2006

Inspiration as Motivation for Creative Performance

Scott Edward Cassidy
College of William & Mary - Arts & Sciences

INSPIRATION AS MOTIVATION FOR CREATIVE PERFORMANCE

A Thesis

Presented to

The Faculty of the Department of Psychology

The College of William and Mary in Virginia

In Partial Fulfillment

Of the Requirements for the Degree of

Master of Arts

---

by

Scott Edward Cassidy

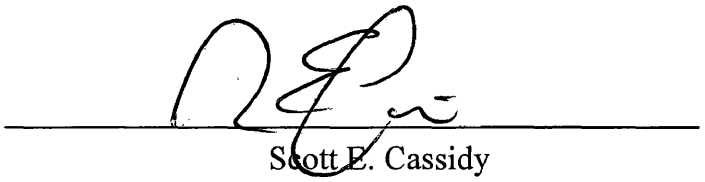
2006

APPROVAL SHEET

This thesis is submitted in partial fulfillment of

the requirements for the degree of

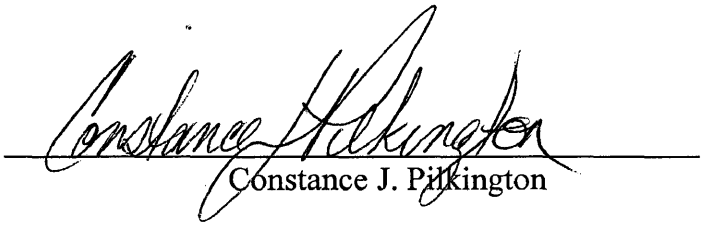
Master of Arts



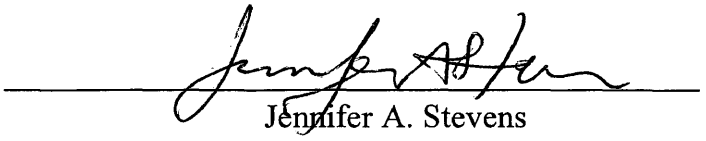
Scott E. Cassidy

Approved by the Committee, June 2006

Todd M. Thrash, Chair



Constance J. Pilkington



Jennifer A. Stevens

TABLE OF CONTENTS

ACKNOWLEGEMENTS

The author wishes to express his sincere gratitude to Professor Thrash for his guidance and enthusiasm over the past two years. The comprehensive critiques and discussions with Professor Thrash throughout the process of this investigation are greatly appreciated. The author is also indebted to Professor Pilkington and Professor Stevens for their careful evaluation of the manuscript. Additionally, the author wishes to thank the many undergraduate research assistants in the Thrash Lab for their invaluable assistance in conducting the experimental sessions and organizing the data.

The author would also like to thank his family, especially his mother and father, for their unconditional love and support. This accomplishment is a testament to their lifelong examples of hard work, dedication, and belief in oneself. Finally, the author wishes to thank Lauren Hersh for her unwavering patience and support, and her critical eye, over the past two years. Without her, this would not have been possible.

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This study investigated the relationship between inspiration and creativity by addressing three specific goals. To address these hypotheses, participants were given 30 minutes to write a mystery story. Inspiration, effort, and PA were assessed using two questionnaires. Questionnaire 2 was completed before writing and assessed these three variables as they related to the process of idea(s) generation and the moment that they got idea(s) for their story. This questionnaire was also used to assess creativity of the initial idea(s) for their story. Questionnaire 3 was completed after completing their story and assessed these three variables as they related to the process expressing their idea(s) and to the process of revising and finalizing their story. The creativity of the final product was evaluated by judges using Amabile's (1996) Consensual Assessment Technique (CAT). Physiological arousal was assessed using the Critical Flicker-fusion (CFF) procedure. Writing efficiency was determined using the ratio of the total number of keystrokes used while writing the story to the total number of characters in the final story.

First, it was demonstrated that inspiration predicts creativity while controlling for several known predictors of creativity, including effort and positive affect (PA). Second, the transmission model of inspiration (Thrash & Elliot, 2004) was validated in the context of the creative process by demonstrating that inspiration functions as a mediator between the creativity of one's initial insight and the creativity of the final product, again controlling for effort and PA. Finally, it was demonstrated that inspiration is related to an increase in writing efficiency and physiological arousal.

INSPIRATION AS MOTIVATION FOR CREATIVE PERFORMANCE

INTRODUCTION

Theories of the creative process often acknowledge the involvement of inspiration, suggesting that a relationship between creativity and inspiration exists. However the empirical research describing and integrating these processes, especially inspiration, is limited and largely atheoretical. Such a fragmented and disconnected literature demonstrates a failure to provide a clear conceptualization of this relationship. The current investigation aims to provide clarity by more precisely defining the role of inspiration within the context of the creative process.

To accomplish this, three specific goals will be pursued. First, whereas the effect of inspiration in the creative process has rarely been considered empirically, and consequently never directly tested, the first aim of the current investigation is to demonstrate that inspiration predicts creativity while controlling for several known predictors of creativity, including effort and positive affect (PA). Furthermore, discussions integrating inspiration and creativity have been atheoretical. Therefore, the second aim of this study is to validate the transmission model of inspiration (Thrash & Elliot, 2004), demonstrating that inspiration functions as a mediator between the creativity of one's initial insight and the creativity of the final product, again controlling for effort and PA. Moreover, little is known about other correlates of inspiration. Therefore, a third goal of this investigation is to provide a more complete picture of inspiration's function, by relating inspiration to several objective correlates, including arousal and writing efficiency. These aims are discussed in the following three sections.

Aim 1: Inspiration as a Predictor of Creativity

The creative process. If one were asked to identify the best artists, writers, musicians, teachers, entrepreneurs, or business executives, one would most likely select individuals who are highly creative. Indeed, many leaders are heralded primarily for their unique vision and ability to implement innovative ideas. Creativity is a far-reaching topic that applies to a wide range of task domains at both the individual and societal levels. At the individual level, creativity affects problem solving on a daily basis, both at work and in everyday life. At a societal level, creativity leads to innovation and the development of new scientific findings, artistic movements, and social programs that cure disease, create new jobs, and enlighten perspective. There is little debate that creativity influences and enhances many diverse facets of our lives.

Despite the obvious importance of attempting to understand creativity and the mechanism(s) through which it occurs, the scientific literature investigating the creative process is both limited and incomplete. Creativity has received relatively little attention in psychology, and, more importantly, the existing literature provides an incomplete description of the creative process. Midway through the twentieth century, Guilford (1950), challenged psychologists to investigate creativity, which he considered to be an important but neglected topic. Yet, while nearly every major twentieth-century psychologist (e.g., Freud, Rogers, Piaget, and Skinner) has also acknowledged the importance of creativity, creativity has remained a relatively marginal topic in psychological research, at least until very recently.

An analysis by Sternberg and colleagues found that only 0.5% of the articles indexed in *Psychological Abstracts* from 1975 to 1994 concerned creativity. As a

comparison, they found that articles on reading accounted for approximately three times the number of entries in *Psychological Abstracts* during the same period (Sternberg, 1999). Likewise, Amabile (1996) reported that between 1976 and 1978, no articles on creativity were published in the *Journal of Experimental Psychology*, *Psychological Review*, or the *Journal of Experimental Social Psychology*. However, during that same period, nearly 600 creativity articles were published in less experimentally oriented journals (Amabile, 1996). To date there are only three journals devoted to creativity – *Journal of Creative Behavior*, *Creativity Research Journal*, and *Creativity and Innovation Management*. An analysis of the *Journal of Creative Behavior* showed that nonempirical articles far exceeded empirical ones and that education and creative enhancement were the most frequent topics (Feist & Runco, 1993). Both the *Creativity Research Journal* and *Creativity and Innovation Management* have a more research-oriented focus, but were begun only recently.

Although the definition of creativity has been debated for decades, it is generally agreed upon today that it can be defined as the ability to produce work that is both novel and appropriate (Amabile, 1996; Lubart, 1994; Ochse, 1990; Sternberg & Lubart, 1991, 1995, 1996). The creative process, the sequence of thoughts and actions that leads to such a product, has been one of the major topics of creativity research during the past century. In his presidential address to the APA, Guilford (1950) noted that there was "considerable agreement that the complete creative act involves four important steps" (p. 451), traditionally identified as *preparation*, *incubation*, *illumination*, and *verification*.

Wallas (1926) is credited with originally formalizing this four-stage model of the creative process. The first step, preparation, involves a preliminary analysis of a problem,

defining and setting up the problem. Preparation involves conscious work and draws on one's education, analytical skills, and problem-relevant knowledge. During incubation, the second phase, there is no conscious mental work on the problem, often as a result of reaching an impasse. A person may be working consciously on other problems or simply taking a break from the problem. Unconsciously, however, the mind continues to work on the problem, forming trains of associations. A third phase, called illumination, occurs when a promising idea breaks through to conscious awareness. Illumination has been characterized as a "flash," a sudden enlightenment. Wallas (1926) suggested that illumination is often preceded by an intuitive feeling that an idea is coming. Following the illumination, there is a phase of conscious work called verification, which involves evaluating, refining, and developing one's idea.

For most researchers, the four-stage model or a variant of it serves as the basis for understanding the creative process (Amabile, 1996; Busse & Mansfield, 1980; Cagle, 1985; Goswami, 1996; Ochse, 1990; Osborn, 1953; Stein, 1974; Taylor, 1959; Taylor, Austin, & Sutton, 1974). Of particular relevance to the current investigation is the likely role of inspiration in this process. The term *inspiration* is, in fact, commonly used in the creativity literature. However, it is used in different ways by different researchers (e.g., Gardner, 1994; Ghiselin, 1952; Martindale, 1999; Rothenberg & Hausman, 1976; Schaffner, 1994; Sternberg, 1999; Wallas, 1926). The varied use of the term inspiration has resulted in considerable overlap with the terms illumination, insight, and intuition.

Unfortunately, what little work that has been done to differentiate these terms from one another has been non-empirical. In a recent study, Stevens and Walker (2002) distinguished these terms as follows: *creativity* was viewed as an embracing, long-term

combination of purposes, activities, and products, including insights. They suggested that a crucial element within this larger process is the experience of *insight*, arguing that a creative person is one who frequently experiences insight. In the same way, they considered *intuition* to be an important aspect or stage within the process of insight, involving the knowing of something in advance of one's capacity to articulate it. Finally, Stevens and Walker (2002) distinguished *inspiration* from insight. They posited that *insight* is proactive understanding, whereas *inspiration* is characterized as a more passive "reception" of ideas, derived from the ancient belief that insights into (spiritual) truths were "breathed" or "inspired" into the soul or mind by "spirits."

In fact, the earliest accounts of creativity were based on divine intervention (Sternberg, 1999). The creative person was seen as an empty vessel that a divine being would fill with inspiration. The individual would then issue out the inspired ideas, forming a transcendental, otherworldly product. In this way, Plato suggested that a poet is able to create only that which the Muse conveys: one person might be inspired to create songs, another, epic poems (Rothenberg & Hausman, 1976). Even today, people often refer to their own Muse as a source of inspiration.

Inspiration conceptualized. The importance of inspiration has been acknowledged since the time of Plato; however, inspiration is only recently beginning to receive systematic empirical and theoretical exploration within psychology. Inspiration is defined in the Oxford English Dictionary (OED; Simpson & Weiner, 1989) as: "A breathing in or infusion of some idea, purpose, etc. into the mind; the suggestion, awakening, or creation of some feeling or impulse, especially of an exalted kind" (p. 1036). While this formal definition of inspiration is not domain-specific, other conceptual definitions of inspiration

have varied, spanning multiple content domains (e.g., creative, religious, and interpersonal). Plato suggested that creative inspiration was influenced by the Muse, who inspires poets who then inspire their readers (Rothenberg & Hausman, 1976). In modern times, Kris (1952) explained creative inspiration in terms of the preconscious, where an individual permits himself or herself to regress to primary processes that involve flexible thinking, thus making novel associations more likely. Inspiration has been viewed from a religious perspective as a God-given capacity to transmit the word of God (Aquinas, 1950). Inspiration has also been explored in the interpersonal realm. Lockwood and Kunda (1997, 1999) argued that individuals of outstanding achievement can serve as a source of such inspiration by motivating others. They posited that if the superstar's success is relevant and attainable, one will be inspired. Similarly, Thrash and Elliot (2003) postulated that people are inspired when a mentor or role model reveals novel or better possibilities that they would not have recognized on their own.

However, Thrash and Elliot's (2003) conceptualization of inspiration goes further, addressing alternative sources of inspiration in addition to such environmental triggers. While such an experience has typically been conceptualized within a particular content domain, Thrash and Elliot's (2003) concept of inspiration is comprehensive, acknowledging both internal and external sources, and extending beyond the restrictive, domain-specific definitions of inspiration. To derive their concept of inspiration, Thrash and Elliot (2003) incorporated prominent characteristics from the diverse literatures on inspiration and established construct validity, permitting a fundamental construct that can be applied to specific domains, including creativity.

This broad conceptualization of inspiration involves a tripartite construct

characterized by evocation, transcendence, and motivation. Evocation refers to the fact that inspiration is reflexive, one does not feel directly responsible for becoming inspired. Transcendence refers to the fact that inspiration directs one toward something that is better or more important than one's ordinary expectations; one envisions better possibilities. Finally, motivation refers to the fact that inspiration involves the desire to express that which is newly conceived. Given the positive valence of this aim, Thrash and Elliot (2003, 2004) have conceptualized inspiration as an appetitive motivational state, in that it involves the activation and direction of behavior toward positively-valenced goals (Elliot, 1997).

Expanding on their tripartite conceptualization of state inspiration, Thrash and Elliot (2004) identified the processes that give rise to the three characteristics that comprise the psychological core of inspiration. They demonstrated that inspiration is a hybrid construct that emerges from the combination of two component processes: (a) being inspired *by*, which involves evocation and transcendence upon encountering an inspiring influence, and (b) being inspired *to*, which involves motivation to extend the inspiring qualities toward a motivational object. Whereas our most exalted pursuits, i.e., those involving inspiration, appear to be triggered by higher cognitive processes, they are energized through the redirection of evolutionarily ancient approach motivational systems (Thrash & Elliot, 2004). Thrash and Elliot's findings illustrate the unique motivational state associated with inspiration, where action often follows evocation and transcendence.

Recall that the widely-accepted four-stage model of creativity also implies motivation and action, in that following the illumination, there is a final phase of

conscious work called *verification*, which involves evaluating, refining, and developing one's idea (Wallas, 1926). However, Wallas' model does not completely capture the creative process, because it is primarily cognitive and problem-solving oriented – once one obtains the solution, one must simply verify it. But the act of creation is really about actualization – bringing one's vision to life, a process that is implicit in "verification" but is much more than this. Inspiration is the motivation to actualize the idea.

Therefore, if inspiration is the motivation to actualize one's idea, then it follows that inspiration should predict creativity. Surprisingly, however, inspiration's effect on creativity has only been empirically tested in a single set of studies. In their multiple-study investigation, Thrash and Elliot (2003; Study 2) showed that inspiration relates to self-reported creativity. More specifically, in their study of the nomological network inspiration, these researchers found that trait-level inspiration correlated positively with creative self-concept. In a longitudinal follow-up study employing an experience sampling methodology, Thrash and Elliot (2003; Study 4) demonstrated that, while controlling for PA (inspiration's strongest correlate), self-reported creativity was among the most robust consequences of being inspired, and that this relationship holds across time and at both the between-persons and within-person levels of analysis. While encouraging, these results are not definitive, as creativity was self-reported rather than objectively assessed.

Accordingly, in a third study, Thrash and Elliot (2003; Study 3) introduced an objective measurement of creativity by examining U.S. patent holders, a group consisting of individuals who are stimulated by novel ideas and are motivated to translate their ideas into reality. These researchers demonstrated that patent holders are inspired more

frequently and more intensely than a comparison group of university alumni. Moreover, among patent holders, the number of patents held was related to the frequency (but not the intensity) of inspiration. These findings suggest that individuals who are inspired are more likely to actualize their creative insight into tangible, creative products. However, whereas they controlled for sex, age, and education level, they did not control for either effort or PA, both of which have been linked to creativity by many theorists.

Other known predictors of creativity. Indeed, the creative process necessitates action and it is not surprising that a considerable body of research highlights the role of effort in creativity. In fact, some researchers have drawn the conclusion that creativity is solely the result of hard work, offering no credence to less understood, but potentially highly influential, processes such as inspiration. For example, Ericsson, Krampe, and Clemens (1993) concluded that the individuals at the highest levels of accomplishment in fields where creativity is paramount to success (e.g., artists, musicians, and writers), work at their capacity for sustained, effortful work. The same conclusion was drawn from interview studies amongst 20 individuals who had achieved high levels of success in each of several fields requiring creativity including music, art, and science (Bloom, 1985). Similarly, it has been demonstrated that creative eminence depends on the application of consistent effort over long periods of time (e.g., Raskin, 1936; Simonton, 1997). This research has documented relationships between eminence as a creator and both the number of years spent working and the number of creative works produced. Indeed, it has been shown that most eminent creators have invested huge amounts of time and energy in their fields, and as a result, are able to see where gaps exist and to know a good problem or creative solution when they see one. Hayes (1978) went so far as to estimate that

10,000 hours must be invested to develop expertise (see also Simon & Chase, 1973). However, it should be noted that expertise does not guarantee creative performance, and that sometimes experts actually become rigid and inflexible, thus losing the capacity for creativity (Runco, 2005). Often, it appears that they are competent in a traditional fashion but not in a creative fashion.

In her extensive work on creativity, Amabile (1983a, 1983b, 1996) suggests that among the most important facilitators of the creative process is a work style that includes an orientation toward working hard. In a profile of the author John Irving, Amabile (2001) pointed out that Irving has described writing as "one-eighth talent and seven-eighths discipline" (Gussow, 1998, as cited in Amabile, 2001, p. 333). According to Amabile, Irving describes working hard from the time he was a child, and asserts that he continues to work hard, often writing 10 hours per day, steadfastly maintaining that "the so-called natural writer is just not going to get it done" (Amabile, 1989, as cited in Amabile, 2001, p. 334).

Despite the considerable support suggesting the importance, and perhaps the necessity, of effort in producing creative work, other research suggests that effort is not a direct antecedent of creativity, but rather that creativity arises effortlessly. According to Martindale (1999), the formal similarity between scientific and artistic inspiration is mirrored in the similarity in self-reports concerning creative inspiration, indicating that for neither scientists nor artists do novel ideas seem to arise from intellectual deduction. Ghiselin (1952) concluded after a study of such reports that "production by a process of purely conscious calculation seems never to occur" (p. 14). Besides being nonintellectual, Ghiselin (1952) found that creation is reported as being automatic and effortless. For

example, Mozart found composing quite easy because he simply transcribed the melodies that he heard in his mind.

Likewise, something similar happens in the creation of literature. A large number of great authors have remarked that they created by describing visual mental images or by copying down auditory mental images (Ghiselin, 1952). James Blake's (1803/1906) comment is typical of many authors: "I have written this poem from immediate dictation, 12 or sometimes 20 or 30 lines at a time without premeditation, and even against my will" (as cited in Martindale, 1999, p. 137). Like writers, scientists' creative ideas often arise as spontaneous mental images, as when Kekule's daydream about a snake biting its own tail led to the discovery of the benzene ring. Often, inexplicable sources have been suggested in creator's introspective reports (Ghiselin, 1985). For example, Rudyard Kipling (1937/1985, as cited in Sternberg & Lubart, 1999, p. 5) referred to the "Daemon" that lives in the writer's pen: "My Daemon was with me in the Jungle Books, Kim, and both Puck books...When your Daemon is in charge, do not think consciously. Drift, wait, and obey." Such mystical explanations for creative inspiration have likely made it more difficult for scientific approaches to be heard and understood. Indeed, many people might believe that creativity and inspiration do not lend themselves to empirical investigation because they are spiritual processes.

On the surface, the take-home message about the roles of effort in the creative process is somewhat unclear. Some researchers claim its importance, while others do not. While it stands that a considerable body of empirical research suggests the necessity of effort in producing creative products, the research indicating the importance of effortlessness in creative production is largely anecdotal. However, it is probable that

effort and effortlessness are both important factors in the creative process.

In addition to effort, certain other aspects of the human psyche have been widely researched and empirically linked to the creativity. One of the most robust relationships that has been demonstrated is the association between creativity and PA. Watson and Tellegen (1985) posited that PA reflects the extent to which a person feels enthusiastic, active, and alert. High PA is a state of high energy, full concentration, and pleasurable engagement. Indeed, there is a large body of research indicating that PA leads to more flexible, adaptive thinking and to enhanced innovative ability, creativity, and problem solving in a wide range of circumstances (e.g., Aspinwall & Taylor, 1997; Carnevale & Isen, 1986; Estrada, Isen, & Young, 1994, 1997; George & Brief: 1996; Greene & Noice, 1988; Hirt, Melton, McDonald, & Harackiewicz, 1996; Isen, Daubman, & Nowicki, 1987; Staw & Barsade, 1993; Taylor & Aspinwall, 1996). Studies addressing this relationship cover a wide range of tasks and domains, from those involving adolescents and college students, to studies involving interpersonal negotiations, organizational settings, and physicians solving diagnostic problems. This research affirms that PA promotes flexible, adaptive thinking that is creative and at the same time effortful, effective, thorough, and responsive to the details of the problem and the context.

More specifically, Carnevale and Isen (1986) found that PA, induced by means of receipt of a small gift and by reading funny cartoons, facilitated participants' taking a problem-solving approach in an integrative bargaining task, which resulted in improved outcomes for both parties in the negotiation. Similarly, several studies on the effects of naturally occurring PA have shown that PA is associated with creative problem solving in work settings (e.g., George & Brief, 1996; Staw & Barsade, 1993), and flexible and

effective coping skills (e.g., Aspinwall & Taylor, 1997; Taylor & Aspinwall, 1996). Thus, both laboratory and field studies have demonstrated that positive feelings promote cognitive elaboration and flexibility, resulting in more numerous and more atypical (though relevant) thoughts.

Another series of studies indicates that PA promotes creative or innovative problem solving (Isen et al., 1987). In one of these tests, the "candle problem" (Duncker, 1945), a person is presented with a candle, a box of tacks, and a book of matches and is asked to affix the candle to the wall so that it will burn without dripping wax on the table or floor. Solving the problem requires one to empty the box of tacks, tack the box to the wall, and place the candle in the box so that the candle cannot drip wax onto the table or floor. Thus, the person must use one of the items (the box) in an atypical way. In three studies, from two different laboratories, using two different age range populations (college students and eighth-grade students), individuals in whom PA had been induced performed significantly better than individuals in a control condition (e.g., Greene & Noice, 1988; Isen et al., 1987). Solving the candle problem requires cognitive flexibility or the ability to put ideas together in novel and appropriate ways, thus satisfying the accepted definition of creativity (e.g., Amabile, 1996).

In addition to the individual-level research, the association between PA and creativity has also been demonstrated in groups. Grawitch, Munz, and Kramer (2003) found that positive mood promotes creative problem solving. In their study, temporary workgroups were induced to experience positive, neutral, or negative mood before engaging in a creative production task. The results indicated that positive mood increased creative performance and implementation efficiency, whereas negative mood had no

effect. These results are consistent with the group-level results reported by Grawitch, Munz, Elliott, and Mathis (2003), who examined the effect of mood and autonomy in problem definition on the idea-generating performance of temporary workgroups. In this study, groups were randomly assigned to a mood (positive vs. neutral) and autonomy (high vs. low) condition and asked to brainstorm ways to improve university student life. It was found that temporary workgroups whose members experienced positive mood generate more original ideas than groups whose members experienced neutral or negative moods.

Taken together, all of these studies indicate that creativity can be facilitated through the application of effort, and by a transient, pleasant affective state, i.e., PA. However, inspiration, as a predictor of creativity, has received insufficient scientific attention. Given that inspiration has been posited to relate to creativity since the time of Plato, that inspiration is conceptualized as a motivational source for the actualization of creative insight, and that preliminary findings indicate that inspiration predicts creativity (Thrash & Elliot, 2003), careful empirical analysis is paramount and long overdue. The current investigation will address the importance of inspiration in the creative process rigorously, by employing a peer-rated measurement of creativity and controlling for established predictors of creativity.

It is hypothesized that inspiration will predict the creativity level of a final product and that this effect will remain significant while controlling for both effort and PA. Given that PA is strongly correlated with both inspiration and creativity, and that a relationship between effort and creativity has been shown, a possible alternative explanation of this relationship might be the overlap between PA and inspiration, PA and

creativity, and effort and creativity. The inclusion of effort and PA as control variables addresses these important considerations.

Aim 2: Inspiration as a Mediator of the Relationship between Creativity of Initial Idea(s) and Creativity of the Final Product

While the existing literature suggests that inspiration likely predicts creativity, no research to date has directly addressed the nature of the motivational state associated with actualizing creative insight. In addition to being fragmented and incoherent, the literature regarding inspiration's role in the creative process is also largely atheoretical. In other words, if inspiration predicts creativity, why should this occur? A potential explanation is provided by Thrash and Elliot (2004), who speculated that inspiration serves a distinct function: transmission. Unlike other forms of appetitive motivation (e.g., seeking food), where acquisition is the central function, Thrash and Elliot (2004) characterize inspiration as a unique form of approach motivation that allows one to see or recognize something deeply important (e.g., creative insight) and, in turn, transmit that which is newly conceived (e.g., creative product).

These researchers point out that, in some cases, the transmission is highly automatic, as in the expression of creative insights; in other cases, the transmission is more controlled and necessitates the translation of the evocative stimulus into a performable goal, as in the modeling of a future self after a role model. Nevertheless, inspiration is viewed as a desire to express and actualize something while it is clearly conceived. Thus, transmission involves two objects: an illuminating trigger object (e.g., a creative insight or a role model) and a target object toward which the inspiring qualities are extended (e.g., a creative product or possible self) (Thrash & Elliot, 2004).

Inspiration's transmission function satisfies certain adaptive needs, particularly higher human longings such as creativity, meaning, and spiritual truth. Many of these goals are valued because they transcend oneself or one's state of knowledge (Thrash & Elliot, 2004). As Thrash and Elliot (2004) point out, emptiness in life, writer's block, and other unfulfilled states appear to be failures of illumination and transmission; these are failures to participate, as an intermediary, in something beyond oneself (see also Seligman, 2002). The capacity to function as such an intermediary has extensive sociocultural implications, in that transmission often involves multiple parties, flowing from a source to a particularly receptive individual, and finally to the common person.

For example, in the Judeo–Christian tradition, inspiration is portrayed as mediating transmission of divine knowledge from God to the prophet and from prophet to the rest of humanity (Thrash & Elliot, 2004). Following Socrates' teachings, Plato stated that the Muse inspires the poet, who in turn inspires his readers, thus forming a chain resembling a series of magnetized objects (Rothenberg & Hausman, 1976). Simonton (1994) noted the importance of admiration and emulation in the accession of eminent individuals, who in turn influence and inspire those who follow. Thus, inspiration is not a terminal experience but rather a transmission of the knowledge of higher goods that appears to provide much of the moral, aesthetic, and intellectual fabric on which cultures are based (Thrash & Elliot, 2004). Indeed, among the most socially, culturally, and psychologically pervasive forms of such transmission is the transmission of creative insight into a creative idea or product, and this general transmission model is readily applied to the creativity domain.

However, the transmission model of inspiration has never been tested, including

within the context of the creative process. But given that inspiration is conceptualized as the motivation to convert a compelling idea or illumination (trigger) into a work of art, a text, or some other concrete form (target), it is likely that inspiration functions as a mediator between the creativity of one's insight and the creativity of one's product. Therefore, the second hypothesis of this study is that inspiration will mediate between the creativity of the insight and the creativity of the product, again controlling for effort and PA. In this way, the second hypothesis of this study builds on the first, embedding the relationship between inspiration and creativity in the context of Thrash and Elliot's (2004) general transmission model of inspiration.

Aim 3: Additional Correlates of Inspiration

The third goal of this investigation is to further broaden our understanding of the inspiration construct by examining the consequences of creative inspiration. Recall that creativity and inspiration are both associated with an energized emotional state; consequently there are theoretical reasons to believe that creativity and inspiration are related to physiological arousal. Many theorists have investigated the construct of general level of activation, or arousal (e.g., Duffy, 1962; Hebb, 1955). Arousal is often viewed as existing along a continuum, ranging from sleep through alert wakefulness to states of emotional tension, and that arousal is related to performance (and learning) in a curvilinear fashion, where optimal performance occurs at mid-levels of arousal (Yerkes & Dodson, 1908). That is, as task complexity increases, the optimal level of arousal decreases. Simple tasks are performed most efficiently at high levels of arousal, whereas more complex tasks require lower levels of arousal.

While this curvilinear relationship alone does not permit a determination of

whether creative inspiration is associated with high or low-arousal states, self-reports by creative geniuses suggest that creative inspiration most likely occurs in low-arousal, meditative-like states (Martindale, 1999). Likewise, Martindale and Greenough (1973) found that intense white noise, which increases cortical arousal, produced decrements on tests of creativity. Even arousal caused by rewards seems to decrease creativity (Amabile, 1983b). These and similar findings suggest that creative people exhibit defocused attention accompanied by low levels of cortical activation, while uncreative people focus their attention too much, preventing them from thinking of original ideas.

Martindale and Hasenfus (1978) hypothesized that these differences should be most apparent during the "inspirational" (incubation) stage of the creative process because of the usefulness of defocused attention, while there should be no differences in arousal during the elaboration phase because it requires focused attention. To test their hypotheses, these researchers measured EEG activity while people thought about a story they would write (the "inspirational" phase) and while they wrote the story (the elaboration phase). These researchers found, as predicted, that highly creative people exhibited lower levels of cortical activation during the inspirational stage than did less creative people and that no differences in activation occurred during the elaboration phase. It should be noted that Martindale and Hasenfus (1978) define "inspiration" as a process analogous to the incubation phase of the four-stage model, highlighting the role of defocused attention. Their characterization of the term "inspiration" is very different from the conceptualization of inspiration applied in the current investigation and, therefore, it cannot be concluded that inspiration does, in fact, involve low arousal.

While it has been shown that creative individuals, i.e., those who experience

creative inspiration, are generally less aroused while generating ideas, after getting an idea (i.e., experiencing illumination or creative insight), it is plausible that they become highly aroused, and that this arousal effect lingers after they are finished writing. This hypothesis is consistent with the classic conceptions of inspiration as a breathing in of spirit and vitality.

Inspiration is also likely to affect the writing process. Inspired individuals are presumably motivated to convey their creative insight, and this urge to actualize such insight is likely to be manifest as an increase in writing efficiency. It is hypothesized that inspired individuals are likely retain more of what is initially expressed, rather than experiencing a greater need to revise. However, neither the relationship between inspired writing and increased arousal nor that between inspiration and writing efficiency has been tested. Therefore, the third goal of this investigation is to demonstrate that inspiration predicts an increase in arousal during the creative process, and that inspired writing is more efficient than uninspired writing.

Integration and Present Research

As the above review illustrates, while there is a relatively modest body of knowledge describing creativity and the creative process, the nature of inspiration is only recently beginning to receive empirical attention. Consequently, the literature formally integrating inspiration and creativity is virtually nonexistent. This had led to a fragmented understanding of how these two important processes interact. First, the term *inspiration* has been widely used in conjunction with the various theories of creativity in a multitude of different ways, creating a lack of clarity regarding inspiration's likely role in the creative process. In fact, the specific function of inspiration in the creative process has

never been directly tested. This is likely due to the fact that only very recently has inspiration itself been formally conceptualized through empirical validation. Second, while it has been suggested that the transmission model of inspiration might play a role in the creative process, this has never been validated scientifically. Lastly, little is known about the additional consequences of being inspired in the context of the creative process.

Therefore, in an effort to provide clarity by integrating the literature on inspiration and creativity, the current investigation addresses the role of inspiration within the context of the creative process more precisely and with greater scientific rigor. Specifically, it is hypothesized that inspiration predicts creativity, while controlling for effort and PA, two established predictors of creativity. Furthermore, it is hypothesized that inspiration functions as a mediator between the creativity of one's initial insight and the creativity of one's product, again controlling for effort and PA. Finally, it is hypothesized that inspiration is associated with increased writing efficiency and increased physiological arousal.

METHOD

Participants

One hundred sixty-four (72 male and 91 female) undergraduates participated in this study in return for course credit in introductory psychology. One participant did not indicate his/her gender. Participants were assured that their responses would remain confidential, and they were debriefed after participating in the study. All participants were at least 18 years of age and were treated in accordance with the ethical guidelines established by the American Psychological Association.

Self-report Measures

Creativity of initial idea(s). A 4-item measure, developed by the investigator, was used to assess the creativity of the initial idea(s). The phrase "I felt that my idea(s) were" was followed by the items: "original," "ingenious," "novel," and "creative" (See Appendices D & E). Participants rated each item on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The index of creativity of the initial idea(s) was computed using the mean value of these four items. Descriptive statistics and internal consistencies may be found in Table 1.

Inspiration. A 3-item measure, derived from the trait-level Inspiration Scale (IS; Thrash & Elliot, 2003), was used to assess state inspiration. Participants completed this twice at each of two time points, but concerning the four phases of the process, indicating inspiration ("I felt inspired"; "I was inspired"; "Something inspired me") related to

generation, illumination, expression, and revision (See Appendices D & E). Participants rated each item on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

Six indices of inspiration were computed: generation, illumination, expression, revision, writing, and overall. The writing index of inspiration was computed by combining the expression and revision indices of inspiration to form a composite measure of inspiration while writing. The overall index of inspiration was computed by combining the generation, illumination, expression, and revision indices of inspiration to form a composite measure of inspiration across all stages. Descriptive statistics and internal consistencies may be found in Table 1.

Effort. A 2-item measure, similar to Elliot, McGregory, and Gable's (1999) effort and persistence scale, was used to assess effort. Participants completed this twice at each of two time points, but concerning the four phases of the process, indicating effort ("I worked hard," "I put forth a great deal of effort") related to generation, illumination, expression, and revision (See Appendices D & E). Participants rated each item on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Six indices of effort were computed in the same manner as for inspiration. Descriptive statistics and internal consistencies may be found in Table 1.

Positive affect. A four-item measure, derived from the MacKinnon et al. (1999) short form of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988), was used to assess PA. Participants completed this twice at each of two time points, but concerning the four phases of the process, indicating PA ("excited," "enthusiastic," "alert," "determined") related to generation, illumination, expression, and revision (See Appendices D & E). The MacKinnon et al. (1999) five-item measure includes the item

"inspired", which was dropped as a potential confounder. Participants rated each item on a scale from 1 (*very slightly or not at all*) to 7 (*extremely*) regarding how they felt. Six indices of PA were computed in the same manner as inspiration and effort. Descriptive statistics and internal consistencies may be found in Table 1.

Objective and Coded Measures

Creativity - Consensual Assessment Technique (CAT). Amabile's (1996) CAT was used to assess creativity. Following this procedure, ten judges were recruited to evaluate each mystery story. The judges consisted of 5 senior-level English majors and 5 graduate students from the American Studies department. Most of the judges were published poets or had editorial experience. The judges evaluated each story using several items: *novelty/originality*, *presentation*, *ingenuity*, *organization*, *imaginativeness*, *craftsmanship*, *spelling*, *suspensefulness*, *effectiveness of resolution*, *sophistication of expression*, *insightfulness*, *sensory imagery*, *inspiration evident*, *effort evident*, and *creativity* (See Appendix H). Each item was rated on a 9-point scale, (1 = Very Low, 5 = Medium, and 9 = Very High). The judges were told to view the scale as having equal spacing between the nine reference points, and were encouraged to make use of the entire range of scale. They were asked to evaluate the mystery stories relative to one another, rather than rating them against some absolute standard for mystery writing. The stories were evaluated in a different random order by each judge.

Each judge worked independently and was not allowed to discuss the stories or the judging task with others until the evaluations for every story were complete. The judges were told that the participants had 30 minutes in which to write their mystery

stories and were asked to read through a copy of several stories prior to making any evaluations.

A principal-components analysis yielded two components, according to the Kaiser criterion (the first three eigenvalues were 10.60, 1.73, and 0.66). The first two components accounted for 70.6% and 11.5% of the total variance prior to rotation and 44.3% and 37.8% following varimax rotation. Varimax loadings are shown in Table 2. Creativity, novelty/originality, ingenuity, and imaginativeness loaded on the second component (Creativity). An index of creativity of each story was computed by taking the mean value of ratings from these four items. Descriptive statistics and interrater reliabilities may be found in Table 1.

Several factors support using a mystery story as the writing task that would be evaluated for creative quality. Writing a mystery story can be difficult, and a good mystery story generally requires being creative to varying degrees. Furthermore, unlike other types of writing, such as a romance or comedy, a mystery story is not as easily developed using personal experience and, therefore, prevents the temptation to write a personal narrative. Stories based on such personal experience may not be as valid of an index of creativity. The first paragraph was provided to establish more comparable stories, minimizing variability in story content while still allowing for variance in creativity (cf., Amabile, 1996).

Arousal – Critical flicker-fusion (CFF). A Schuhfried Flicker Fusion Meter (FLIM) (distributed by Lafayette Instruments) was used to assess general CNS arousal. The Flicker-fusion procedure is an objective test that uses threshold values to determine the level of CNS activation (arousal). These threshold values are derived from the

perception of the frequency of light at which a flickering light appears fused (solid) and vice versa. Physiological studies show that the arousal of an organism is centrally controlled. The flicker-fusion frequency is regarded, along with other criteria (e.g. electroencephalogram, skin conductance responses) as an indicator for this central-nervous function capacity. Sato, Kanda, and Anan (2002) and Grunberger, Saletu, Linzmayer, and Stohr (1982) reported that CFF thresholds are highly correlated with electroencephalographic (EEG) measures of arousal. CFF thresholds have also been related to self-report measures of subjective alertness (e.g. Baschera & Grandjean, 1979; Grundstrom, Holmberg, & Lederman, 1977). CFF has also been used to support Eysenck's extraversion-arousal hypothesis (e.g. Frith, 1967).

The CFF apparatus consisted of a control unit which allowed the researcher to alter the flicker/fusion frequency, and a display unit for the presentation of the stimuli to participants. The flicker/fusion display unit comprised a metal viewing chamber 1 meter long with a soft eye-mask at one end for participants to place against their foreheads, which provided both eyes with an unobstructed view of the stimuli. Participants viewed the stimuli by looking down the viewing chamber using both eyes. Inside the viewing chamber was a light emitting diode (LED). The frequency of the LED (the rate at which it flickered) was altered by means of varying the voltage produced by the control unit. The frequency was displayed to the researcher by means of a digital frequency meter which was part of the control unit.

A psychophysical method of limits procedure was adopted in which participants viewed a flickering light ascending from 20 Hz or a fused light descending from 80 Hz. In the ascending process, the frequency of a light perceived as flickering was increased in

1 Hz increments until a fused (constant) light was perceived. In the descending process, the frequency of a light perceived as fused (constant) was decreased in 1 Hz increments until a flickering light was perceived. Participants indicated a change from flicker to fusion (ascending threshold) or from fusion to flicker (descending threshold) by pressing a button that stopped the signal.

This method yielded two parameters: (1) the frequency at which the two intermittent lights fused into a single percept (fusion threshold) and (2) the frequency at which the single percept separated to form two flickering lights (flicker threshold). The average values across multiple trials of the critical frequencies in the ascending or descending process are threshold values and are called fusion frequency (VF) and flicker frequency (FF). The mean of fusion (VF) and flicker (FF) thresholds represents the CFF threshold (CFFT). An increase in the CFFT is indicative of an increase in the overall integrative activity of the CNS and vice versa (Hindmarch, 1980).

The first (pre-writing) CFF procedure included a series of ten trials: five ascending and five descending. The first of each set of five trials was a practice trial. The second (post-writing) CFF procedure included a series of eight trials: four ascending and four descending (there was no practice trial). The variable used for analysis is the change in CFFT that was computed by subtracting the pre-writing CFFT from the post-writing CFFT. Descriptive statistics and reliability may be found in Table 1.

Pilot tests were performed to determine the FLIM settings, including the determination of the initial ascending and descending signal frequencies and chamber view (unilateral or bilateral), and the number of pre/post-writing trials.

Writing Efficiency. Spector Pro v. 5.0 (for Windows) software was used to assess the total number of keystrokes throughout the writing process. A keystroke was recorded any time a key was pressed on the keyboard. This included all letter, number, and symbol keys, as well as all formatting keys (e.g., *Enter*, *Backspace*, *Delete*, *spacebar*). Participants were unaware that this program was running throughout their session. The data collected by this program, and the program itself, were password protected and could only be accessed by the principal investigator. Microsoft Word was used to assess the total number of characters in the completed story. A character was defined as any letter, number, symbol, or space that remained after the story was completed. Efficiency was computed as follows:

$$\text{Writing Efficiency} = \frac{\text{Total \# characters}}{\text{Total \# keystrokes}}$$

For example, using this ratio, if the total number of keystrokes used is the same as the total number of final characters, a perfect writing efficiency rating of 1 would be assigned. In contrast, if the total number of keystrokes used is more than the total number of final characters, a writing efficiency rating between 0 and 1 would be assigned. The more efficient one's writing was, the closer the rating was to 1. Descriptive statistics and reliability may be found in Table 1.

Procedure

Participants were run individually during one-hour sessions. Participants read and signed the consent form (See Appendix A), were given a copy to keep, and were asked if they had any questions. Questionnaire 1 (Q1) was completed by the participants while the researcher waited in another room. Q1 was used to assess several variables for a related

investigation, and it was not utilized for analysis in the current investigation. The researcher returned, and the first of two critical flicker-fusion (CFF) procedures was completed to assess participants' CNS arousal before beginning the creative writing task. Participants were then informed that the first paragraph of a mystery story had already been written, and that their task was to complete this story. Participants read the following opening paragraph:

> John and Maria walked through town on a summer evening, hand in hand. It was their third date, and they were in love. As they were passing a house next to the lake, they stopped, alarmed by a sound coming from inside the house. Immediately they knew that the evening had taken a turn in a direction that they could not have anticipated.

Participants were informed that they had a total of 30 minutes to complete their story, but were asked to begin by simply coming up with an idea for their story. Participants were asked to alert the researcher once they had an idea for their story. At this point participants completed Questionnaire 2 (Q2) while the researcher waited in another room. Q2 was used to assess inspiration, effort, and PA as they related to the process of idea generation (hereafter called "generation") and the moment that they got idea for their story ("illumination"). Participants' appraisals of the creativity of the initial idea(s) were also assessed using Q2.

The researcher returned, turned on the monitor, which displayed the opening paragraph of the mystery story in Microsoft Word, and left the room to allow participants to write. Throughout the writing process, specialized computer software surreptitiously recorded every keystroke. The researcher returned to inform participants when they had

five minutes remaining. When participants finished, the monitor was turned off, and the participants completed Questionnaire 3 (Q3) while the researcher waited in another room. Q3 was used to assess inspiration, effort, and PA as they related to both the process of expressing their idea ("expression") and the process of revising and finalizing their story ("revision").

Finally, the second (post-writing) CFF procedure was completed. The participants were given a final consent form (See Appendix F) and debriefed (See Appendix G).

RESULTS

Hypothesis 1: Inspiration Predicts the Creativity of the Final Product

Correlations between Predictor Variables and Creativity of the Final Product

The results from the following analyses are shown in Table 2.

Overall inspiration, effort, and PA. Overall inspiration and overall PA were both positively correlated with creativity of the final product, $r(162) = .24$, $p < .01$ and $r(162) = .17$, $p < .05$, respectively. Overall effort was uncorrelated with creativity of the final product.

Inspiration, effort, and PA at specific stages. Inspiration while generating idea(s), effort while generating idea(s), and PA while generating idea(s) were all uncorrelated with creativity of the final product. Inspiration at illumination and PA at illumination were both positively correlated with creativity of the final product, $r(162) = .28$, $p < .01$ and $r(162) = .16$, $p < .05$, respectively. Effort at illumination was uncorrelated with creativity of the final product. Creativity of the final product was positively correlated with inspiration while expressing, $r(162) = .25$, $p < .01$, effort while expressing, $r(162) = .18$, $p < .05$, and PA while expressing $r(162) = .16$, $p < .05$. Inspiration while revising, effort while revising, and PA while revising were all uncorrelated with creativity of the final product.

Inspiration, effort, and PA while writing (i.e., as noted, composite of the expression and revision stages). Creativity of the final product was positively correlated

with inspiration while writing, $r(162) = .18$, $p < .05$, and PA while writing, $r(162) = .16$, $p < .05$. Effort while writing was uncorrelated with creativity of the final product.

Regression Analyses of Predictors of Creativity of the Final Product

The results from following analyses are shown in Table 3.

Overall inspiration, effort, and PA. In a regression analysis, overall inspiration, overall effort, and overall PA were entered as predictors of creativity of the final product. Creativity of the final product was found to be predicted by overall inspiration, $\beta = .24$, $p < .05$, but not by overall effort or overall PA.

Inspiration, effort, and PA at specific stages. In a regression analysis, inspiration while generating idea(s), effort while generating idea(s), and PA while generating idea(s) were entered as predictors of creativity of the final product. Creativity of the final product was not found to be predicted by any of these variables. Inspiration at illumination, effort at illumination, and PA at illumination were entered as predictors of creativity of the final product. Creativity of the final product was found to be predicted only by inspiration at illumination, $\beta = .32$, $p < .01$. Inspiration while expressing, effort while expressing, and PA while expressing were entered as predictors of creativity of the final product. Creativity of the final product was found to be predicted only by inspiration while expressing, $\beta = .21$, $p < .05$. Inspiration while revising, effort while revising, and PA while revising were entered as predictors of creativity of the final product. Creativity of the final product was found to be negatively predicted by effort while revising, $\beta = -.26$, $p < .01$.

Inspiration, effort, and PA while writing. In a regression analysis, inspiration while writing, effort while writing, and PA while writing were entered as predictors of

creativity of the final product. Creativity of the final product was not found to be predicted by any of these variables.

These findings indicate that inspiration, particularly during illumination and expression, is a positive predictor of creativity. The effect of inspiration remains significant when covariates are controlled in regression analyses.

Hypothesis 2: Inspiration Mediates the Relationship between the Creativity of the Initial Idea(s) and Creativity of the Final Product

The following procedure testing for mediation is adapted from Baron and Kenny (1986). Following their procedure, a series of three analyses is used to test for mediation: (a) correlating the mediator with the independent variable (b) correlating the dependent variable with the independent variable (c) regressing the dependent variable on both the independent variable and on the mediator. These three analyses provide the tests of the linkages of the mediational model.

To establish mediation in this case, the following conditions must hold: First, the creativity of the initial idea(s) must correlate with inspiration in the first analysis; second, the creativity of the initial idea(s) must correlate with the creativity of the final product in the second analysis; and third, inspiration must predict the creativity of the final product in the third analysis. If these conditions all hold in the predicted direction, then the effect of the creativity of the initial idea(s) on the creativity of the final product must be less in the third analysis than in the second. Perfect mediation holds if the creativity of the initial idea(s) has no effect when inspiration is controlled.

Relationship between Creativity of the Initial Idea and Inspiration at Specific Stages

As shown in Table 4, creativity of the initial idea was positively correlated with inspiration at every stage of the procedure.

Relationship between Creativity of the Initial Idea and Creativity of the Final Product

Self-reported creativity of the initial idea was positively correlated with the creativity of the final product, $r(162) = .27, p < .01$. This correlation coefficient is also reflected as an identical beta coefficient in Step 1 of Table 5.

Relationship between Inspiration and Creativity of the Final Product, Controlling for Creativity of the Initial Idea(s)

The results from the following analyses are shown in step 2 of Table 5.

Overall inspiration. In a regression analysis, overall inspiration and creativity of the initial idea(s) were entered as predictors of creativity of the final product. Creativity of the final product was found to be predicted only by creativity of the initial idea(s), $\beta = .20, p < .05$.

Inspiration at specific stages. In a regression analysis, inspiration while generating idea(s) and creativity of the initial idea(s) were entered as predictors of creativity of the final product. Creativity of the final product was found to be predicted only by creativity of the initial idea(s), $\beta = .26, p < .01$. Inspiration at illumination and creativity of the initial idea(s) were entered as predictors of creativity of the final product. Creativity of the final product was found to be predicted only by inspiration at illumination, $\beta = .19, p < .05$. Inspiration while expressing and creativity of the initial idea(s) were entered as predictors of creativity of the final product. Creativity of the final product was found to be predicted by creativity of the initial idea(s), $\beta = .20, p < .05$, and by inspiration while expressing, $\beta = .18, p < .05$. Inspiration while revising and creativity

of the initial idea(s) were entered as predictors of creativity of the final product. Creativity of the final product was found to only be predicted by creativity of the initial idea(s), $\beta = .27, p < .01$.

Inspiration while writing. In a regression analysis, inspiration while writing and creativity of the initial idea(s) were entered as predictors of creativity of the final product. Creativity of the final product was found to only be predicted by creativity of the initial idea(s), $\beta = .23, p < .01$.

Relationship between Inspiration and Creativity of the Final Product, Controlling for Creativity of the Initial Idea(s), Effort, and PA

The results from these analyses are shown in step 3 of Table 5, and are nearly identical to those found in step 2 as reported above.

These results indicate that inspiration at illumination is the best mediator between creativity of initial idea and creativity of the final product. The results demonstrate that (a) creativity of the initial idea(s) is positively correlated with inspiration at illumination, (b) creativity of the initial idea(s) predicts creativity of the final product ($\beta = .27, p < .01$; See Figure 1A), and (c) inspiration at illumination predicts creativity of the final product while creativity of the initial idea(s) is controlled ($\beta = .26, p < .05$). The effect of creativity of the initial idea(s) is nonsignificant ($\beta = .16$, *n.s.*) when inspiration at illumination is controlled, indicating that inspiration mediates the effect of creativity of the initial idea(s) (See Figure 1B). These findings hold when effort and PA are controlled.

Hypothesis 3: Inspiration is Associated with Increased Writing Efficiency and Increased Arousal

Correlations between Predictor Variables and Writing Efficiency

The results from the following analyses are shown in Table 6.

Overall inspiration, effort, and PA. Overall inspiration and overall PA were both positively correlated with writing efficiency, $r(162) = .20, p < .05$ and $r(162) = .17, p < .05$, respectively. Overall effort was uncorrelated with writing efficiency.

Inspiration, effort, and PA at specific stages. Inspiration while generating idea(s) and effort while generating idea(s) were both positively correlated with writing efficiency, $r(162) = .16, p < .05$, for both variables. PA at illumination was positively correlated with writing efficiency, $r(162) = .16, p < .05$. Writing efficiency was positively correlated with inspiration while expressing, $r(162) = .20, p < .05$, effort while expressing, $r(162) = .18$, $p < .05$, and PA while expressing $r(162) = .17, p < .05$. Inspiration while revising was positively correlated with writing efficiency, $r(162) = .19, p < .05$.

Inspiration, effort, and PA while writing. Inspiration while writing was positively correlated with writing efficiency, $r(162) = .23, p < .01$.

Regression Analyses of Predictors of Writing Efficiency

The results from the following analyses are shown in Table 7.

Overall inspiration, effort, and PA. In a regression analysis, overall inspiration, overall effort, and overall PA were entered as predictors of writing efficiency. Writing efficiency was found not to be predicted by any of these variables.

Inspiration, effort, and PA at specific stages. Regression analyses indicated that writing efficiency was found to only be predicted by inspiration while revising, $\beta = .30, p < .01$.

Inspiration, effort, and PA while writing. In a regression analysis, writing efficiency was found to only be predicted by inspiration while writing, $\beta = .25, p < .05$.

Correlations between Predictor Variables and Change in Arousal

The results from the following analyses are shown in Table 8.

Overall inspiration, effort, and PA. Overall inspiration, overall effort, and overall PA were all uncorrelated with change in arousal.

Inspiration, effort, and PA at specific stages. Correlation analyses indicated that change in arousal was positively correlated with both inspiration at illumination, $r(162) = .16$, $p < .05$, and PA at illumination $r(162) = .17$, $p < .05$. These were the only significant findings.

Inspiration, effort, and PA while writing. All of these variables were uncorrelated with change in arousal.

Regression Analyses of Predictors of a Change in Arousal

The results from the following analyses are shown in Table 9.

Overall inspiration, effort, and PA. In a regression analysis, overall inspiration, overall effort, and overall PA were entered as predictors of a change in arousal. A change in arousal was found not to be predicted by any of these variables.

Inspiration, effort, and PA at specific stages. Regression analyses indicated that a change in arousal was found not to be predicted by any of these variables at any stage of the procedure.

Inspiration, effort, and PA while writing. In a regression analysis, inspiration while writing, effort while writing, and PA while writing were entered as predictors of arousal. Arousal was not found to be predicted by any of these variables.

These findings indicate that inspiration, only while revising and while writing, is a positive predictor of writing efficiency. This effect of inspiration remains significant

when covariates are controlled in regression analyses. These findings also show that inspiration at illumination is predictive of increased physiological arousal.

DISCUSSION

The first aim of this investigation was to demonstrate that inspiration predicts creativity of a mystery story while controlling for effort and PA, two established predictors of creativity. The results provided strong support for this hypothesis. It was found that overall inspiration was positively correlated with the creativity of the final product. Furthermore, inspiration at specific stages (illumination, expression, and writing) was also positively correlated with creativity of the final product. More important, regression findings indicated that inspiration was predictive of creativity of the final product while controlling for effort and PA, and that neither effort nor PA were predictive of creativity. This important finding not only supports the hypothesis that inspiration predicts creativity, but provides evidence that effort and PA may not be as essential in facilitating creativity as many have suggested.

Most notably, the strongest predictor of creativity of the final product was inspiration at illumination, suggesting that the inspiration one experiences at the moment of insight, before one has written or revised anything, is the greatest facilitator of the creative quality of the final product. This is a noteworthy finding because it is based on one's experience of inspiration prior to writing, rather than on one's inference of the contribution of inspiration retrospectively, based on how creative one's story was perceived after it had been written. Another noteworthy finding is that effort while revising was found to be a negative predictor of creativity, at least when inspiration and PA are controlled (see Table 3). This is striking in that it suggests that effort per se may

not be a necessary facilitator of creativity, and that uninspired effort may actually impede creativity. Alternatively, it is possible that effort is a symptom of a failure to become inspired, whereby one works hard in an attempt to make one's story creative during the revision process but fails to do so.

The second aim of this investigation was to validate the transmission model of inspiration (Thrash & Elliot, 2004), by demonstrating that inspiration functions as a mediator between the creativity of initial insight and the creativity of the final product, again controlling for effort and PA. The results provided strong evidence to support this hypothesis. Following Baron and Kenny's (1986) procedure for determining mediation, a series of three analyses was performed. The first analysis demonstrated that creativity of the initial idea(s) was positively correlated with inspiration at every stage of the procedure. The second analysis demonstrated that creativity of initial idea(s) was positively correlated with creativity of the final product. Finally, the third analysis demonstrated that inspiration at illumination was predictive of creativity of the final product, while controlling for the creativity of one's idea, and that the effect of creativity of initial idea(s) was reduced (it became nonsignificant) when inspiration at illumination was entered as a predictor. A fourth regression analysis further demonstrated that this relationship held (the effect of inspiration actually increased) when effort and PA were controlled.

Taken together, these analyses build on the first set of findings, suggesting that inspiration at illumination not only predicts creativity, but that it functions as a mediator between the creativity of initial idea(s) and creativity of the final product. This important finding embeds the relationship between inspiration and creativity in the context of

Thrash and Elliot's (2004) general transmission model of inspiration, and supports the characterization of inspiration as a unique form of motivation. In this context, it is suggested that inspiration allows one to recognize creative insight and, in turn, transmit that insight into a creative product.

Two other findings should be noted. First, creativity of the initial idea(s) was a significant predictor of creativity of the final product when inspiration at various stages of the procedure was included. However, this did not occur at illumination, where inspiration was found to uniquely predict creativity. Second, similar to previous findings in this investigation, effort while revising and effort while writing were found to be negative predictors of creativity of the final product. These findings provide increased support to suggest that effort may not be as predictive of creativity, as is often claimed, and that effort may be symptomatic of having not been inspired.

The third goal of this investigation was to provide a more complete picture of inspiration's function by (1) demonstrating that inspiration is associated with more efficient writing and (2) demonstrating that inspiration is associated with increased physiological arousal. The results provided support for both of these hypotheses and are discussed below.

It was found that overall inspiration was positively correlated with writing efficiency. Furthermore, inspiration while generating idea(s), inspiration while expressing, inspiration while revising, and inspiration while writing were all positively correlated with writing efficiency. More important, regression findings indicated that inspiration while revising and inspiration while writing were predictive of writing efficiency, controlling for effort and PA. Whereas effort and PA were correlated with writing

efficiency at various stages of the procedure, inspiration uniquely predicted writing efficiency while revising and while writing, controlling for these other variables.

Experiencing a state of transcendent motivation (i.e., inspiration) likely results in eagerness to convey novel and insightful idea(s). In turn, one writes more efficiently, retaining the initial written expression of the insight, rather than experiencing a greater urge to revise. In contrast, having been less inspired, or uninspired, one writes less efficiently, apparently experiencing the need to reexamine and change what has been written. It is striking that the efficiency of inspired writing does not come at the cost of producing a low quality product. Inspired writing is more creative, despite having received less revision.

The final analysis of this investigation demonstrated that inspiration at illumination is associated with an increase in physiological arousal. This finding is consistent with the classic conceptions of inspiration as a breathing in of spirit and vitality, and with the characterization of inspiration as an activated construct. This finding also supports the hypothesis that this arousal effect is evident even after the participant is finished writing. A related finding is that PA at illumination was also associated with physiological arousal. This finding is consistent with the research indicating that inspiration and PA are both activated constructs and that one of inspiration's strongest correlates is PA (Thrash & Elliot, 2003).

Overall, the results indicate that, as hypothesized inspiration predicts creativity of the final product while controlling for effort and PA; inspiration mediates between the creativity of insight and the creativity of the final product; and inspiration is associated with both increased writing efficiency and increased physiological arousal. Of particular

importance is the experience of inspiration at illumination. Indeed, there appears to be something very special and unique about this discrete moment. Inspiration at illumination uniquely predicted creativity of the final product; it mediated the relationship between creativity of initial idea(s) and creativity of the final product; and it was associated with an increase in physiological arousal. Such findings provide a compelling account of the importance of inspiration, especially at the moment of insight, in the creative process.

However, many researchers have touted the importance of other predictors of creativity, such as effort and PA. The current investigation tested for the effect of these predictors in addition to inspiration. The findings provide strong support for the facilitative effect of inspiration but not of effort or PA. In fact, effort was demonstrated to be a negative predictor of creativity of the final product while revising and writing. Regardless, the potential effects of effort and PA on the creative process should not be completely discounted, but rather reexamined. Inspiration, however, appears to have a distinct facilitative effect on creativity that has likely been attributed to other variables, such as effort and PA. This confusion was a consequence of the limited empirical research describing and integrating these processes, especially inspiration. The current investigation has helped fill this void.

A few limitations of this research should be acknowledged. This research examined personality constructs at the state-level. Future research should investigate the effect of related, trait-level variables such as openness to experience and the behavioral-activation system (BAS). The measure of writing efficiency used in the current study does not discriminate between typing efficiency and substantive, conceptual efficiency. Future research should incorporate a measure that accounts for differences in these

variables. Additionally, while the CFF procedure was used in this study to assess physiological arousal, future investigations would benefit from employing additional measures of physiological activity, such as positron emission tomography (PET) and event-related potentials (ERP), to better understand the physiology of both inspiration and creativity.

This research focused on undergraduate samples, and future research should examine the generalizability of these findings to other populations. Finally, in future research, it would be profitable to manipulate inspiring stimuli and the precursors to inspiration, including mood states, in order to identify the particular sources and antecedents of inspiration. Additional research addressing some of these limitations is currently underway. Despite these limitations, the current investigation demonstrates the importance of such efforts to study inspiration as it relates to the creative process, and serves as a catalyst for future research on the nature of this unique relationship.

In conclusion, this investigation and the continued research related to it have widespread implications. Theoretically, any area or discipline where creativity is valued benefits from the knowledge that inspiration serves as a motivator of creative performance. With continued research, a greater understanding of *how* one becomes inspired will provide important information regarding the process of fostering inspiration to enhance creativity.

TABLE 1

DESCRIPITIVE STATISTICS AND RELIABILITES

Variable and Stage	M	SD	Actual Range	Internal Consistency
Self-report Variables				
Creativity of initial idea(s)	4.20	1.48	1-7	.81
Inspiration				
Overall	12.08	3.20	5-20	.90
Generation	12.57	4.00	3-21	.87
Illumination	12.15	4.39	3-21	.90
Expression	14.23	3.95	3-21	.91
Revision	9.36	4.13	3-21	.76
Writing	11.80	3.41	3-21	.82
Effort				
Overall	8.03	2.01	4-13	.84
Generation	8.24	2.95	2-14	.86
Illumination	8.41	3.00	2-14	.88
Expression	10.04	2.22	4-14	.83
Revision	5.41	2.87	2-14	.89
Writing	7.73	1.98	4-14	.70
PA				
Overall	18.08	4.07	4-27	.93

TABLE 1 CONTINUED

Variable and Stage	M	SD	Actual Range	Internal Consistency
Generation	16.84	4.94	4-28	.83
Illumination	18.16	5.01	4-28	.87
Expression	20.72	4.33	4-28	.85
Revision	16.59	5.62	4-28	.88
Writing	18.65	4.34	4-28	.88
Objective and Coded Variables				
CAT				
Novelty/originality	5.19	1.22	1-9	.72
Presentation	4.90	1.30	1-9	.86
Ingenuity	4.75	1.25	1-9	.79
Organization	5.02	1.22	1-9	.81
Imaginativeness	5.00	1.32	1-9	.82
Craftsmanship	4.73	1.31	1-9	.84
Spelling	5.21	1.28	1-9	.87
Suspensefulness	4.47	1.25	1-9	.82
Effectiveness of resolution	4.39	1.33	1-9	.78
Sophistication of expression	4.71	1.28	1-9	.84
Insightfulness	4.23	1.18	1-9	.78
Sensory imagery	4.77	1.31	1-9	.84

TABLE 1 CONTINUED

Variable and Stage	M	SD	Actual Range	Internal Consistency
Inspiration evident	4.78	1.22	1-9	.81
Effort evident	5.12	1.41	1-9	.88
Creativity	4.79	1.34	1-9	.83
CFF	10.68	2.86	-7.24-13.10	.96
Writing efficiency	.62	.12	.25-.88	--

Note. N = 164 in all cases.
CFF = Critical Flicker Fusion (data indicates change in CFFT).

TABLE 2

FACTOR LOADINGS OF CREATIVITY ITEMS

	Loadings (varimax)	
Item	Component 1	Component 2
Novelty/originality	.09	**.94**
Presentation	.88	.20
Ingenuity	.47	**.83**
Organization	.90	.26
Imaginativeness	.31	**.92**
Craftsmanship	.90	.36
Spelling	.79	.13
Suspensefulness	.61	.38
Effectiveness of res.	.57	.50
Sophistication of exp.	.84	.44
Insightfulness	.67	.64
Sensory imagery	.71	.47
Creativity	.36	**.91**

Notes. Effectiveness of res. = Effectiveness of resolution.
Sophistication of exp. = Sophistication of expression.

TABLE 3

CORRELATIONS BETWEEN PREDICTOR VARIABLES AND CREATIVITY OF THE FINAL PRODUCT

	Correlation Coefficients by Stage of the Predictor Variable					
Predictor	Gen.	Illum.	Expr.	Rev.	Writing	Overall
insp.	.14	.28**	.25**	.06	.18*	.24**
effort	.03	.13	.18*	-.12	.01	.07
PA	.10	.16*	.20*	.01	.16*	.17*

*p<.05 **p<.01.
Notes. N = 164.
insp. = inspiration.
Gen. =generation.
Illum. = illumination.
Expr. = expression.
Rev. = revision.
Writing = expression and revision.
Overall = across all stages.

TABLE 4

PREDICTION OF CREATIVITY OF THE FINAL PRODUCT FROM PREDICTOR VARIABLES WITH COVARIATES CONTROLLED

	Beta Coefficients by Stage of the Predictor Variable					
Predictor	Gen.	Illum.	Expr.	Rev.	Writing	Overall
insp.	.13	.32**	.21*	.13	.18	.24*
Effort	-.01	.09	.06	-.26**	-.15	-.02
PA	.02	-.09	.02	.13	.12	.00

*p<.05 **p<.01.
Notes. N = 164.
insp. = inspiration.
Gen. =generation.
Illum. = illumination.
Expr. = expression.
Rev. = revision.
Writing = expression and revision.
Overall = across all stages.

TABLE 5

CORRELATIONS BETWEEN CREATIVITY OF THE INITIAL IDEA(S) AND INSPIRATION BY STAGE

	Inspiration by Stage					
	Gen.	Illum.	Expr.	Rev.	Writing	Overall
creat. idea	.46***	.56***	.28***	.22**	.35***	.52***

**p<.01 ***p<.001.
Notes. N = 164.
creat. idea = creativity of initial idea(s).
Gen. =generation.
Illum. = illumination.
Expr. = expression.
Rev. = revision.
Writing = expression and revision.
Overall = across all stages.

TABLE 6

PREDICTION OF CREATIVITY OF THE FINAL PRODUCT FROM PREDICTOR VARIABLES WITH COVARIATES CONTROLLED

		Beta Coefficients by Stage of the Predictor Variable					
Step	Predictor	Gen.	Illum.	Expr.	Rev.	Writing	Overall
Step 1:	creat. idea	.27**	.27**	.27**	.27**	.27**	.27**
Step 2:	creat. idea	.26**	.16	.20*	.27**	.23**	.20*
	insp.	.02	.19*	.18*	.00	.10	.13
Step 3:	creat. idea	.28**	.19	.20*	.29***	.26**	.22*
	insp.	.05	.26*	.17	.10	.12	.16
	effort	-.04	.08	.04	-.30**	-.20*	-.06
	PA	-.05	-.15	-.02	.12	.11	-.02

*p<.05 **p<.01 ***p<.001.
Notes. N = 164.
insp. = inspiration.
creat. idea = creativity of initial idea(s).
Gen. =generation.
Illum. = illumination.
Expr. = expression.
Rev. = revision.
Writing = expression and revision.
Overall = across all stages.

TABLE 7

CORRELATIONS BETWEEN PREDICTOR VARIABLES AND WRITING EFFICIENCY

	Correlation Coefficients by Stage of the Predictor Variable					
Predictor	Gen.	Illum.	Expr.	Rev.	Writing	Overall
insp.	.16*	.08	.20*	.19*	.23**	.20*
effort	.16*	.08	.18*	.04	.13	.07
PA	.13	.16*	.17*	.07	.13	.17*

*p<.05 **p<.01.
Notes. N = 164.
insp. = inspiration.
Gen. =generation.
Illum. = illumination.
Expr. = expression.
Rev. = revision.
Writing = expression and revision.
Overall = across all stages.

TABLE 8

PREDICTION OF WRITING EFFICIENCY FROM PREDICTOR VARIABLES WITH COVARIATES CONTROLLED

	Beta Coefficients by Stage of the Predictor Variable					
Predictor	Gen.	Illum.	Expr.	Rev.	Writing	Overall
insp.	.12	-.05	.13	.30**	.25*	.18
effort	.13	.01	.08	-.10	.02	.10
PA	.02	.20	.05	-.08	-.05	-.02

*p<.05 **p<.01.
Notes. N = 164.
insp. = inspiration.
Gen. =generation.
Illum. = illumination.
Expr. = expression.
Rev. = revision.
Writing = expression and revision.
Overall = across all stages.

TABLE 9

CORRELATIONS BETWEEN PREDICTOR VARIABLES AND AROUSAL

	Correlation Coefficients by stage of the Predictor Variable					
Predictor	Gen.	Illum.	Expr.	Rev.	Writing	Overall
insp.	.10	.16*	.05	.01	.03	.10
effort	.05	.03	-.02	-.03	-.03	.02
PA	.11	.17*	.06	.01	.03	.10

*p<.05.
Notes. N = 164.
insp. = inspiration.
Gen. =generation.
Illum. = illumination.
Expr. = expression.
Rev. = revision.
Writing = expression and revision.
Overall = across all stages.

TABLE 10

PREDICTION OF AROUSAL FROM PREDICTOR VARIABLES WITH COVARIATES CONTROLLED

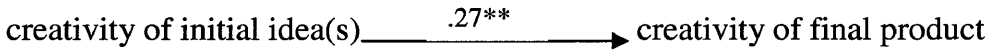
	Beta Coefficients by Stage of the Predictor Variable					
Predictor	Gen.	Illum.	Expr.	Rev.	Writing	Overall
insp.	.05	.08	.03	.04	.04	.05
Effort	.02	-.04	-.09	-.06	-.08	-.05
PA	.07	.13	.10	.01	.06	.09

*p<.05 **p<.01.
Notes. N = 164.
insp. = inspiration.
Gen. =generation.
Illum. = illumination.
Expr. = expression.
Rev. = revision.
Writing = expression and revision.
Overall = across all stages.

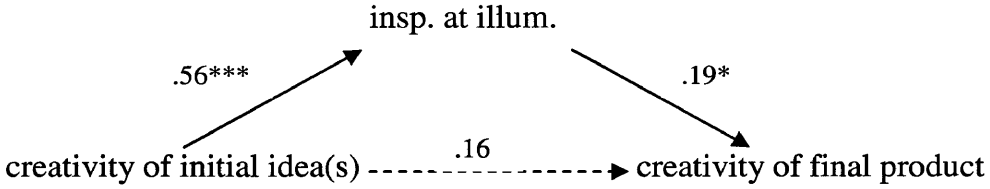
FIGURE 1

INSPIRATION AS A MEDIATOR OF THE RELATIONSHIP BETWEEN CREATIVITY OF THE INITIAL IDEA(S) AND CREATIVITY OF THE FINAL PRODUCT

1A. Without inspiration as a mediator.



1B. With inspiration as a mediator.



*p<.05 **p<.01.
Notes. N = 164.
Note. insp. at illum. = inspiration at illumination.

APPENDIX A

INFORMED CONSENT

I, _____, agree to participate in a study of personality, physiology, and the writing process. The purpose of the study is to examine the ways in which various aspects of personality, motivation, and physiology interact to affect the writing process.

I understand that I will be asked to complete a one-hour session. During the session, I will be asked to complete a series of questionnaires, to write a story using Microsoft Word, and to complete assessments of physiological processes related visual perception.

An individual should not participate in this study if he or she (1) is less than 18 years of age, (2) is currently taking, or has previously taken, anti-convulsant medications, or (3) has been diagnosed with, or suspects having, a seizure disorder or Tourette's-like symptoms. I confirm that none of these restrictions applies to me.

I understand that I will receive 1 hour of research participation credit to apply toward my research participation requirement in my introductory psychology course.

I understand that all of my data will be identified using a randomly assigned ID number. I will be asked to provide my email address on a form that also lists my ID number, so that the data I provide may be linked to personality data that I provided during mass testing. However, only the Principle Investigators on this research project, Todd Thrash and Scott Cassidy, will have access to the information linking my email address to my ID number, and this information will be kept under lock and key. After the session, this consent form will be separated from the data that I provide so that identifying information will not be directly linked to my data. All information that is collected will be stored in locked rooms. In these ways, the researchers will maintain strict confidentiality.

I understand that no personal risk or harm to participants is expected. I also understand that my participation is strictly voluntary, and that I am free to withdraw my consent and discontinue participation in this study for any reason, at any time, without negative consequences. I am also aware that, if I do not complete the session, the compensation that I receive (research participation credit for my introductory psychology course) will be granted in proportion to how much of the study that I complete.

If I have any questions or if problems arise in connection with my participation in this study, I may contact Scott Cassidy (secass@wm.edu; 703-371-7685), director of this research project, Dr. Glenn Shean (gdshea@wm.edu, 221-3886), Chair of the Psychology Department's Research Ethics Committee, or Dr. Michael Deschenes (mrdesc@wm.edu, 221-2778), Chair of the College's Protection of Human Subjects Committee.

My signature below signifies that I have read this consent form, agree with the statements above, and have received a copy of this consent form for my records.

Date: _____

Name (printed): _____

Signature of participant: _____

THIS PROJECT WAS APPROVED BY THE COLLEGE OF WILLIAM AND MARY PROTECTION OF HUMAN SUBJECTS COMMITTEE (Phone 757-221-3966) ON 2005-10-08 AND EXPIRES ON 2006-10-07.

APPENDIX B

QUESTIONNAIRE 1

Your responses on this questionnaire will be completely confidential. Please complete all items as honestly as possible. Please respond with your initial reaction to each item, rather than spending a lot of time thinking about each item.

Please read each of the statements carefully. Using the scale below, indicate to what extent you agree with each statement.

1 = If you *strongly disagree* or the statement is definitely false.
2 = If you *disagree* or the statement is mostly false.
3 = if you are neutral on the statement, you cannot decide, or the statement is equally true or false
4 = If you *agree* or the statement is mostly true.
5 = If you *strongly agree* or the statement is definitely true.

____ 1. I don't like to waste my time daydreaming.

____ 2. If I feel my mind starting to drift off into daydreams, I usually get busy and start concentrating on some work or activity instead.

____ 3. Aesthetic and artistic concerns aren't very important to me.

____ 4. Once I find the right way to do something, I stick to it.

____ 5. I find it easy to empathize – to feel myself what others are feeling.

____ 6. I find philosophical arguments boring.

____ 7. I am intrigued by the patterns I find in art and nature.

____ 8. Without strong emotions, life would be uninteresting to me.

____ 9. I have an active fantasy life.

____ 10. I believe letting students hear controversial speakers can only confuse and mislead them.

____ 11. I enjoy solving problems or puzzles.

____ 12. I have a very active imagination.

____ 13. Poetry has little or no effect on me.

____ 14. I rarely experience strong emotions.

____ 15. I try to keep all my thoughts directed along realistic lines and avoid flights of fancy.

____ 16. I often try new and foreign foods.

____ 17. I am sometimes completely absorbed in music I am listening to.

____ 18. How I feel about things is important to me.

____ 19. I seldom notice the moods or feelings that different environments produce.

____ 20. Watching ballet or modern dance bores me.

1 = If you *strongly disagree* or the statement is definitely false.
2 = If you *disagree* or the statement is mostly false.
3 = if you are neutral on the statement, you cannot decide, or the statement is equally true or false
4 = If you *agree* or the statement is mostly true.
5 = If you *strongly agree* or the statement is definitely true.

____ 21. I enjoy concentrating on a fantasy or daydream and exploring all its possibilities, letting it grow and develop.

____ 22. I believe we should look to our religious authorities for decisions on moral issues.

____ 23. I sometimes lose interest when people talk about very abstract, theoretical matters.

____ 24. I seldom pay much attention to my feelings of the moment.

____ 25. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement.

____ 26. Certain kinds of music have an endless fascination for me.

____ 27. I experience a wide range of emotions or feelings.

____ 28. I have little interest in speculating on the nature of the universe or human condition.

____ 29. As a child I rarely enjoyed games of make believe.

____ 30. I enjoy working on "mind-twister"-type puzzles.

____ 31. I have a lot of intellectual curiosity.

____ 32. I would have difficulty just letting my mind wander without control or guidance.

____ 33. I enjoy reading poetry that emphasizes feelings and images more than story lines.

____ 34. I often enjoy playing with theories or abstract ideas.

____ 35. Odd things – like certain scents or the names of distant places – can evoke strong
moods in me.

____ 36. I have a wide range of intellectual interests.

Please indicate how much you agree or disagree with each of the statements by circling a number from 1 (strongly disagree) to 4 (strongly agree).

	Strongly disagree			Strongly agree
1. When I want something, I usually go all-out to get it.	1	2	3	4
2. I go out of my way to get things I want.	1	2	3	4
3. If I see a chance to get something I want, I move on it right away.	1	2	3	4
4. When I go after something I use a "no holds barred" approach.	1	2	3	4

Using the 7-point scale below, please indicate the degree to which you are experiencing each of these feelings or emotions at present. Please write your responses in the spaces provided.

1	2	3	4	5	6	7
very slightly or not at all			moderately			extremely

At present, I feel...

___ 1. excited
___ 2. enthusiastic
___ 3. alert
___ 4. inspired
___ 5. determined
___ 6. attentive
___ 7. strong
___ 8. interested
___ 9. proud
___ 10. active

Please verify that you did not accidentally skip any pages or questions in this packet. Then, please place a check mark in this box to indicate that you have checked: [ ]

You may then return this questionnaire to the experimenter. Thanks!

APPENDIX C

MYSTERY STORY PROMPT

Mystery Story

John and Maria walked through town on a summer evening, hand in hand. It was their third date, and they were in love. As they were passing a house next to the lake, they stopped, alarmed by a sound coming from inside the house. Immediately they knew that the evening had taken a turn in a direction that they could not have anticipated.

APPENDIX D

QUESTIONNAIRE 2

Your responses on this questionnaire will be completely confidential. Please complete all items as honestly as possible. Please respond with your initial reaction to each item, rather than spending a lot of time thinking about each item.

I. The process of generating ideas

Think back to the moment(s) or period of time when you generated ideas for your story, but *before you got the idea(s) that you plan to write about.* Please answer all questions on this page and the following page regarding these moment(s) or period of time.

For the items below, please use the following scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

Before I got the idea(s) for my story:

___ 1. I worked hard in generating ideas.

___ 2. I felt inspired while generating ideas.

___ 3. I put forth a great deal of effort into generating ideas.

___ 4. I was inspired to generate ideas.

___ 5. Something inspired me.

For the items below, please use the following scale:

1	2	3	4	5	6	7
Not at all						Extremely

<u>Before</u> you got the idea(s) for your story, to what extent was each of the following involved in the process of generating ideas?

___ 1. my conscious mind.

___ 2. my unconscious or subconscious mind.

___ 3. a supernatural or spiritual source.

___ 4. a nonconscious source deep within me.

___ 5. my conscious thought.

___ 6. a spiritual or transcendent influence.

Using the following scale, please indicate the extent to which you experienced each of the following by writing a number from 1 to 7 in the blank.

1	2	3	4	5	6	7
very slightly or not at all			moderately			extremely

<u>Before</u> I got the idea(s) for my story, I felt:

___ 1. excited

___ 2. enthusiastic

___ 3. alert

___ 4. inspired

___ 5. determined

II. The moment(s) you got the idea(s) for your story

Think back to the moment(s) or period of time when you got the idea(s) that you plan to write about. Please answer all questions on this and the following pages regarding these moment(s) or period of time.

To what extent did the idea(s) take the form of each of the following (not whether the idea(s) were about the following)?

The idea(s) for my story took the form of:

	strongly disagree						strongly agree
1. visual images	1	2	3	4	5	6	7
2. words	1	2	3	4	5	6	7
3. emotions	1	2	3	4	5	6	7
4. sounds	1	2	3	4	5	6	7
5. scents or tastes	1	2	3	4	5	6	7
6. abstract thoughts or concepts	1	2	3	4	5	6	7
7. intuitions or gut feelings	1	2	3	4	5	6	7
8. moods	1	2	3	4	5	6	7
9. tactile sensations (sense of touch)	1	2	3	4	5	6	7
10. feelings	1	2	3	4	5	6	7
11. phrases or sentences	1	2	3	4	5	6	7
12. verbal (language-based) thoughts	1	2	3	4	5	6	7

Below, please indicate how you viewed your idea(s). Please use the following scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

I felt that my idea(s) were:

___ 1. original

___ 2. beautiful or aesthetically appealing

___ 3. clever

___ 4. well-reasoned

___ 5. ingenious

___ 6. astonishing

___ 7. creative

___ 8. elegant

___ 9. interesting

___ 10. valuable or worthy

___ 11. logically coherent

___ 12. surprising

___ 13. insightful

___ 14. suspenseful

___ 15. pleasant

___ 16. intriguing

___ 17. novel

___ 18. inspired

___ 19. rational or sensible

___ 20. amazing (in the sense of eliciting amazement, not necessarily that the idea is of "amazing" quality)

For the items below, please use the following scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

<u>At the moment(s)</u> I got the idea(s) for my story:

___ 1. I was working hard at those moment(s).

___ 2. I felt inspired at those moment(s).

___ 3. I was putting forth a great deal of effort at those moment(s).

___ 4. I felt inspired to write.

___ 5. Something inspired me.

For the items below, please use the following scale:

1	2	3	4	5	6	7
Not at all						Extremely

<u>At the moment(s)</u> you got the idea(s) for your story, to what extent did you feel that each of the following was involved in the process of generating those particular idea(s)?

___ 1. my conscious mind.

___ 2. my unconscious or subconscious mind.

___ 3. a supernatural or spiritual source.

___ 4. a nonconscious source deep within me.

___ 5. my conscious thought.

___ 6. a spiritual or transcendent influence.

Using the following scale, please indicate the extent to which you experienced each of the following by writing a number from 1 to 7 in the blank.

1	2	3	4	5	6	7
very slightly or not at all			moderately			extremely

<u>At the moment(s)</u> I got the idea(s) for my story, I felt:

___ 1. excited

___ 2. enthusiastic

___ 3. alert

___ 4. inspired

___ 5. determined

Please verify that you did not accidentally skip any <u>pages</u> or <u>questions</u> in this packet. Then, please place a check mark in this box to indicate that you have checked: [ ] Thanks!

APPENDIX E

QUESTIONNAIRE 3

Your responses on this questionnaire will be completely confidential. Please complete all items as honestly as possible. Please respond with your initial reaction to each item, rather than spending a lot of time thinking about each item.

I. The process of expressing your idea(s), prior to revision

Think back to the moment(s) or period of time when you expressed your idea(s) in the form of a story, *prior to revision or modification.* On this and the next page, please answer all questions with respect to these moment(s) or period of time.

For the items below, please use the following scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

While writing my story, but prior to revision:

___ 1. I worked hard in writing this story.

___ 2. I felt inspired while expressing my idea(s).

___ 3. I put forth a great deal of effort into expressing my idea(s).

___ 4. I was inspired to write.

___ 5. Something inspired me.

For the items below, please use the following scale:

1	2	3	4	5	6	7
Not at all						Extremely

<u>While</u> writing your story, but <u>prior to</u> revision, to what extent was each of the following involved in the process of expressing your idea(s)?

___ 1. my conscious mind.

___ 2. my unconscious or subconscious mind.

___ 3. a supernatural or spiritual source.

___ 4. a nonconscious source deep within me.

___ 5. my conscious thought.

___ 6. a spiritual or transcendent influence.

Using the following scale, please indicate the extent to which you experienced each of the following by writing a number from 1 to 7 in the blank.

1	2	3	4	5	6	7
very slightly or not at all			moderately			extremely

<u>While</u> writing my story, but <u>prior to</u> revision, I felt:

___ 1. excited

___ 2. enthusiastic

___ 3. alert

___ 4. inspired

___ 5. determined

II. The process of revising your story

Think back to the moment(s) or period of time when you revised your story – that is, *while modifying portions that you had already written.* Please answer all questions on this page and the following page regarding these moment(s) or period of time.

For the items below, please use the following scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

While revising or modifying my story:

___ 1. I revised my story extensively.

___ 2. I worked hard on revising this story.

___ 3. I felt inspired while revising and finalizing this story.

___ 4. I put forth a great deal of effort into revising and finalizing this story.

___ 5. I was inspired to revise this story.

___ 6. I hardly revised my story at all.

___ 7. Something inspired me.

For the items below, please use the following scale:

1	2	3	4	5	6	7
Not at all						Extremely

To what extent was each of the following involved in the process of <u>revising or modifying</u> your story?

___ 1. my conscious mind.

___ 2. my unconscious or subconscious mind.

___ 3. a supernatural or spiritual source.

___ 4. a nonconscious source deep within me.

___ 5. my conscious thought.

___ 6. a spiritual or transcendent influence.

Using the following scale, please indicate the extent to which you experienced each of the following by writing a number from 1 to 7 in the blank.

1	2	3	4	5	6	7
very slightly or not at all			moderately			extremely

While <u>revising or modifying</u> my story, I felt:

___ 1. excited

___ 2. enthusiastic

___ 3. alert

___ 4. inspired

___ 5. determined

III. Your completed story

Please rate your story on each of the dimensions below. Please use the following 1-7 scale and write your answers in the blanks before each item. Please rate the story itself, rather than the ideas that stimulated or guided the writing of the story.

1 2 3 4 5 6 7
strongly disagree neutral strongly agree

My story is:

___ 1. original

___ 2. beautiful or aesthetically appealing

___ 3. clever

___ 4. well-reasoned

___ 5. ingenious

___ 6. astonishing

___ 7. creative

___ 8. elegant

___ 9. interesting

___ 10. valuable or worthy

___ 11. logically coherent

___ 12. surprising

___ 13. insightful

___ 14. suspenseful

___ 15. pleasant

___ 16. intriguing

___ 17. novel

___ 18. inspired

___ 19. rational or sensible

___ 20. amazing (in the sense of eliciting amazement, not necessarily that the idea is of "amazing" quality)

Final Questions

1. What is your sex? (circle one) Male Female

2. What is your age? _____ years old

3. What were your scores on the SAT (if unsure, please give your best guess)?

Verbal_____ Math _____

If you took the ACT instead, what was your score?_____

4. What is your ethnic background? (check one)

____African American ____Caucasian ____Native American

____Asian ____Hispanic ____Other

5. Did you learn English before the age of 5? (circle one) Yes No

6. Was English the first language you learned? (circle one) Yes No

7. How difficult was the mystery writing task (1 = very easy; 7 = very difficult)? _____

8. Did you write a complete story? Yes No

Please verify that you did not accidentally skip any pages or questions in this packet. Then, please place a check mark in this box to indicate that you have checked: [ ] Thanks!

APPENDIX F

FINAL CONSENT AND DEBRIEFING

The purpose of this study is to examine ways in which various aspects of personality, motivation, and physiology interact to affect the writing process. We are interested in how motivation while writing (e.g., effort, inspiration) is influenced by personality traits (e.g., approach temperament) and physiological processes (e.g., cortical arousal, as determined by the visual perception task). We are also interested in the effects of various motivations on changes in physiology and on writing quality. Regarding writing quality, we plan to have a group of research assistants evaluate the stories that participants generated, in order to determine whether quality varied as a function of the motivational processes involved in generating them. In the future, we may conduct a study in which we examine research participants' reactions to stories and relate these reactions to the data obtained in this study. With your permission, we would like to include your story (along with those of the other participants) in that possible future study. No information identifying you will be disclosed to the research assistant judges or to future research participants.

A second purpose of this project is to identify the ways in which personality, motivation, and physiology influence objective aspects of the writing process, such as writing speed and degree of revision. To evaluate these outcome variables objectively, we have used a computer program to record all of your keystrokes during the writing process. With your permission, we will use this data to analyze writing speed, degree of revision, and related outcome variables. However, because we did not tell you in advance that we would be recording your keystrokes, we will not retain and analyze your data unless you give us explicit permission to do so. We hope that you will understand why we did not warn participants in advance that we would examine typing speed or degree of revision. If we had, then participants would have been self-conscious about their typing speed or revision, and this may have invalidated these data.

Do you give consent for the researchers to use the story that you wrote as a stimulus in a future study, and to link your other data to future participants' reactions to your story? Your identity will <u>not</u> be revealed.

___ Yes, I give my consent for my data to be used in this way. My identity will <u>not</u> be revealed.
___ No, I do not give my consent for my data to be used in this way.

Do you give consent for the researchers to retain and analyze your keystroke data?

___ Yes, I give my consent for my keystroke data to be used in this way.
___ No, I do not give my consent for my data to be used in this way. My keystroke data will be deleted and not analyzed.

If you would like to find out about the overall findings and conclusions of this study, please contact Scott Cassidy (secass@wm.edu) in 3-4 months.

Date: _____

Name (printed): _____

Signature of participant: _____

THIS PROJECT WAS APPROVED BY THE COLLEGE OF WILLIAM AND MARY PROTECTION OF HUMAN SUBJECTS COMMITTEE (Phone 757-221-3966) ON 2005-10-08 AND EXPIRES ON 2006-10-07.

In order to maintain the validity of the data that we collect from future research participants, we would appreciate your cooperation in not discussing the specifics of this research with any individuals who might possibly participate later in the semester. Specifically, we ask that you make every possible effort not to reveal the nature of the writing task (so that participants do not plan their stories in advance) or the fact that we are examining keystroke data (so that participants do not intentionally modify their writing style). Thanks!

APPENDIX G

MYSTERY CODING INSTRUCTIONS

Contents

Overview and general directions

* 164 participants in a psychology experiment were given 30 minutes to plan and write a mystery story using Microsoft Word. Participants were given the following opening paragraph and were asked to complete the story.

Mystery Story

John and Maria walked through town on a summer evening, hand in hand. It was their third date, and they were in love. As they were passing a house next to the lake, they stopped, alarmed by a sound coming from inside the house. Immediately they knew that the evening had taken a turn in a direction that they could not have anticipated.

You will receive a printout or PDF containing the stories. Each story begins on a separate page. An ID number appears at the top left above each story. ID numbers range from 16 to 184 (excluding 38, 78, 93, 135, and 178).

* Below you will find a list of 18 coding dimensions and a definition of each. Please study the definitions carefully. Identify sets of dimensions that seem interrelated, and rearrange the columns in the Excel spreadsheet that I have provided so that related columns are grouped together (see below for details).

* Read and familiarize yourself with the first 35 stories, so that you gain a sense for the degree of variability or range of each of the variables that you will be coding. You will be rating the stories relative to one another, and it would be impossible to do so if you haven't already familiarized yourself with a substantial number of the stories.

* Once you are familiar with the coding system and the first 35 stories, you may begin evaluating the stories:

* Read and rate the stories (see below for details about assigning ratings) in the order that they appear in your packet, beginning with the first story. Please do not skip around. The stories are in a different order for each rater, and it is important that you evaluate them in the predetermined order.

* Read each story several times as needed. A single reading is unlikely to yield a sufficiently differentiated understanding of the merits of the story (i.e., 18 separate dimensions).

* Record the codes that you generate in the Excel file (see below). It is extremely important that you double check your work, so that you are 100% confident that there are no errors in your data file. And be sure to backup your data file. (One rater regretted not having done so last time!)

* After you have coded your first 20 stories, please email your data file to me at tmthra@wm.edu. Please do so again after you have coded a total of 40 stories, 80 stories, 120 stories, and 164 stories. Please email your entire data file each time. Verify that there are no data entry errors in your file before sending it to me.

* If you find that you need to revise your ratings on a story that you coded previously, please do. In particular, you may find that you need to revise some of your early ratings.

* When you are finished, please destroy or delete any copies of the stories.

* If you have any questions, please contact me (tmthra@wm.edu; 757-221-3887). Thanks!

Coding scale (for all dimensions except affective tone)

Relative to the other stories, how low or high would you rate this story on the given dimension?

1	2	3	4	5	6	7	8	9
very low, relative to the other stories				moderate, relative to the other stories				very high, relative to the other stories

Dimensions (variables names are included in parentheses)

novelty/originality (novel): The degree to which the story is novel, original, or out-of-the-ordinary.

presentation (present): The extent to which the story has a polished visual presentation. Lower scores should be given if a story has typos, or if it has inconsistencies in (or lack of) capitalization, punctuation, or formatting (e.g., paragraphs are sometimes, but not always, separated by a blank line). The highest scores should go to stories that both lack such problems and include positive elements that enhance the presentation in some way (e.g, inclusion of a title other than "Mystery Story").

ingenuity (ingen): The degree to which the story shows ingenuity and cleverness.

organization (organ): The degree to which the story is well-organized and has a sensible and coherent structure, rather than having an illogical structure or consisting of undisciplined stream-of-consciousness

imaginativeness (imagine): The degree to which the story reveals a rich, vivid, and unconstrained imagination.

craftsmanship (craft): The degree to which the story, overall, appears carefully crafted, rather than sloppily or haphazardly constructed.

spelling (spell): The degree to which the story has proper spelling. An absence of spelling mistakes is not sufficient to earn a particularly high score if the story is unambitious in its word usage. The highest scores should go to stories that reveal particularly good knowledge of spelling. (Assume that the participant did not use the spelling checker, which had been disabled). Stories with spelling mistakes that clearly reflect typing errors, rather than poor knowledge of spelling, should receive lower scores on the "presentation" dimension rather than on this dimension.

suspensefulness (suspen): The effectiveness of the story in eliciting curiosity, building tension, and creating suspense.

effectiveness of resolution (resolut): The effectiveness of the resolution in eliciting surprise, satisfying curiosity, and releasing tension. A resolution that elicits a eureka or "aha" experience in the reader will typically deserve a particularly high score.

sophistication of expression (express): The sophistication and quality of the verbal expression of ideas (regardless of the quality of the ideas being expressed), including skill in phrasing, effective use of literary devices, and writing style.

insightfulness (insight): The degree to which the story reveals insightfulness of thought; the idea for the story has a gestalt quality that seems to transcend the constraints of linear thought.

sensory imagery (imagery): The degree to which vivid sensory imagery (e.g., visual, auditory, olfactory, tactile, etc.) is present.

inspiration evident (insp): The amount of inspiration evident in the writing of the story.

effort evident (effort): The amount of effort evident in the writing of the story.

creativity (creat): The degree to which the story is creative, using your own subjective definition of creativity.

grammar (gram): The degree to which the story has proper grammar. An absence of grammatical mistakes is not sufficient to earn a particularly high score if the story is unambitious in its use of grammar. The highest scores should go to stories that reveal a particularly high degree of grammatical skill.

affective tone: The degree to which the story content (e.g., events or characters' emotions) has a positive vs. negative affective tone. Be sure to focus on the positivity vs. negativity of the story content, not your own mood or evaluative reaction to the story. Provide two ratings for each story:

affective tone prior to resolution (affpre): Affective tone of the story prior to the resolution of the mystery.

affective tone of resolution (affres): Affective tone of the resolution and ending of the story. Note that a resolution that focuses on relief or the removal of negative circumstances should be rated less positively than a resolution that involves happiness or the addition of

positive circumstances.

* For these affective tone dimensions, use the following absolute scale:

1	2	3	4	5	6	7	8	9
extremely negative affective tone		moderately negative affective tone		neutral (or mixed pos/neg) affective tone		moderately positive affective tone		extremely positive affective tone

Coding guidelines

1. Rate the stories relative to one another, not relative to an absolute standard*. The stories that are the best on a given dimension should receive 9's; those that are worst should received 1's; stories that are average should receive 5's; etc.

Think of a rating of 5 as a "non-statement" about the story (i.e., it does not stand out as either relatively good or bad), and think of scores other than 5 as "statements" or assertions that a story is better or worse than average. Therefore, if, for some reason, you find a particular story to be difficult to code on a particular dimension in a valid and non-arbitrary fashion, then you should give a score close to 5, so as not to assert that it is better or worse than average

* Note that the affective tone dimensions are exceptions -- they have their own, absolute scale, with 5 representing neutral affective tone, rather than average or (relatively) moderate affective tone.

2. Aim to use the full range of the scale for all dimensions. Be as discriminating as you can in distinguishing stories from one another on a given dimension. That is, do your best to make use of the full range of the 9-point scale and to reliably distinguish, say, stories worthy of a 2 from stories worthy of a 1 or 3.

Although the scale has labels that define the meaning of 1 (very low), 5 (moderate), and 9 (very high), these three values do not have any special status beyond the fact that they represent the extremes and midpoint of the scale. Please try not to use these particular values any more often, or any less often, than the values that don't have labels. So, please aim to give roughly the same number of 1's as 2's, the same number of 2's as 3's, and so on.

3. Be consistent across stories. Your ratings on a given dimension will be used as an outcome variable to be predicted from variables related to personality, motivation, and the writing process. So, keep in mind that it's important to be consistent in your level of stringency on a given dimension. If you change your standards across time, then some of the ratings will be biased, and this will obscure the statistical relationships with the predictor variables.

After you have done some coding, you might find that your ratings aren't as evenly distributed as you intended (see #2 above). In general, it is more important to be consistent (#3) than it is to attain an even distribution (#2), so it wouldn't make sense to alter your degree of stringency midway in order to achieve a more even distribution. However, if your ratings are highly skewed in one direction or the other, then it may be necessary to go back and revise your earlier ratings in order to achieve a more even distribution. Of course, it would be preferable to prevent a severe skew from the outset, and this is why it is important to examine the variability of each variable in the 35 stories that you read before beginning your coding.

4. Discriminate dimensions from one another. It is important not only to discriminate stories from one another (on a given dimension), but also to discriminate the various dimensions from one another (for a given story). Aim to maintain distinctions among the 18 dimensions, rather than giving two dimensions the same value simply because they seem similar. No two dimensions are intended to be synonymous, although some dimensions are expected to be interrelated. The degree of correspondence between your ratings on two dimensions should reflect the degree to which those dimensions are intrinsically related. Placing related variables in consecutive columns of your spreadsheet will facilitate the process of distinguishing these dimensions. If a story is better on some of the related dimensions than on others, you can make sure that your ratings reflect these differences (say, by rating it a 9 on one dimension and a 7 on the other). Note that I have provided the dimensions in a random order so as not to bias your perception of which dimensions should be related to which.

5. Please do not discuss your ratings, or your rating strategy, with other coders. These should be independent judgments.

Format of the data file

* Data should be entered in the Excel file provided to you.

* Variable names appear in the first row of the spreadsheet. Please do not change these variable names.

* Column 1 (ID): The ID number should be entered in the first column. These should appear in the same order as in your packet of stories.

* Columns 2-19: Enter your ratings for the 18 dimensions. Note that the variables appear in the same order in Excel as they do in the definition list above. Be sure to rearrange the Excel columns as described above (either by cutting and pasting columns, or by retyping labels), and be careful to make sure that your ratings correspond to the column labels. You might find it helpful to arrange (cut and paste) the definitions above so that they correspond to the order of your rearranged spreadsheet.

* Column 20 (rank): Enter the rank order in which the story was coded. That is, the first story that you code (which will appear on row 2, beneath the variable names) should have a rank of 1. The second story (row 3) should have a rank of 2, and so on. Note that the first story in your packet will be the story with a rank order of 1.

* Column 21 (date): Enter the date on which the story was coded. Enter the date as a six digit number: MMDDYY.

* Column 22 (unfin): A few stories that were unfinished have been eliminated from the data set, but you might find that a small number of stories that I've included seem unfinished, making it difficult to provide meaningful ratings. In such cases, please do your best, and rate the story on all dimensions, even if you are not confident in your ratings. However, *if you feel that the majority of your ratings for a given story are essentially meaningless, due to the fact that the story is unfinished, then enter a 1 in this column.* Otherwise, leave this column blank. Please be attentive to the wording of the italicized sentence. The fact that a story seems unfinished is not sufficient reason to assign a 1 in this column. Based on the wording above, you might find that you do not need to assign any ones in this column.

* Column 23 (hours): Enter the total number of hours that you have worked so far on this project in column 23 (e.g., two and a half hours = 2.5). There is no need to enter a value after every story – once after every work session would be fine. So, column 23 will be blank for most stories and will only have a value for the last story coded in a given sitting. In addition, please include a value for your first story that includes both the time spent on that story and the time spent on your initial preparation (e.g., reading the 35 stories).

Given that money is tight, I would appreciate it if you would exclude "distraction time," if any, from your report of hours worked. Thanks!

REFERENCES

Amabile, T. M. (1983a). Brilliant but cruel: Perceptions of negative evaluators. *Journal of Experimental Social Psychology, 19(2),* 146-156.

Amabile, T. M. (1983b). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology, 45(2),* 357-376.

Amabile, T. M. (1996). *Creativity in context: Update to the Social Psychology of Creativity*. Boulder, CO: Westview.

Amabile, T. M. (2001). Beyond talent: John Irving and the passionate craft of creativity. *American Psychologist, 56(4),* 333-336.

Aspinwall, L. G., & Taylor, S. E. (1997). A stitch in time: Self-regulation and proactive coping.

Psychological Bulletin, 121, 417-436.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51(6),* 1173-1182.

Baschera, P., Grandjean, E. (1979). Effects of repetitive tasks with different degrees of difficulty on critical fusion frequency (CFF) and subjective state. *Ergonomics, 22(4),* 377-385.

Bloom, B. (1985). *Developing talent in young people*. New York: Ballentine Books.

Busse, T. V., & Mansfield, R S. (1980). Theories of the creative process: A review and a perspective. *Journal of Creative Behavior, 14,* 91-103.

Cagle, M. (1985). A general abstract-concrete model of creative thinking. *Journal of Creative Behavior, 19,* 104-109.

Carnevale, P. J. D., & Isen, A. M. (1986). The influence of positive affect and visual access on the discovery of integrative solutions in bilateral negotiation. *Organizational Behavior and Human Decision Processes, 37,* 1-13.

Duffy, E. *Activation and behavior.* Oxford, England: Wiley.

Duncker, K. (1945). On problem solving. *Psychological Monographs. 58*(5, Whole No. 270).

Elliot, A. J. (1997). Integrating the "classic" and "contemporary" approaches to achievement motivation: A hierarchical model of approach and avoidance achievement motivation. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 143-179). Greenwich, CT: JAI Press.

Elliot, A. J., & Thrash, T. M. (2002). Approach-avoidance motivation in personality: Approach and avoidance temperaments and goals. *Journal of Personality and Social Psychology, 82(5),* 804-818.

Elliot, A. J., McGregor, H. A., & Gable, S. (1999). Achievement goals, study strategies, and exam performance: A mediational analysis. *Journal of Educational Psychology, 91(3),* 549-563.

Ericsson, K. A., Krampe, R. T., & Clemens, T. R. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review, 100(3),* 363-406.

Estrada, C., Isen, A. M., & Young, M. (1994). Positive affect influences creative problem solving and reported source of practice satisfaction in physicians. *Motivation and Emotion, 18,* 285-299.

Estrada, C. A., Isen, A. M., & Young, M. J. (1997). Positive affect facilitates integration of information and decreases anchoring in reasoning among physicians. *Organizational Behavior and Human Decision Processes, 72,* 117-135.

Feist, G. J. & Runco, M. A. (1993). Trends in the creativity literature: An analysis of research in the Journal of Creative Behavior (1967-1989). *Creativity Research Journal, 6,* 271- 286.

Frith, C. D. (1967). The interaction of noise and personality with critical flicker fusion performance. *British Journal of Psychology, 58(2),* 127-131.

Gardner, H. (1994). *Creating Minds.* New York: Basic Books.

George, J. M., & Brief, A. P. (1996). Motivational agendas in the workplace: The effects of feelings on focus of attention and work motivation. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior* (Vol. 18, pp. 75-109). Greenwich, CT: JAI Press.

Ghiselin, B. (Ed.). (1952). *The creative process: A symposium.* Berkeley: University of California Press.

Ghiselin, B (Ed.). (1985). *The creative process: A symposium.* Berkeley: University of California Press.

Goswami, A. (1996). Creativity and the quantum: A unified theory of creativity. *Creativity Research Journal, 9,* 47-61.

Grawitch, M. J., Munz, D. C., & Kramer T. J. (2003). Effects of member mood states on creative performance in temporary workgroups. *Group Dynamics: Theory, Research, and Practice, 7(1),* 41-54.

Greene, T. R., & Noice, H. (1988). Influence of positive affect upon creative thinking and problem solving in children. *Psychological Reports, 63,* 895-898.

Grunberger J., Saletu B., Linzmayer L., & Stohr H. (1982). Objective measures in determining the central effectiveness of a new antihypoxidotic SL-76188: pharmaco-EEG, psychometric and pharmacokinetic analyses in the elderly. *Archives of Gerontology & Geriatrics, 1(3),* 261-85.

Guilford, J. P. (1950). Creativity. *American Psychologist, 5,* 444-454.

Grundstrom, R., Holmberg, G., & Lederman, H. (1977). Sedative properties of doxepin in comparison with diazepam. *Psychopharmacology, 54(2),* 165-169.

Hayes, J. R. (1978). *Cognitive psychology.* Homewood, IL: Dorsey.

Hebb, D. O. (1955). Drives and the CNS (conceptual nervous system). *Psychological Review, 62,* 243-54.

Hindmarch, I (1980). Psychomotor function and psychoactive drugs. *British Journal of Clinical Pharmacology, 10(3),* 189-209.

Hirt, E. R., Melton, R. J., McDonald, H. E., & Harackiewicz, J. M. (1996). Processing goals, task interest, and the mood-performance relationship: A mediational analysis. *Journal of Personality and Social Psychology, 71,* 245-261.

Isen, A. M., Daubman, K. A., & Nowicki, G. P. (1987). Positive affect facilitates creative problem solving. *Journal of Personality and Social Psychology, 52,* 1122-1131.

Kris, E. (1952). *Psychoanalytic explorations in art.* New York: Schocken Books.

Lockwood, P., & Kunda, Z. (1997). Superstars and me: Predicting the impact of role models on the self. *Journal of Personality and Social Psychology, 73,* 91-103.

Lockwood, P., & Kunda, Z. (1999). Increasing the salience of one's best selves can undermine inspiration by outstanding role models. *Journal of Personality and Social Psychology, 76,* 214-228.

Lubart, T. I. (1994). Creativity. In: R. J. Sternberg (Ed.), *Thinking and problem solving* (pp. 289-332). San Diego, CA: Academic Press.

Mackinnon, A., Jorm, A. F., Christensen, H., Korten, A. E., Jacomb, P. A., & Rodgers, B. (1999). A short form of the Positive and Negative Affect Schedule: Evaluation of factorial validity and invariance across demographic variables in a community sample. *Personality and Individual Differences, 27,* 405-416.

Martindale, C. (1999). Biological bases of creativity. In (Sternberg, R. J., Ed.), *Handbook of creativity* (pp. 137-152). Cambridge: Cambridge University Press.

Martindale, C. & Greenough, J. (1973). The differential effects of increased arousal on creative intellectual performance. *Journal of Genetic Psychology, 123,* 329-335.

Martindale, C & Hasenfus, N. (1978). EEG differences as a function of creativity, stage of the creative process, and effort to be original. *Biological Psychology, 6,* 157-167.

Ochse, R. (1990). *Before the gates of excellence: The determinants of creative genius.* New York: Cambridge University Press.

Osborn, A F. (1953). *Applied imagination.* New York: Scribners.

Raskin, E. A. (1936). Comparison of scientific and literary ability: A biographical study of eminent scientists and men of letters of the nineteenth century. *Journal of Abnormal and Social Psychology, 31,* 20-35.

Rothenberg, A., & Hausman, C. R. (Eds.). (1976). *The creativity question.* Durham, NC: Duke University Press.

Runco, M. A. (2005). Motivation, competence, and creativity. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp.609-623). New York, NY: Guilford.

Sato, R., Kanda, K., & Anan, M. (2002). Sleep EEG patterns and fatigue of middle-aged and older female family caregivers providing routine nighttime care for elderly persons at home. *Perceptual and Motor Skills, 95(3),* 815-829.

Schaffner, K. (1994). Discovery in biomedical science: Logic or intuitive genius? *Creativity Research Journal, 4,* 351-363.

Seligman, M. E. P. (2002). *Authentic happiness.* New York: Free Press.

Simon, H. A., & Chase, W. (1973). Skill in chess. *American Scientist, 61,* 394-403.

Simonton, D. K. (1994). *Greatness: Who makes history and why.* New York: Guilford.

Simonton, D. K. (1997). Creative productivity: A predictive and explanatory model of career trajectories and landmarks. *Psychological Review, 104,* 66-89.

Simpson, J. A., & Weiner,S.C. (Eds.). (1989). *The Oxford English dictionary* (2nd ed.). Oxford, England: Clarendon Press.

Staw, B. M., & Barsade, S. G. (1993). Affect and managerial performance: A test of the sadder- but-wiser vs. happier-and-smarter hypotheses. *Administrative Science Quarterly, 38,* 304-331.

Stein, M. I. (1974). *Stimulating creativity: Individual procedures.* New York: Academic.

Stevens C. D. & Walker, B. M. (2002). Insight: Transcending the obvious. In R. A. Neimeyer, & G. J. Neimeyer (Eds.), *Advances in personal construct psychology new directions and perspectives* (pp. 39-79). Westport, CT: Praeger.

Sternberg, R. J., & Lubart, T. I. (1991). An investment theory of creativity and its development. *Human Development, 34(1),* 1-31.

Sternberg, R. J., & Lubart, T. I. (1995). An investment perspective on creative insight. In R. J. Sternberg & J. E. Davidson (Eds.), *The nature of insight* (pp. 535-558). Cambridge, MA: The MIT Press.

Sternberg, R. J., & Lubart, T. I. (1996). Investing in creativity. *American Psychologist, 51(7),* 677-688.

Sternberg, R. J. & Lubart, T. I. (1999). The concept of creativity: Prospects and paradigms. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 3-15). New York, NY: Cambridge University Press.

Taylor, I. A. (1959). The nature of the creative process. In P. Smith (Ed.), *Creativity: An examination of the creative process* (pp. 51-82). New York: Hastings House.

Taylor, I. A., Austin, G. A., & Sutton, D. F. (1974). A note on "instant creativity" at CPSI. *Journal of Creative Behavior, 8,* 208-210.

Taylor, S. E., & Aspinwall, L. G. (1996). Mediating and moderating processes in psychosocial stress: Appraisal, coping, resistance and vulnerability. In H. B. Kaplan (Ed.), *Psychosocial stress: Perspectives on structure, theory, life-course, and methods* (pp. 71-110). San Diego, CA: Academic Press.

Thrash, T. M., & Elliot, A. J. (2003). Inspiration as a psychological construct. *Journal of Personality and Social Psychology, 84,* 871-889.

Thrash, T. M., & Elliot, A. J. (2004). Inspiration: Core characteristics, component processes, antecedents, and function. *Journal of Personality and Social Psychology, 87*, 957-973.

Wallas, G. (1926). *The art of thought.* New York: Harcourt Brace.

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. Psychological Bulletin, 98, 219–235.

Watson, D., Clark, L.A.. & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54(6),* 1063-1070.

Yerkes, R. M., & Dodson, J. D. (1908). The relationship of strength of stimulus to rapidity of habit formation. *Journal of comparative and Neurological Psychology, 18,* 459-482.

VITA

Scott Edward Cassidy

Scott Edward Cassidy was born in Washington, D. C. on December 13, 1976. He graduated from South Lakes High School in Reston, Virginia in June 1995. Scott Cassidy was graduated *cum laude* from James Madison University in Harrisonburg, VA in July 1999 with a BS in Biology/Pre-medical studies.

In August 2004, the author entered the College of William and Mary as a graduate student and teaching assistant in the Department of Psychology. Scott Cassidy defended his thesis in June of 2006. He is currently working as an *Associate* at ICF International, Inc. in Fairfax, VA and may pursue a doctoral degree in I/O psychology or a related field in the future.