, Liam, and Phillip made it clear that those bureaucratic processes were tremendous blocks to the creative process. If that is the case, in a Creative Theory organization, management must consider the sharing of both control and power.

There is research support for the interviewees’ remarks indicating that the creative individual needs control and freedom from bureaucratic micro-management. Feist (1998) taught that creative people tend to be self-controlled, norm intolerant, and independent with high levels of internal reliance. Furnham (2008) noted that creative people exhibit high levels of conscientiousness. Similarly, Mednick (1962) pointed out that stereotypical associations that rely on socially controlled “correct” (p. 226) responses generate few new ideas.

**Leadership power.**

Classical Organizational Theory relies upon legitimate leadership power (Hanson, 2003) conferred by divine right, statute, or appointment (French & Raven, 1959). Sociopolitical Organizational Theory relies upon expert leadership power (Hanson, 2003), which results from demonstrated competency (French & Raven, 1959). Open Systems Organizational Theory relies upon referent/charismatic leadership power (Hanson, 2003), which is the result of the unique attractiveness and personal appeal of the leader.

The interviewees’ remarks indicated that alternative sources of leadership power would be ideal for Creative Organizational Theory, as they are all one-way power flows. The individual worker is, thus, vulnerable to the exclusive power of the boss. Glenn noted that employees have to feel safe and trust their organization in
order to express themselves creatively. Greenleaf (1977) extended the French and
Ravens (1959) identifications of leader power sources to include the power of service.
I believe that service leadership power source would work best in a Creativity Theory
organization because unselfish service begets trust, which in turn not only begets the
acceptance of leader power by those led but also can facilitate creativity. In
particular, Greenleaf (1977) pointed out that leader power can never be awarded by
some external force; to be reliably effective, it must be given to the leader by those
being led. Those followers impart that power to the servant leader most readily and
most reliably. Chad similarly noted his appreciation for mentors and bosses that have
“put it on the line for me” and that made it possible for him to be creative. Those
mentors and bosses shared their power in the service of Chad’s needs, thus it is likely
he will be a loyal and enthusiastic follower in the future.

There is little in the existing research exploring the impact of leadership
power on creativity cultivation. As a result, further exploration of the link could
represent a rich area for future research.

**Leadership style.**

Classical Organizational Theory incorporates a leadership style based on
personal traits (Hanson, 2003) or by what is most comfortable for the leader
(Hemphill & Coons, 1957). Sociopolitical Organizational Theory incorporates a
contingency leadership style (Hanson, 2003), which is informed by the matrix of
leader-member relations, task structure, and leader power position (Fiedler, 1971,
1974). Open Systems Organizational Theory incorporates a transformational
leadership style (Hanson, 2003), which seeks to develop employees to higher levels by creating an energizing vision and attractive goals (Burns, 1978).

The interviewees’ remarks suggest that alternative leadership styles would be ideal for Creative Organizational Theory. Each of these theories seeks to force or encourage desired employee actions through some strategic and transactional leadership approach. As we have discussed, creative behaviors happen when employees feel protected and safe. That is why Glenn takes responsibility for all failures and insures his subordinates get credit for all successes. It is hard for employees to feel safe or to feel trust when someone is attempting to channel others’ behaviors for his or her goals (Greenleaf, 1977). In contrast, Greenleaf (1977) noted that a servant leader is there to serve, as Glenn was. For that reason, servant leadership is the ideal leadership style in Creative Organizational Theory.

There is very little in the research exploring any links between leader style and the cultivation of creativity. Future studies exploring such a linkage might provide important new insights.

**Conflict attitude.**

Classical Organizational Theory is characterized by a view that conflict is inefficient and must be avoided (Hanson, 2003). Sociopolitical Organizational Theory is characterized by a view that conflict is inevitable and the response determines whether it is positive or negative (Hanson, 2003). Open Systems Organizational Theory is characterized by a view that conflict is necessary for continuous positive change (Hanson, 2003).
The interviewees’ remarks do not support that these views on conflict would be ideal for Creative Organizational Theory. Liam noted he had no problem asking “Why not?” to anyone, at anytime, and about anything. Mae had no problem negotiating a conflict with another manager when she had a major cost-cutting idea. Clark was more than willing to face conflict when his creative idea was blocked. Bella Rose had no problem in engaging in conflict with her boss and co-workers over attitudes that inhibited her creative path. All these examples suggest that within a Creative Theory organization, conflict should be considered an important aid to the creative process and thus serves the creative purpose. Conflict is a sign that there is a problem or insufficiency, which is the start of the creative process. Conflict is also intrinsic to combining diverse ideas from differing domains, a situation in which many creative breakthroughs occur.

There is support in the creativity research literature that supports interviewees’ remarks that conflict can actually be a catalyst for creativity cultivation. Sternberg and Lubart (1995) taught that creative people often buy into unpopular ideas and then endure the conflict of selling that new idea to others. MacKinnon (1978) noted that creative people are often less stereotypical, more unique, less socially prescribed than others, so more likely to comfortably deal with conflict.

**Environmental view.**

The Classical Organizational Theory view is that the environment must be prevented from intruding into the organization, since that intrusion can lead to inefficient agenda and goal conflicts (Hanson, 2003). The Sociopolitical Organizational Theory view is that the environment must be tolerated as it cannot be
feasibly excluded (Hanson, 2003). The Open Systems Organizational Theory view is that the environment should be embraced for the guidance and resources it offers (Hanson, 2003).

The interviewees’ remarks indicate alternative views on the environment that would be ideal for Creative Organizational Theory. Interviewees’ remarks were dual faceted on this issue. Overwhelmingly, 75% (12 of 16 interviewees) offered that exposure to a rich diversity of fields and information was a primary catalyst to their creative thoughts. Glenn presented a carefully considered argument for using environmental needs, advances, and conditions to motivate, build, and support a creative organization. However, interviewees also cautioned that the mass of the existing environment could actually inhibit creativity if not carefully managed. Bella Rose, Carl, Liam, Phil, George, and Glenn made it clear that environmental intrusions effectively stopped some creative endeavors.

There is support in the creativity research literature to support interviewees’ remarks that environmental factors can support or inhibit creativity cultivation. Mumford (2003) reviewed existing literature and found that three crucial supports for creativity and innovation within organizations -- available new technology, market demand, and environmental turbulence. This implies that the more open the organization is to the environment, the more likely the organization will be aware of and responsive to new technologies, new demands, and the environmental turbulence that can reveal new opportunities. However, Meyer and Rowan (1977) noted that the environment is formed in part by socially sanctioned norms and the organization has to guard against mindlessly assimilating those dogmatic norms. Pfeiffer and Salancik
(1978) pointed out that organizations are dependent upon supports from the environment to survive and hence the temptation to reflect socially sanctioned norms can be powerful. The environment clearly offers both supports and inhibitions to the creativity cultivation process.

**View of employees.**

Classical Organizational Theory views employees as lazy and in need of close supervision (Hanson, 2003). Sociopolitical Organizational Theory views employees as potentially self-managing but not inherently so, and sees employees as prone to sub-optimal personal agendas (Hanson, 2003). Open Systems Organizational Theory views employees as having an inherent positive desire to assimilate environmentally (Hanson, 2003).

The interviewees’ remarks do not indicate these views about employees would be ideal for a Creative Theory organization. Essentially every interviewee talked about his or her unique backgrounds, a desire for new knowledge, and a self-motivation to create. The purpose of a Creative Theory organization is to create, and the first nugget of a new idea begins in a single human brain. Therefore, the Creative Theory organization must rest on the view of employees that recognizes the fullest expression of the human experience is the self-actualization of creative thought, and that therefore the natural desire of supported employees is the development of that self-actualized creativity.

There is support in the creativity research literature for interviewees’ remarks that the creative worker must be valued and supported. Fymire (2006) identified a trend where organizations increasingly are focusing not on cheap workers, but instead
on finding employees with “brainpower both natural and trained, and especially the ability to think creatively” (p. 1). Baer and Oldham (2006) also reviewed existing organizational theory research and found considerable evidence that the creativity of employees can have a significant, even dominant, impact on an organization’s competitiveness and survival.

**Employee motivation.**

Classical Organizational Theory describes employees as being motivated by money and working conditions alone (Hanson, 2003). Sociopolitical Organizational Theory describes employees as being motivated by factors extending beyond money and working conditions, including sub-group service and affiliation (Hanson, 2003). Open Systems Organizational Theory describes employees as intrinsically motivated to serve the environment, if supported (Hanson, 2003).

The interviewees’ remarks indicate that alternative views on employee motivation would be ideal for Creative Theory organization. Every interviewee enthusiastically described the irresistible and hugely rewarding motivation of creative work. Therefore, the Creative Theory organization must hold the view that the joy of creativity intrinsically motivates, and if supported, employees will pursue more and more creative work.

There is motivation theory research supporting the interviewees’ point that creative pursuits are inherently motivating. Maslow (1934) detailed six motivating levels of need in his seminal Hierarchy of Motivating Needs. Maslow identified two higher order “being needs” (1943, p.1) as being especially motivating and upon fulfillment, especially satisfying. He defined his fifth level need “self-actualization”
(Maslow, 1943, p.1) as the compelling drive to fulfill one’s purpose in life. Maslow defined his sixth level need “aesthetic understanding” (1943, p. 1) as the highly motivating need for an understanding of one’s ideal role in the world. Self-actualization and aesthetic understanding are the two highest levels of motivating need in Maslow’s (1934, 1971) Hierarchy of Motivating Needs. Maslow (1971) noted that these two being needs are an expression of the innate human desire “to become everything one is capable of becoming” (p. 46). He specifically noted these being needs include the drive for continued self-development and the release of creative energies. Maslow noted that the desire for creativity, when supported by the satisfaction of lower level needs, is powerfully compelling because it is the fullest expression of the human experience. He wrote: “My feeling is that the concept of creativeness and the concept of the healthy, self-actualizing, fully human person seem to be coming closer and closer together, and may perhaps turn out to be the same thing” (Maslow, 1971, p. 57). Alderfer’s (1969) ERG theory of motivation also identified the need for creative expression, for individuals with lower level needs satisfied, as being particularly motivating. He noted that because the satisfaction of creative expression needs are so rewarding, creative expression fuels the desire for more self-actualizing creative expressions (Alderfer, 1969). Other motivational researchers also noted the inherently motivating impact of creative efforts (House, 1971; Porter & Lawler, 1968; Vroom, 1969).

There are also findings in the creativity research literature to support the interviewees’ remarks that creative individuals are naturally motivated to create if supported. Amabile (1983, 1986) and Weisberg (2006) both taught that motivation is
the key to creative cultivation. The joy of creativity was described by Csikszentmihalyi (1996) as *Flow*, and he noted it drove creative individuals to high levels of motivation and achievement.

**Employee value.**

Classical Organizational Theory views employees as being interchangeable (Hanson, 2003). Sociopolitical Organizational Theory views employees as unique, with unique sub-group loyalties and motivations (Hanson, 2003). Open Systems Organizational Theory views employee motivation as unique and with varying levels of commitment to serve the environment (Hanson, 2003).

The interviewees’ remarks do not indicate these views on employee motivation would be ideal for Creative Theory organization. Every interviewee presented a powerful recount of his or her unique and non-duplicable package of individual experiences, interests, commitments, and critical thinking skills not necessarily tied to the environment. The Creative Theory organization must be based on recognition that every employee is a unique creative force offering unique skills and resources.

There is a large amount of creativity research literature supporting the interviewee remarks indicating the unique package of experience and capabilities that each creative individual brings to the work. MacKinnon (1978) did pioneering work correlating some individual characteristics and creative outputs. Furnham et al. (2009) correlated the Five Factor Model of personality types with creative performance. The research support for openness to new and varied experiences, discussed previously, also supports the interviewee remarks that indicate each
individual creator brings unique value to the work. Finally, King et al. (1996) specifically documented a relationship between creativity and individual openness to new experiences. As the individual opens to new experiences, they bring those unique new experiences to the work.

**Addressing research gaps**

I believe this work does much to address the previously isolated gaps in the literature. This qualitative research helps supplement the previously primarily quantitative creativity research. This research also, unlike most earlier work, concentrated not on the individual creator alone but on the individual within the social contexts of their lives. The lived experiences of the interviewees traced the process of creativity cultivation and reflected the social impacts on their creativity cultivation. This research also focused on the process of creativity cultivation, as opposed to previous concentrations on the creator or creative outcomes: I believe this process concentration is a key reason that we found early experiences were key supports to the cultivation of creativity. The importance of early experiences to creativity cultivation had not been significantly noted in the creative research literature to date.

This research also allowed a more comprehensive integration of organizational theory and creativity theory, especially through the use of the integrative analytical template proposed. These research findings also suggest organizational design that would encourage continual creative improvement through supportive organizational characteristics framing the work.
Limitations

This research project does have potential limitations. Specifically, I have created a purposeful sampling of individuals with at least two U.S. patents. Patents are, by their nature, technically based. Not all creativity is technically based; in fact, much creativity is artistic in nature. That distinction may invite criticism of the work. However, my intent was not to explore creativity cultivation on a general basis but to focus on this specific subset of creative individuals. Ideally, my work could eventually be extended to study other subsets of creative individuals including individuals whose creativity is not technically based.

The value of using a purposeful sample of individuals with at least two U.S. patents was the advantage of insuring that I was interviewing only individuals that an impartial, rigorous process had identified as serially creative. However, besides being solely technical in nature, the pool of patent holders is less diverse than the population in general and that is a limitation. While the patent office does not maintain ethnicity data on patent holders, they do have some information on the sex of patent holders. The U. S. Patent Office website (2015) indicates that less than 5% of patent holders are women. I was deeply committed to a racially and gender diverse pool of interviewees. I was able to include four interviewees of color in my pool, but even with intensive effort I found it difficult to isolate willing women with at least two U.S. patents. The few females with two patents that I found, seemed to be as highly supportive of the research as the male interviewees, but they reported very limited time so tended to deny my interview request. I was only able to isolate and interview two women (12% or 2 of 16 interviewees). To secure the second female
interview, I found it necessary to travel to Florida. While my interviewees were 12%
female as compared to the 5% of females in the general patent pool, I would have
preferred even more gender diversity. The female interviewee comments, however,
were consistent in essentially all regards with male interviewee comments. Ideally,
follow up work would be done with a more diverse participant pool.

Additionally, the impact of receiving at least two patents may have been an
intervening effect causing changes in the interviewees’ feelings about this lived
experience, thus modifying their responses. The success of having received two
patents may, in effect, color the recollections and attitudes of the interviewees. For
instance, participants who have become quite wealthy because of their patents may
forget the frustration and pain of rejection that they faced as they painstakingly
developed their patented ideas. I have attempted to explore this possibility by
exploring creative attitudes and behaviors across the whole life arc, including the
period before and after patent awards.

As noted above, my intent in this research was not to explore creativity
cultivation on a general basis but to focus on this specific subset of creative
individuals. I believe the qualitative research design was the ideal vehicle to isolate
key issues. However, depending upon what the next step of the research is, a
quantitative approach may be advantageous now that some of the key issues are
known. Quantitative methods could allow a greater number, more diverse sampling
of research participants for a broader number of experiences. A greater number of
participants will also make it easier to reach out to creative individuals with all types
of both technical and non-technical creative abilities.
Further research

This work suggests a number of potentially promising future research agendas as discussed in my recommendations for practice and research. The limitations discussed above, also, suggest the need for future work with non-technical creatives, a more diverse participant pool, and through the use of quantitative methods.

Finally, the findings that organizational characteristics exert both powerful supports and powerful inhibitions toward creativity cultivation coupled with the minimal amount of research integrating organizational theory research and creativity research suggest another promising area for future research. In particular, the tentative, analytical, integrative template, included in this work, highlights some key areas where there is a dearth of research: (1) organizational goals and creativity cultivation, (2) communication channels and creativity cultivation, (3) communication purposes and creativity cultivation, (4) leader power and creativity cultivation, and (5) leader style and creativity cultivation. As more and more research integrating organizational theory research and creativity theory research becomes available, it will become more feasible to develop a Creative Organization Theory that is as fully featured and researched as those for the existing three organizational theories. Since creative individuals function within social contexts characterized by organizations, the outcome of such work could be particularly valuable for educational institutions, businesses and families.

Implications of the Research

This research highlights important implications for organizations, especially educational and business organizations. First, if childhood provides the most
important sources of support and inspiration for creativity cultivation, the research suggests that institutions of higher education that train pre-school, elementary, and secondary educators should consider curricular designs that are informed by creativity theory and research. It also suggests that educational counselors, who may often deal with unsuccessful students who are actually creatively stifled (A. S. Kaufman, 2009), should be exposed to creativity theory and research as part of their educational journey. Second, if diverse and varied personal experiences serve as a creativity catalysts, the research suggests educational institutions and business organizations should consider the value of cross-functional projects and support for collaborative explorations of varied fields for all employees. The argument for liberal arts could serve as an especially effective frame for this discussion since liberal arts proponents make a powerful case for broadly educated individuals (Bok, 2006). Third, if organizations have such a powerful positive and negative impact on creativity cultivation, the research suggests that organizational designers in both education and business must familiarize themselves with the evolving information on organizational characteristics that support creativity cultivation. They can then design those characteristics into their organizational structures and plans. It also suggests that researchers must aggressively pursue the gaps in the research, linking as many organizationally descriptive characteristics as possible to relevant creativity cultivation research. Higher education institutions, informed by this continuing research, could ultimately become an exemplar for organizational design to support creativity cultivation. Creativity is definitionally the generation of new knowledge,
which is also one of the key goals of education so the effort could be particularly appropriate, rewarding, and valuable.

**Chapter Summary**

In this chapter, I analyzed findings and provided recommendations for practice. I noted areas where further research could be helpful to the exploration of the factors that support or inhibit creativity cultivation, and I discussed potential limitations of the research. I also offered a primitive, analytical framework for integrating creativity theory and organizational theory utilizing the typical evaluative template used for organizational research.
REFERENCES


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APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE

Date completed: _____/_____/_____

Name: _________________________________ Date of Birth: ___/___/____

Address: _____________________________ City: ___________ State: __ Zip:______

Cell number: _________________________ Sex: __________

Email address: __________________________

Marital status: _______________________ # of Children: __________________

# of Patents: ___________ General patent areas: ____________________________
(Granted or approved)

______________________________

Date of earliest patent: _____/_____/_____ Date of latest patent ____/_____/_____

Highest degree: _________________________ Major: ___________

Occupation: __________________________

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For the bulk of your career were you an (please circle one):

Entrepreneur/Self-Employed  Employee:

Have any of your patents been commercialized? ________________________________

If yes, how many__________________________________________________________
My name is Mary Grilliot. I am a Ph.D. candidate at the University of Dayton, working on my dissertation, which focuses on creativity cultivation. I am aware that you have been awarded at least two U.S. utility patents. As part of my research, I will interview individuals who have received multiple patents. Since I am researching the process of creativity cultivation, speaking with repetitively creative individuals about their feelings regarding their creative process will be invaluable to my work. I was hoping you would agree to meet for a short (45 minutes to one hour) interview. I can come to your office or can arrange for meeting space on the UD campus. The interview will be taped and transcribed verbatim, a copy of that transcription will be provided to you. You will also receive a copy of my preliminary report and will be encouraged to modify, extend, or correct any points. Your identity will be protected through the use of a pseudonym of your choice. There is no preparation required of you for the interview as I am exploring your recollection of your creative experiences. If you agree to be interviewed, I will follow up this conversation with an interview confirmation letter, a brief demographic questionnaire, and an informed consent form. That follow up information will also provide my contact information in the event you have any questions.
before the interview. Would you have a time in your schedule, where we could meet for 45 minutes to one hour?
APPENDIX C
CONFIRMATION LETTER

Ph.D. Candidate
6577 S. Rangeline Rd.
West Milton, OH 45383
(937) 371-6242
Mary.Grilliot@gmail.com

[Date]

[Recipient Name]
[Title]
[Company Name]
[Street Address]

Dear [Recipient Name]:

Thank you for taking the time to discuss my doctoral dissertation research on Creativity Cultivation, and for agreeing to be interviewed as a part of this work. This letter is intended to provide a convenient summary of that discussion.

As you will recall, my research purpose is to better understand what encourages and/or discourages creativity cultivation. I contacted you because you meet my sampling criterion of holding at least two U.S. patents.

I suspect, given your background, that you share my conviction that creative abilities will be the primary driver of economic success in the future. Unfortunately, the available research does not clearly suggest strategies for creativity cultivation. While earlier research has been performed on creativity, the bulk of the work has concentrated on completed creative outputs and/or the personal characteristics of established creators. My work will focus more on the creative process as it unfolds. I believe focusing on the process of creativity cultivation will offer more pertinent information to (1) guide others
in developing their creativity and (2) to guide others in constructing social and organizational tools that support creativity development.

The imposition on your time will be minimal, approximately a 45 minute to one-hour interview. No preparation on your part is needed for this interview; I am only interested in your impressions of how your creative process unfolds. The interview will be taped and transcribed to allow me to draw on the specific language you use to share your ideas. I will be glad to share your transcript with you upon request. I will conceal your identity through the use of a pseudonym. You will also receive a copy of my preliminary report and will be invited to correct or modify any points you feel need further elaboration.

Before the interview, a brief demographic questionnaire, and an informed consent sheet must be completed. These two forms are attached to this letter; please bring these completed forms to our interview.

I recognize your time is extremely valuable and limited, and I very much appreciate your willingness to be interviewed. As a successful inventor yourself, your experiences are very valuable to the research record. I believe your participation will also offer you some personal benefits.

- You will have the opportunity to positively influence organizational and social theory development, in ways that can help cultivate creativity.
- You will have the opportunity to positively influence organizational and social theory development, in ways that can help cultivate creativity.
- You will be making a positive contribution that will benefit your region, your country, your world, and the next generation of potential creators by providing insights on how the creative process can be helped or hindered.
- The act of reflecting on the creative process may provide valuable insights to refine your future creative work.

I have included a business card with this letter; please do not hesitate to contact me if you have any questions.

Finally, and most importantly, I would like to thank you for the assistance you will provide in this critical research effort. I will see you at the agreed to location, place, and time for your interview: [Date, Time, Location provide here].
Sincerely,

Mary I. Grilliot, M.B.A., C.M.A.
Ph.D. Candidate