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Distinguishing Originality from Creativity in ADHD: An Assessment of Creative Personality, Self-Perception, and Cognitive Style among Attention-Deficit/Hyperactivity Disorder Adults

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Abstract of Thesis

Debates over whether Attention-Deficit/Hyperactivity Disorder (ADHD) relates to high levels of creativity have been hampered by a lack of rigor when defining creativity. The purpose of the present study was to go beyond the rhetoric by empirically investigating creative personality, creative self-perception, and cognitive style among 49 ADHD adults. Comparative analysis to studies of non-ADHD samples revealed distinctive tendencies: A mean group score of 115.71 (*SD*=18.02) on the Kirton Adaption-Innovation Inventory (KAI) indicated preferences for originality, nonconformity, paradigm-breaking, and low efficiency that was over one standard deviation higher than average non-ADHD population scores. Combined inattentive/hyperactive-impulsive subtypes (*n*=20) scored 124.30 (*SD*=12.96). Ideator tendencies on Puccio's FourSight indicated preferences for generating novel ideas and overlooking details. Adjective Check List (ACL) scores were slightly elevated on the Domino Creative Personality and Gough Creativity scales, but more so on the Change scale, indicating a tendency to seek novelty and avoid routine. Creative self-perception was high, with 85.71% reporting themselves as more creative than average. Although their dispositions toward originality might benefit creativity, it might be undermined by their disinclination for effectiveness necessary for full-fledged creativity. Results may help clinicians distinguish maladaptive ADHD behaviors from concomitant behaviors that might play a valuable role in creativity.

Key Words: Adaption-Innovation Theory**,** Attention Deficit Disorder (ADD), Attention-Deficit/Hyperactivity Disorder (ADHD), Cognitive Style, Creative Personality, Creative Self-Perception, Creativity, Implicit Theories

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Distinguishing Originality from Creativity in ADHD: An Assessment of Creative Personality, Self-Perception, and Cognitive Style among Attention-Deficit/Hyperactivity Disorder Adults

A Thesis in Creative Studies

by

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CAUTION TO THE LAY READER:

This paper should not be interpreted as medical or professional advice. The intent behind this paper is not to downplay the potentially destructive effects of Attention-Deficit/Hyperactivity Disorder (ADD/ADHD) on a person's career, education, home life, relationships, and overall well-being. The possibility that ADHD may in some cases be associated with certain advantages for creativity does not necessarily diminish the challenges of living with it. If you have been diagnosed with ADHD, please do not let this idea get in the way of seeking help for living a fulfilling life that will maximize your well-being and creativity. Although the diagnosis is widespread, ADHD specialists are still rare—therefore try to make an effort to find a professional who truly understands the complexities of ADHD to best help you. If the fear of taking ADHD medication makes you reluctant to seek help, know that many ADHD specialists (psychiatrists, psychologists, and professional ADHD coaches) have developed and continue to develop drug-free ways of helping people face the difficulties of living with ADHD.

Acknowledgments and Dedication

In memory of Mary C. Murdock (1947-2010), whose intense passion for the field, devotion to her students, and Southern belle charm brought delight and inspiration

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Chapter One: Statement of the Problem

Introduction

The purpose of this research is to assess the creative personality, creative cognitive style, and creative self-perception of adults diagnosed with Attention-Deficit/ Hyperactivity Disorder (ADHD) and to examine the results in light of the debate over whether having ADHD can be beneficial for creativity. This first chapter presents the background and rationale for conducting the study, introduces ADHD, and lays out relevant theories of creativity. This includes an introduction to the four instruments used in this study to assess creativity-related dimensions among 49 ADHD adults, and the four corresponding hypotheses. This chapter concludes with the significance of the study.

Background and Rationale

ADHD is characterized by problems of attention and/or hyperactive and impulsive behaviors that impair daily functioning and significantly lower a person's quality of life (APA, 2000; Barkley, 2005; Brown, 2005). Despite these impairments, some ADHD clinicians and the authors of some of the most popular self-help books on ADHD have asserted that this disorder is usually accompanied by high levels of creativity. Some authors even seem to surmise that ADHD may have accompanied the creativity of the likes of Leonardo da Vinci and Thomas Edison (e.g., Cramond, 1995; Freed & Parsons, 1998; Hallowell & Ratey, 1994, 2006; Hartmann, 2003; Honos-Webb, 2008). Similarly, giftedness specialists have observed high incidences of ADHD traits in the creatively gifted population (e.g., Cramond, 1994; Hartnett,

Nelson, & Rinn 2004). In addition, high-profile entrepreneurs have occasionally publicly credited their ADHD for their high levels of creativity and entrepreneurial success in major North American media outlets such as the *New York Times* and the *Wall Street Journal* (e. g., Beck, 2010; Garfinkel, 2000; Shellenbarger, 2008; Underwood, 2005). Prominent examples have included David Neeleman, founder of JetBlue airlines, and Paul Orfalea, founder of Kinko's (now FedEx Office). However, empirical studies of creativity among people with ADHD (ADHD-creativity studies)—though still small in number and size—do not strongly support these claims of concomitant creativity. This has led to heated debates with some concerned prominent ADHD researchers publicly arguing that due to lack of strong evidence, it is not only false to associate ADHD with higher levels of creativity—but the detrimental romanticizing of a serious disorder (Garfinkel, 2000; Underwood, 2005).

Why is there such a discrepancy between the empirical ADHD-creativity studies—that do not clearly show that people with ADHD are more creative than average—and the claims made by many popular ADHD self-help books, high profile entrepreneurs, giftedness specialists, and even some ADHD clinicians? One issue that may be muddling the debate (aside from the fact that only a small body of research exists) is the virtual lack of shared explicit definitions of creativity. Popular press publications that claim that people with ADHD are more creative (such as ADHD self-help books), generally fail to provide explicit definitions of creativity—instead these claims seem based on the author's implicit assumptions about creativity. Even more problematic is the surprising dearth of explicit definitions of creativity among the empirical ADHD-creativity studies that have directly assessed creativity in people with ADHD. What exacerbates the problem is that these studies often claim to have assessed creativity after having examined only very narrow dimensions related to creativity—not creativity per se. Though it

may seem unusual to be overly concerned by popular press, self-help books, and public debates in empirical studies such as this one, the relationship between creativity and mental disorders is, as Silvia and Kaufman (2010) recently highlighted, "one of the few scientific domains driven by popular books and the cultural imagination" (p. 381).

A related limitation of empirical ADHD-creativity studies has been the relatively homogeneous approach to creativity assessment—namely the heavy reliance on timed paper-and-pencil divergent thinking (DT) tests. These tests commonly give participants a few minutes to generate as many ideas or solutions as they can in response to open-ended questions or problems (such as finding alternative uses for common household objects), either through the written word or by drawing figures. The number of ideas generated, originality of responses, and flexibility of perspective usually determines level of divergent thinking. This is an approach that has research value but also has important potential limitations (especially for the ADHD population), and as a principal approach to creativity assessment does not reflect the complexity of creativity nor the increasing sophistication of the field of creativity assessment (for developments see Plucker & Makel, 2010). Plucker and Makel (2010) observed that, "not only has the most energy been expended on DT tests; almost all of the earliest tests of DT remain in wide use in creativity research and education" (p. 52), and cited that "Kaufman et al. (2008) have noted that it is one of the great ironies of the study of creativity that so much time and energy have been devoted to the use of a single class of assessments" (p. 52). More importantly, as will be further discussed in Chapter Two, the intrinsic challenges faced by people with ADHD may bring into question the validity of these particular divergent thinking tests for this population—at least in the way they are commonly administered. For these reasons, this study diversified beyond DT tests by administering types of assessments that, so far, have not been widely used

with the ADHD population.

Finally, in addition to the lack of explicit definitions of creativity, and the limited approach to creativity assessment described above, the creative personality and creative cognitive style tendencies that are hypothesized to be common among people with ADHD are known to have negative aspects that seem similar to ADHD. It seems possible that *some* behaviors that are often attributed to the neurocognitive impairments of ADHD may instead be due to personality and cognitive style differences that may happen to commonly co-exist in the ADHD population. In other words, assuming that ADHD does in most cases consist of genuine neurocognitive impairments (e.g., working memory problems, see Barkley, 1997; Castellanos, Sonuga-Barke, Milham, & Tannock, 2006; Diamond, 2006), might *some* of the behaviors that clinicians, employers, researchers, teachers, and others perceive among those with ADHD—and attribute to neurocognitive impairments—be due instead to commonly co-arising differences in personality and cognitive style? More importantly for this study, might some of these differences play a healthy role with regard to group and individual creativity?

While it was beyond the scope of this study to assess how or even if the neurocognitive impairments of ADHD somehow shape personality and cognitive style, or if they share a common etiology, this study used tools from the field of creativity research to gather creative personality and cognitive style data that may help future researchers untangle the theoretical constructs. There has been a recent effort in ADHD research to theoretically untangle *general* personality from ADHD (e.g., Faraone, Kunwar, Adamson, & Biederman, 2009; Kaplan, 1999; Miller, Miller, Newcorn, & Halperin, 2008; Nigg et al., 2002; Valero et al., 2012), and it is now believed that "it is likely that the presence of ADHD and some personality characteristics are closely intertwined" (Miller et al., 2008, p. 166). However, because so much has been written

about the purported link between creativity and ADHD, it seems that assessing ADHD through the lens of *creative* personality theories may provide a particularly useful conceptual bridge.

Regardless of whether future research will robustly substantiate significant differences in levels of creative potential among people with ADHD—it is still desirable to maximize their creativity. The effort of this study to help theoretically untangle creative personality and cognitive style from ADHD was done so that we can best treat the impairments of ADHD while being careful to not suppress potentially co-existing factors that may benefit creativity. The notion that ADHD treatment could potentially suppress creativity is a concern that has been voiced since the 1970s (e.g., Cramond, 1994; Hartnett, Nelson, & Rinn, 2004; Kaufman & Sternberg, 2010; Krippner, 1977; Krippner, Silverman, Cavallo, & Healy, 1974; Shaw, 1992), yet has remained largely untested empirically, except for a handful of pilot ADHD drug studies with very small sample sizes (see Farah, Haimm, Sankoorikal, & Chatterjee, 2009; Funk, Chessare, Weaver, & Exley 1993; Swartwood, Swartwood, & Farrell, 2003). This concern was recently reiterated when former American Psychological Association president, Robert Sternberg and his colleague James Kaufman cautioned researchers (while being careful not to encourage the abetting of disorders for creativity's sake), "there is a chance that treating various disorders, such as attention-deficit hyperactivity disorder, may result in the world's missing out on creative contributions that otherwise might have been made" (Sternberg & Kaufman, 2010, p. 470).

Creativity is one of the most powerful and valuable of all human capacities. At its best, it can bring into existence many of our highest aspirations, from the alleviation of human suffering through the invention of medical procedures and devices, to the innovations in high-technology that connect people across time and space, to the masterpieces in the arts that bring meaning and joy to human existence. As humanity faces a seemingly accelerated pace of significant

challenges, the capacity to creatively solve our pressing social and environmental problems may have become critical for the very survival of our species. Therefore understanding how we might maximize our creative capacity has become a critical task. This study hopes to bring us closer to understanding the potential advantages and disadvantages of ADHD in the creative endeavor, both for the benefit of the individual, and for humanity at large.

This was the rationale for this study, whose three main thrusts can be summarized as: (1) to bring more rigor to the definition of creativity in ADHD research by introducing more explicit definitions and theories of creativity; (2) to push beyond divergent thinking tests and widen the current approach to creativity assessment in ADHD studies (namely by assessing creative personality, creative self-perception, and creative cognitive style); and (3) to determine if the assessment results reveal distinctive creative personality and cognitive style tendencies among this group (such as a strong preference for nonconformity or originality) that are known to lead to behaviors could resemble ADHD. If such tendencies are revealed, it could potentially help future researchers conceptually distinguish creative personality and cognitive style from the neurocognitive impairments of ADHD. This could potentially help to best design treatments that maximize creativity, and to reduce the possibility of suppressing it—regardless of whether or not people with ADHD have higher-than-average levels of creative potential.

Key Terms and Concepts

Attention-Deficit/Hyperactivity Disorder (ADHD)

Attention-Deficit/Hyperactivity Disorder is a classification of the American Psychiatric Association (APA), published in its *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR, latest edition at the time of data collection) for a condition that affects

approximately 3-5% of the global population, according to most estimates (APA, 2000; Singh, 2008). To meet diagnostic criteria, there must be evidence since childhood of inattention and/or hyperactivity and impulsivity that is more frequent and severe than people of comparable age and background—to the point that social, academic, or occupational functioning is significantly impaired. It is divided into three subtypes (1) Predominantly Inattentive, (2) Predominantly Hyperactive-Impulsive, or both (3) Combined. Symptoms must be observed before the age of seven, though some clinicians point out that sometimes impairments are not noticed until adolescence, when more self-management is expected (Barkley, 2005; Brown, 2005). To meet diagnostic criteria, the traits described above must be pervasive enough to cause problems in at least two life-settings such as at work, play, school, or home. The following is a breakdown of the three ADHD subtypes.

Predominantly Inattentive (ADHD-PI)

This subtype is still commonly referred to as simply Attention Deficit Disorder (ADD), which was its formal clinical name until 1987 (Brown, 2005). (Another point of confusion is that some clinicians and manuals still use ADD as an interchangeable umbrella term for all three ADHD subtypes). Common criteria of inattention in diagnostic manuals include: disorganization, often having trouble organizing activities and completing tasks, making mistakes at work or school from not paying close attention to detail, being forgetful in daily activities, being easily distracted, often losing things, and having trouble sustaining attention on tasks and following instructions and rules. It is common for people with this ADHD type to be called ‘daydreamers,’ ‘absentminded professors,’ or ‘spacey’ by others, who sometimes perceive them as irresponsible, extreme procrastinators, disorganized, and having a poor sense of time (APA, 2000; Barkley &

Murphy, 2006; Diamond, 2005; Hallowell & Ratey, 2006; Solanto, Marks, Mitchell, Wasserstein, & Kofman, 2008).

Predominantly Hyperactive-Impulsive (ADHD-PHI)

This includes as its criteria: hyperactivity through excessive talking, often being 'on the go' or acting as if 'driven by a motor,' having trouble enjoying leisure activities quietly, running or climbing about when not appropriate (or in adulthood, feeling very restless), fidgety hands or feet, and often getting up when seating is expected (or in adulthood, a feeling of inner jitteriness). Impulsivity is described as often interrupting or intruding on others (such as in conversations or games), having trouble waiting one's turn, or blurting out answers before questions have been finished. As children, these individuals may have been seen as the 'class clown,' (Hallowell & Ratey, 2006) often getting in trouble with teachers, parents and peers because of their impulsive behaviors. These symptoms can lead to breaking rules at school, at home, and among peers, and often they are seen as tactless in social interactions. There is considerable overlap between this hyperactive-impulsive type and both Conduct Disorders and Oppositional Defiant Disorders (Maughan, Rowe, Messer, Goodman & Meltzer, 2004; Satterfield, Swanson, & Schell, 1994), with up to half of these children meeting criteria for one or both of those disorders. This can continue into adulthood, and some estimate that a large percentage of prison populations struggle with this disorder (Einarsson, Sigurdsson, Gudjonsson, Newton, & Bragason, 2009; Hallowell & Ratey, 2006).

Combined: Inattentive and Hyperactive-Impulsive (ADHD-C)

This is a combination of the two above subtypes. This roughly corresponds to what the

World Health Organization (WHO, 1993) classifies as Hyperkinetic Disorder (HKD). This is published in its International Classification of Disease (ICD-10), which is more widely used outside North America.

ADHD Diagnosis and Treatment

From quiet inattentive daydreamer, to boisterous hyperactive risk-taker—to some combination depending on the context—the diversity in how the varieties of ADHD can manifest can make describing typical ADHD traits and behaviors seem like an exercise in contradictions to the public eye. Compounding this challenge is the possibility that the predominantly inattentive ADHD subtype may be a different neurobiological phenomenon altogether from the other two subtypes (Diamond, 2005), adding yet another layer of difficulty to making a proper diagnosis, conducting research, and public understanding of the disorder.

Many experts contend that *Attention-Deficit/ Hyperactivity Disorder* is a misleading name that contributes to misunderstandings: rather than an attention *deficit*, they specify that ADHD is more accurately an issue of attention control or attention inconsistency (e.g., Hallowell & Ratey, 1994). People unfamiliar with ADHD may be surprised to learn that although in many situations people with ADHD may have more trouble paying attention than their peers—they can sometimes pay great attention to things that interest them. In these situations, they sometimes seem able to focus even better than people without ADHD, according to some clinicians, some of whom have termed this capacity *hyperfocusing* (e.g., Hallowell & Ratey, 1994; Honos-Webb, 2008). However, when there is difficulty shifting this focus away from a subject of interest when appropriate, this behavior can sometimes be interpreted as a form of maladaptive *perseveration* (e.g., Barkley, 1997; Hallowell & Ratey, 1994). The APA's diagnostic manual advises clinicians

to be conscious of these situational factors when making a diagnosis because ADHD symptoms may decrease or seem to disappear altogether when engaged in activities that the patient finds especially interesting, in one-on-one situations, when under close supervision, when frequently rewarded for appropriate behavior, and when in novel settings (APA, 2000; Hallowell & Ratey, 1994). On the other hand, symptoms worsen in situations that lack intrinsic appeal or novelty, as well as those that require sustained attention or mental effort (APA, 2000). What may be especially significant here are the critical roles of intrinsic appeal and novelty in harnessing attention—also considered to be important motivating factors for the highly creative (Healey & Rucklidge, 2006; Martindale, 1999; Runco, 2007; Schmajuk, Aziz, & Bates, 2009). However, because sustained attention and mental effort are often important in following through on potentially creative ideas, if there is a reduction in this capacity after the novelty may have worn off—even in areas of initial intrinsic interest—this could be a factor that would theoretically hamper creativity in people with ADHD.

Though the root causes of ADHD are still not fully understood—and it is beyond the scope of this paper to explore specific neurocognitive theories such as working memory problems—the most common and immediately effective form of treatment so far has been the administration of stimulant medication (Barkley, 2000; Hallowell & Ratey, 1994). Roughly, these are thought to work by activating the executive functioning parts of the brain's prefrontal cortex that regulate attention and control impulsive behavior (Barkley, 2000; Hallowell & Ratey, 1994). Medication alone is no longer considered sufficient treatment, particularly because ADHD is generally a life-long condition, while medication loses its effectiveness after about two to three years (Jensen, et al., 2009). Therapy and ADHD coaching are usually considered integral accompanying components of successful treatment in order to put in place healthy coping habits,

life-organizing structures, and to deal with maladaptive psychological and emotional patterns that often accumulate before diagnosis (Hallowell & Ratey, 1994; Kubik, 2010; Solanto et al., 2008). These can run deep—until an adult diagnosis, the chronic underachievement or social rejection that is often experienced by the sufferer is frequently misattributed by his or her social circles to perceived moral failings such as intentional misbehavior, laziness, or even low intelligence. These perceptions are often internalized by the sufferer—leading to problems of self-esteem (Hallowell & Ratey, 1994; Kubik, 2010; Solanto et al., 2008). Some people must rely exclusively on therapy, coaching, and other approaches because they do not respond positively to medication. New empirical studies are showing promise for additional treatments such as mindfulness training combined with cognitive therapies (e.g., Schoenberg et al., 2014).

Creativity

Because of its complexity, creativity can be difficult to define. However, creativity researchers have come to a consensus over the last several decades that for something to be considered creative, it must have at least two essential elements: (1) originality (novelty, newness) and (2) effectiveness (meaningfulness, usefulness, value) (Plucker, Beggheto, & Dow, 2004; Runco, 2007; Sternberg & Lubart, 1999). Despite a popular bias to associate it with the arts (Runco, 2007), creativity—*originality that has effectiveness*—appears in every conceivable domain of human activity, whether it be in social interactions, machinery design, cinematography, developing mathematical theorems, cooking, composing music, or leading political movements, to name a few diverse examples.

One challenge in defining and assessing creativity is that both originality and effectiveness are not necessarily present in equal amounts. In other words, one can always ask

how original or new an idea or product really is—a revolutionary departure from anything that has been done before, or a slight but important evolution? One can ask similar questions about levels of effectiveness or value. Then we come upon questions like: which should we consider more creative—something that is highly original but only moderately effective, or something that is moderately original but highly effective?

Runco's *Balanced Ratio Theory of Creativity and Innovation* (Runco, 2007) offers a useful way to think about these questions with a continuum that runs between *originality* on one end, and *effectiveness* on the other (see Figure 1). He proposed that potentially creative behaviors and products reflect a balance on this continuum. If one is too far on the side of effectiveness (with little originality), instead of creativity or innovation there is only mindless routine problem solving, automaticity, or imitation. If one is too far on the side of originality (with little effectiveness), one also does not end up with neither creativity nor innovation, and instead ends up with originality that is out of touch with the constraints of reality (which he labels as psychosis).

Figure 1 - Runco's Balanced Ratio Theory of Creativity and Innovation

Originality- -Effectiveness

[Psychosis] [Creativity] [Innovation] [Routine Problem Solving]

(Runco, 2007, p. 386)

Another way to look at the balance of originality and effectiveness is in Sternberg and Kaufman's (2010) explanation:

> The most creative people are those who can be very original and yet work within the constraints of the construct. Those who are imaginative but whose ideas are useless become frustrated dreamers. Those who have useful ideas that are not imaginative become, whether in name or in deed, technicians. (p. 468)

A note about defining innovation: there is no agreed consensus yet on the difference between *creativity* and *innovation*, and both terms are commonly used interchangeably (Kirton, 2003; Vehar, 2008; West & Rickards, 1999). Creativity research and management literature seem to show a growing tendency to associate *innovation* with specific types of creativity—namely organizational and industrial creativity, and usually in the context of implementation and market interaction (e.g., Puccio, Murdock & Mance, 2007; Puccio & Cabra, 2010; Vehar, 2009; West & Rickards, 1999). As is partially reflected on Runco's continuum above (Figure 1), he described *innovation* as being more usually associated with something that is more apparent in its effectiveness and usually for a larger social purpose, whereas *creativity* is often more associated with originality and personal self-expression, while its effectiveness may not be as obvious (2007).

Creativity's social context: from "Big-C" to "little-c" creativity

An equally difficult and related challenge in defining creativity is that originality and effectiveness are both relative to social and cultural context (Csikszentmihalyi, 1999; Lubart, 2010; Simonton, 1999). In other words we can ask, is the originality in question new only to the creator, to his or her social group, or to humanity at large? And the same question can be asked about the other part of the metaphoric equation—is the effectiveness of a new idea useful only for the creator or for a wider societal circle? This is an especially relevant concept because in many discussions about the creativity of people with ADHD, creativity has been approached as though it were a mostly inherent psychological construct—akin to IQ—however this is not entirely adequate because of this unique socially-contextual aspect. Although creativity certainly does have inherent psychological components (which is an underlying assumption of the

assessment methods used in this study), Sternberg and Kaufman (2010) explained that:

> Creativity has a property that is not true of all psychological constructs—it exists in the interaction of the stimulus and the beholder. A maker may view his or her work as creative, but if there is not an audience that sees it that way, the maker aside, then the work is not considered creative. Moreover, what is creative to one audience may be seditious or even treasonous to another. This interaction places a constraint that one would not see, say, in an intelligence test. (P.468)

Everyone must behave and solve problems in original and effective ways at times in order to function—thus one could argue that creativity is at the root of everyone's basic survival capacity (Kaufman, Kornilov, Bristol, Tan, & Grigorenko, 2010; Kirton, 2003; Richards, 2010). But are there qualitative thresholds of originality and effectiveness that must be crossed before most people consider something creative? In conceptualizing the different orders of magnitude—again, highly influenced by social context—creativity researchers have made a rough distinction between *little-c* creativity (sometimes also called *everyday creativity*), and *Big-C* creativity (sometimes also called *eminent creativity*).

Little-c creativity is generally seen as more subjective and more associated with self-expression—for example, communicating with co-workers in an original way that finally gets a point across or moves them to action; or a child or amateur musician composing a new birthday song that is original and effective, but perhaps only within the narrow context of the birthday party. *Big-C* creativity refers to more eminent and objective forms of creativity (Kozbelt, Beghetto, & Runco, 2010) that tend to be original and effective for a larger circle of humanity such as Beethoven's 9th symphony or the proverbial invention of the wheel. Kaufman and Beghetto (2009) recently proposed to refine this model with two more categories—*mini-c* creativity, referring to new and effective behaviors on very small-scale day-to-day functional levels that are personally meaningful, and *pro-c* creativity, which refers to highly-skilled

professional-level creativity that does not quite reach the threshold of history-altering eminence.

Implicit versus explicit theories and definitions of creativity (or lack thereof)

Implicit theories are defined as the tacit assumptions or folk conceptions that laypeople hold about psychological constructs (Plucker & Renzulli, 1999; Runco, 2007). In contrast, *explicit theorie*s are the definitions that scientists and researchers articulate about these psychological constructs in order to have common ground for research and communication. Studies have been conducted to compare implicit theories of creativity to explicit theories. Though some found that they do tend to correspond in many ways (Plucker & Renzulli, 1999), some have also pointed to important differences (Lubart, 2010; Puccio & Chimento, 2001; Runco, 2007).

Because the relationship between creativity and mental disorders is again, "one of the few scientific domains driven by popular books and the cultural imagination" (Silvia & Kaufman, 2010, p. 381)—in other words by implicit theories—it is important to highlight these implicit theories and assumptions about creativity found in popular ADHD books and public discussions. This is particularly important in areas where there are big discrepancies between implicit and explicit theories. For this reason Chapter Two will delve into implicit notions about creativity in the popular ADHD literature that seem to influence the scientific research and debates.

A big problem introduced in the rationale is the virtual lack of explicit definitions of creativity in empirical studies—where they are normally expected. An analysis was done for this study to find the explicit operational definitions of creativity in studies assessing creativity among those with ADHD, and few could be found. Plucker et al. (2004) conducted a more extensive analysis of general creativity research both within and outside of the field of creativity

found a similar dearth of explicit definitions saying that:

> [M]ost authors did not explicitly define creativity, and those that did provided a wide range of definitions. We interpret these results as evidence in support of our hypothesis: We do not define what we mean when we study "creativity," which has resulted in a mythology of creativity that is shared by educators and researchers alike. In essence, all of these researchers may be discussing completely different topics, or at least very different perspectives of creativity. This is not merely a case of comparing apples and oranges: We believe that this lack of focus is tantamount to comparing apples, oranges, onions, and asparagus and calling them all fruit. Even if you describe the onion very well, it is still not a fruit, and your description has little bearing on our efforts to describe the apple. (pp. 88-89)

What may be especially muddling for the public debates is that ADHD-creativity studies have tended to look only at narrow dimensions theoretically *related* to creativity (especially divergent thinking)—not the bigger picture of creativity. This might not be so problematic if these studies articulated how these narrow dimension results relate to a wider explicit theory of creativity. But they usually do not, and the results of these studies are then often misinterpreted by the public and media as a verdict on the overall creativity of people with ADHD.

Pseudo-creativity

Another vital perspective to keep in mind while considering the creativity of people with ADHD is the possibility of pseudo-creativity (Davis, 1999b; Runco, 2007). According to this view, these are behaviors that can look like creativity but that arise simply from a lack of inhibition or contrarianism. Here Runco (2007) explains:

> It is fairly easy to distinguish between intentional creativity and those parallel behaviors that are original or innovative but not really creative. This kind of uncreative behavior has been called *pseudo-creativity* (Cattell & Butcher 1968), which is defined as potentially original but occurs because of luck or a mere lack of inhibition. This is an important idea because *a lack of inhibition is sometimes helpful for creative thinking* [emphasis added], but it can also lead to criminal efforts! It may not lead to successful crime, however.

> Eisenmen (1999) found many incarcerated persons exhibit low levels of creative potential. Perhaps they just appear to be creative because they are uninhibited, but actually that is all they are—uninhibited. (pp. 397-398)

This is especially salient given that a deficit in cognitive inhibition is often theorized to be at the root of ADHD (Barkley, Murphy, & Fischer, 2008). Relatedly, Runco (2007) explained that contrarianism for the sake of contrarianism can similarly be mistaken for creativity by observers. This is also salient because of the above-mentioned overlap between ADHD and Oppositional Defiant Disorder, Conduct Disorder and other forms of contrarian behavior. But again, Runco asserted that if this potentially original behavior is simply blind nonconformity and has no effectiveness in self-expression or problem solving—it cannot be called truly creative.

The Four (or so) "P" Dimensions of Creativity

Creativity is the result of such a complex interaction between so many factors that are difficult to analyze simultaneously, that it is sometimes referred to as the *creativity complex* or *creativity syndrome* (Runco, 2007). For this reason, creativity researchers often break creativity down into a few of its component interplaying dimensions, sometimes referred to as the *Four Ps*, first proposed by Rhodes in 1961: person, process, product, and press (or place/environment) (Kozbelt et al., 2010). *Person* looks at the human traits or states associated with creativity. *Process* deals with the mental and behavioral patterns in the various stages of creativity. *Product* is the outcome of the creative process in any domain (e.g., a work of art, a chemical formulation, a political manifesto). And finally, *Press/Place* refers to the social, cultural, situational, and environmental factors that nurture or suppress creativity.

Simonton (1990, as cited in Runco, 2007) later suggested *Persuasion* as another dimension—this examines the factors that determine the social acceptance of new ideas and

creative products such as their sheer quality and/or lobbying efforts. And recently, Runco (2007) suggested creative *Potential* as another dimension of analysis, which refers to the not yet manifested, or more subjective forms of creativity—which is perhaps the most difficult to assess, but may be a particularly useful perspective in ADHD-creativity studies. Below is an explanation of the relevance of five of these "P" perspectives to the present study.

Person

Person looks at the human traits or states, personality, and other characteristics that relate to creativity. Much foundational creativity research has gone into trying to understand what distinguishes highly creative people from the rest of the population (Albert & Runco, 1999; Mayer, 1999). Because most claims of observed high creativity in people with ADHD fall largely under the category of creative person, this study approached creativity primarily through this perspective and how the characteristics of a person with ADHD might interact with the creative process. The creative person dimension will be explored in more detail later in this chapter because it is the primary approach of this study. However, it is useful to always bear the other dimensions in mind because they are always at play. In fact, most creativity assessments fall under more than one "P" category, or assess some interaction between them. For example, the cognitive style assessments used in this study assess mainly the interaction between *Person* and *Process.*

Process

Process deals with the mental and behavioral patterns that occur on the way to creative outcomes. Some researchers have argued that the creative process is, at its core, a form of

problem solving, even in artistic self-expression (Kirton, 2003; see also Kozbelt et al., 2010). For example, a composer at work is solving the problem of how to convey an intended feeling or express a new musical conception through his or her experimentation with unique combinations of tempos, chords, melodies, or instruments.

One of the earliest attempts to map the creative process in the very early days of creativity research was by Wallas in 1926 (also attributed to Helmholtz from 1896) (as cited in Martindale, 1999), with a multi-stage model consisting of, (1) *preparation* (intense focus and hard work to accumulate information around the problem at hand), (2) *incubation* (a conscious letting go or stepping away from the problem as it is left to simmer at a subconscious level), (3) *illumination* (the proverbial 'Aha!' or 'Eureka!' moment—the sudden arrival of an insight or solution, and the part over which one has little control. One cannot predict how or when this will occur—e.g., in the shower, while driving, in the middle of the night—but preparation is thought to make it more likely), and finally, (4) *verification* (working to elaborate and verify that the new idea or solution can be applied in the real world). Since Wallace, there have been many complimentary and competing creative process theories (for some of the latest, see Kaufman & Sternberg, 2010).

An aspect of the creative process that has received an enormous of amount of research over the past several decades is the divergent-convergent thinking dichotomy proposed by former American Psychological Association president, J. P. Guilford (Guilford 1950, 1967, as cited in Zhang & Sternberg, 2005), who is widely cited as having launched the modern empirical study of creativity with his 1949 presidential address (Guilford, 1950; Runco, 2010). Divergent thinking refers to the kind of thinking processes that, if one were given a question, would lead to "producing multiple or alternative answers from available information. It requires making

unexpected combinations, recognizing links among remote associates, transforming information into unexpected forms, and the like." (Cropley, 2006, p. 391). This is the mode of thinking that has been most associated with creativity, and much creativity research has been based on this assumption. In contrast, convergent thinking is described as being "oriented toward deriving the single best (or correct) answer to a clearly defined question…it leads to a single best answer and thus, leaves no room for ambiguity: Answers are either right or wrong" (Cropley, 2006, p. 391). Convergent thinking is the kind of thinking that is most encouraged in traditional education systems and standardized testing, and whose overwhelming predominance in teaching practices is often bemoaned as being a barrier to nurturing creative thinking (Beghetto, 2010). Over the years, however, a less black-and-white picture has emerged, with an increased appreciation for the role of convergent thinking in creative endeavors. From this perspective, as long as an appropriate balance is maintained, successful creativity results from the interplay between divergent and convergent thinking processes (Beghetto, 2010; Cropley, 2006; Plucker & Makel, 2010).

One enduring creative process model in which one of the assessment measures used in this study is grounded (FourSight), is the Osborn-Parnes Creative Problem Solving (CPS) model. It is a descriptive model first created by Alex Osborn in the 1950s at his New York City advertising firm in an effort to increase creative production, and its success lead to the development of an academic program with his colleague, Sidney Parnes, at the State University of New York College in Buffalo, where the process has been continually developed and researched over the last several decades (see Puccio, Firestien, Coyle, & Masucci, 2006). It is used to guide deliberate creative problem solving efforts in many domains, especially in group settings, and is thought to parallel an individual's natural creative problem solving processes.

Puccio and Cabra (2010), extracting from the many modifications of the names and steps over the decades, described the core steps of the CPS model as: (1) clarification of the problem, (2) generation of ideas, (3) development of solutions, and (4) planning for action. Later developments of CPS have emphasized that a given situation might not require these steps to be followed in a strictly sequential order (e.g., Puccio, Murdock, & Mance, 2007). Each step begins with a phase of divergent thinking (generation of ideas), followed by a period of convergent thinking (selection of previously generated ideas), reflecting the divergent-convergent thinking interplay described in the previous paragraph. An important element of CPS is the introduction of guidelines that encourage affective states and attitudes thought to be common among the highly creative. These include playfulness, the belief that one can be creative, and the temporary suspension of judgment of new ideas during the divergent thinking phases.

Product

Product refers to creative achievement and is the most self-evident dimension of creativity in any domain (e.g., arts, politics, science, sports, etc.). It is through creative products that the achievement of originality and effectiveness can be most objectively assessed. In fact, assessment of products—such as through Amabile's commonly used Consensual Assessment Technique (Amabile, 1982)—is often considered the 'gold standard' in creativity assessment (Carson, 2006, as cited in Kaufman, Plucker & Baer, 2008) because this approach attempts to directly assess creative achievement, rather than assessing constructs related to creativity (Plucker & Renzulli, 1999). Many consensual assessment techniques of products rely on the social context of expert judges to determine whether products are original and effective (and thus creative) within their domain (Plucker & Renzulli, 1999). Not until recently was this kind of

approach taken to assess creativity among people with ADHD in a study by White and Shah (2011). As will be discussed in Chapter Two—and they did find higher levels of real-world creative achievement. Given the directness of this assessment approach, their study makes a strong case for higher levels of creativity among certain ADHD adults.

Press/ Place

Press (or Place) refers to the social, cultural, situational, and environmental factors that nurture or suppress creativity. So far, studies have not assessed this dimension in relation to people with ADHD, however it is a very valuable dimension to consider in future studies. For example, this could prompt us to examine how factors like time-pressure, conflict, trust, or social rejection in the classroom or at the workplace affects the creativity of people with ADHD.

Potential

This perspective is useful because, as Helson (1999b) explained, sometimes even measuring creativity through creative achievement has problems: "a major limitation is that creative achievement is not an appropriate criterion for studies of creative personality in children or disadvantaged adults" (p. 364). Kozbelt et al. (2010) described the *Potential* dimension as one that "appreciates yet-unfulfilled possibilities and subjective processes." They go on to explain that this "captures the earlier alliterative scheme [Four Ps] but allows research on everyday creativity and creative potentials of children and others who may have most of what it takes but require educational opportunities or other support before they can perform in a creative fashion" (p. 25).

This perspective may be particularly fitting for studies of people with ADHD where there

may be high creative potential, but where creative achievement may be blocked by the inherent impairments of ADHD—and where they might thus fall under the radar of the product assessment perspective. Runco (2007) explained that he "lobbied for potential in an attempt to redirect research and educational attention back to 'the people that need us the most,' namely those with potential but lacking the skills to express themselves" (p. 384). Here and in other places he also pointed to a product bias in the field of creativity research (e.g. Runco, 2007, 2008). While he agreed that creative products provide the most objective manifestation of creativity—which is useful in constructing scientific paradigms of creativity—he also cautioned that it is a perspective that can miss the creative potential of those who are not yet expressing their creativity, or who are expressing more personal or little-c forms of creativity.

Creative Personality

Although there is more to creativity than having a particular kind of personality, it is an important dimension to understand. As Feist (2010) explained, personality traits are more than "mere hypothetical concepts with no effect on behavior. Traits function to lower behavioral thresholds. Creative behavior is no exception…" (p. 125). He conducted a 44-year longitudinal study with Barron (Feist & Barron, 2003) showing that personality may be more predictive of lifetime creative achievement than intelligence. Because the ADHD self-help literature and the giftedness literature is full of anecdotal assertions that people with ADHD are highly creative (as will be discussed in Chapter Two)—and it seems these assertions are largely based on anecdotal observations of personality—it is important to ask what exactly is the meaning of creative personality or creative person. Although everyone is theoretically capable of some forms of creative behavior, what often earns somebody the designation of creative person both in and

outside of the field of creativity seems to be a matter of degree, i.e., one who exhibits significantly higher-than-average levels of creative behavior in frequency and/or in caliber. Feist (2010) has a definition that seems in line with much of the field of creativity research when he describes a creative person as one who has "personality dispositions [that] makes creative thought and behavior more likely" (p. 125) (with the understanding that these thoughts and behaviors are original and effective). Although some seem to argue that there is such a wide spectrum of personalities with equivalent creative potential as to make creative personality indistinguishable—as we will see below (e.g. Kirton, 2003; Mudd, 1996)—Feist (1999) contends that there is such a thing as a creative personality:

> Empirical research over the past 45 [now 60] years makes a rather convincing case that creative people behave consistently over time and situation and in ways that distinguish them from others. The creative personality does exist and personality dispositions regularly and predictably relate to creative achievement in art and science. (p. 290)

One of the most ambitious efforts to examine the dispositions of the creative personality was undertaken at the University of California, Berkeley, through a series of investigations conducted at its Institute of Personality Assessment and Research (IPAR) beginning in the 1950s, and included longitudinal studies that went into the 1990s (Helson, 1999a). The idea was to find people who had the highest levels of proven creativity—validated through real-world creative achievement and expert judgment—and to find the personality traits and dispositions they had in common with one another that set them apart from the rest of the population (and even from their successful but less creative peers). This was a group of famous architects, writers, scientists, mathematicians, and others nominated by their peers as the most creative in their respective fields. The IPAR research team would bring them in for several days at a time and administer a battery of psychometric measures and extensively interview and observe them.

From these and other studies over the years, some common characteristic traits of highly creative people began to emerge, regardless of their field. Kozbelt et al. (2010) explained: "Several traits cut across domains; these include intrinsic motivation, wide interests, openness to experience, and autonomy (Barron, 1995; Helson, 1972). A number of personality traits also appear to be more pervasive either among persons in artistic domains or scientific domains (Feist, 1998, 1999)" (p. 25). There were many more common traits, and the above citation provides only a very broad overview of some creative personality traits that one might consider to be positive. However, because we are comparing here to ADHD—which is a model of disorder that necessarily focuses on negative and problematic traits—it is easier to recognize parallels when we turn our attention in this direction. Davis (1999b) compiled traits that are generally considered negative that were found to be common among highly creative people in his research and that of others such as E. Paul Torrance, J. A. Smith, and George Domino. As he put it:

> A discussion of creative attitudes and personality would be incomplete without acknowledging traits and dispositions that disturb supervisors, parents, teachers, and peers…The traits may stem from a creative student's independence, unconventionality, persistence, and perhaps curiosity and humor… *Many are likely to cause personal or social adjustment problems*. (1999a, p. 173, emphasis added)

From Davis' analysis, seven general categories emerged: *hyperactive, absentminded, impulsive, argumentative, childish, egotistical,* and *neurotic*. Compare these seven categories to the definition of ADHD above. Although the apparent parallels to ADHD could be due to a number of reasons apart from a common etiology, these kinds of face value similarities are striking nevertheless: impulsive, absentminded (inattentive), and hyperactive, are the very descriptors of ADHD when they are present enough to impair one's quality of life, while the argumentative nature of Oppositional Defiant Disorder—which again, is prevalent among those

with the hyperactive-impulsive and combined ADHD subtypes—is a strongly associated characteristic. Also, people with ADHD are often perceived as childish and egotistical or self-centered by others—this is often attributed to factors such as delayed brain maturation, task overwhelm, or inattention to social cues rather than sociopathic intentions (Barkely & Benton, 2010; Hallowell & Ratey, 1994; Thompson-Schill, Ramscar, & Chryiskou, 2009; Tuckman, 2007). Neurotic, the final category describing the highly creative, seems to parallel the budding ADHD studies of general personality using the "Big Five" Five Factor personality model (Costa & McCrae, 1992) where high Neuroticism was found to potentially be positively associated with adult ADHD (see van Dijik & Anckarsäter, 2011), along with low Conscientiousness and low Agreeableness (Miller et al., 2008). On the other hand, Five Factor studies of creativity have generally (but not always) been found to be most positively associated with Openness to Experience (see Furnham, Zhang, & Chamorro-Premuzic, 2006), but this was not found in ADHD (see Miller et al., 2008). However, Five Factor studies are still relatively meager and often seem contradictory—both for ADHD and creativity—and seem to vary depending on the kind of creativity (e.g., artistic or scientific), the type of ADHD (e.g., inattentive or hyperactive-impulsive) and age (e.g., childhood ADHD or adult ADHD).

This leads us to our first research question: Given the apparent similarities between the negative personality descriptors of the highly creative and the diagnostic criteria of ADHD, would creative personality assessments reveal positive associations between ADHD and the creative personality? Below is a description of the instrument used to investigate this research question and its corresponding hypothesis.

Assessing creative personality with the Adjective Check List

The Adjective Check List (ACL) (Gough & Heilbrun, 1983) is a personality assessment that was first developed in 1952 and came out of the landmark Berkeley IPAR studies of highly creative people described above. It helped reveal a great deal about the personality of highly creative people. For example, the architects in the IPAR study with the least self-control were also found to be the most creative (Runco, 2007). The ACL became a very widely used and studied personality assessment, not only in creativity research, but in general psychology (Piedmont, McCrae, & Costa, 1991). It consists of a list of 300 adjectives, and participants are asked to check those they feel represent them. There are currently 37 indigenous scoring scales (e.g., Counseling Readiness, Endurance, Military Leadership, Nurturing Parent, etc.), and more have been developed externally (e.g., Domino, 1970).

To answer the first research question, three relevant scoring scales developed for the ACL (Gough & Heilbrun, 1983) were chosen: (1) Domino's Creativity Scale, (2) Gough's Creative Personality Scale, and (3) the Change Scale. After the ACL was first created, Domino developed a creativity scoring scale for it in 1970 that Davis (1999b) reported to be a good adult creativity test and, "showed high internal consistency, reliability, and good validity in predicting the rated creativeness of students' art and writing projects" (p. 210). In 1979, Gough, one of the co-developers of the ACL developed the Creative Personality Scale and then integrated it into later version of the ACL. It was also found to correlate significantly with creativity, though was found to be slightly more "reflective of social and intellectual competence" (Domino, 1994, pp. 30-31). Theoretically, people with ADHD might be expected to score slightly lower on Gough's creativity scale than Domino's scale because of the difficulties ADHD can pose in social interactions. The Change Scale was an original scale developed with the ACL to assesses a

person's propensity "to seek novelty of experience and avoid routine" (Gough & Heilbrun, 1983, p. 13) and has been shown to be related to creativity, especially artistic creativity (Helson, 1999b). Theoretically, because of associations between ADHD and novelty-seeking behavior (Barkely, 2005; Gizer, Ficks, & Waldman, 2009), this dimension could be expected to relate highly with ADHD.

> ***Adjective Check List Hypothesis****: An ADHD diagnosis will positively correspond with the following three ACL scoring scales: the Domino Creativity Scale, the Gough Creative Personality Scale, and the Change Scale.*

Creative Self-Perception

Another important component of creative people is their perception of their own creativity (Davis, 1999a, 1999b), sometimes referred to as *creative self-perception* (Houtz et al., 2003). There was a long-held assumption among many in the field of creativity research that "an individual who perceives himself as creative, and with accuracy, is a person who can be expected to behave in creative ways" (Khatena, 1977, p. 517). Over the last several decades, countless creativity assessment methods have been designed and refined that have approached creativity from many perspectives, but despite this, Kaufman, Plucker and Baer (2008) mused in their recent guidebook on creativity assessment that, "perhaps the simplest way is just to ask people how creative they are" (p. 101). This direct and simple approach with high face validity has not been investigated much but has been validated to a certain extent in past creativity research (e.g., Domino & Giuliani, 1997; Furnham, Zhang, & Chamorro-Premuzic, 2006). However Kaufman, Plucker, and Baer strongly caution that this approach has potential problems and cite growing studies that show limitations in people's abilities to judge their performance accurately (e.g., Dunning, Johnson, Ehrlinger, & Kruger, 2003). This cautionary attitude should be taken to heart

here, especially given that recent research on ADHD children and college students has suggested that many of them may have significant positive illusory biases, that is, a higher self-perception of their competence than their actual competence (Hoza, Pelham, Dobbs, Owens, & Pillow, 2002; Owens & Hoza, 2003; Prevatt et al., 2012).

However, simply asking people with ADHD how creative they are can still provide us with valuable information. First, it should give us preliminary baseline data on their creative self-perceptions. Second, it may give us insight into their implicit theories of creativity. Third, it could let us see potential discrepancies between their creative self-perceptions and empirical assessments of their creativity. Finally, a new line of research is beginning to demonstrate that seeing oneself as having creative potential—known as *creative self-efficacy*—might lead to higher levels of creative performance (Mathisen, 2011; Tierney & Farmer, 2002, 2011). As Beghetto (2010) noted when discussing creativity in the classroom, "Although self-beliefs are susceptible to bias and inaccuracy (Dunning, Health, & Suls, 2004), such beliefs provide students with the confidence necessary to share and develop their ideas" (p. 457). Thus knowing people's creative self-perceptions could be helpful when designing strategies to maximize their creativity.

Creative self-efficacy is part of what Davis (1999a) and others have called *creative attitudes*, which he describes as intimately tied to creative personality, "Creative attitudes include traits that predispose one to think creatively and be creatively productive. The contrast between creative and uncreative people lies more in the barriers and uncreative attitudes than in differences in intelligence or thinking styles" (p. 165). Davis, a long-time creativity educator and researcher, goes on to emphasize that awareness of one's creativity—what he terms *creativity consciousness*—is exceedingly important: "Creativity consciousness is a common and important

trait among creative people. *In improving our own creativity and in teaching creativity to others, creativity consciousness is the number one trait to develop*" (pp. 170-172).

Assessing creative self-perception through self-report

Given that creative self-perceptions seem to be important in behaving creatively, and given that many people have theorized that people with ADHD are highly creative—including self-help authors and clinicians who admit to having been diagnosed with ADHD themselves (e.g., Hallowell & Ratey, 1994; Weiss, 1997)—it seems important to ask: do most ADHD adults perceive themselves as highly creative? For this study, a short forced-choice list of questions was developed consisting of two core questions, (1) *How creative do you consider yourself to be?*; and in an attempt to reduce potential positive illusory bias, a slightly more objective outside perspective question was asked; (2) *How often have others commented on your creative abilities?* Furthermore, to minimize response bias towards high creativity, these two questions were embedded among four additional dummy questions (such as levels of shyness/ outgoingness) to attempt to mask the fact that it was a creativity assessment (see Appendix D). Note that Domino and Giuliani (1997) found a correlation between creative self-perception and scores on Domino's ACL Creativity Scale described above, and also, Houtz et al. (2003) demonstrated a causal link between creative self-perception and KAI Innovation on the KAI assessment that will be described below.

> ***Creative Self-Perception Hypothesis:*** *Most ADHD participants will report being more creative than average, and that others often comment on their creative abilities.*

Creative Cognitive Style Preferences

Up to this point, we have looked at attempts to understand the characteristics of a person that can lead to higher levels of creativity. Now we transition to a sometimes contradictory way of thinking about creativity: through the lens of cognitive style preferences. These are generally defined as the consistent differences in the way an individual prefers to solve problems, deal with novelty, make decisions, deal with others, or process information (Houtz et al., 2003; Isaksen & Dorval (1993); Martinsen & Kaufmann, 1999; Messick , 1976; Neilson, 2012). This approach to creativity assessment is often informally described in the field as asking 'how are you creative?' (style), versus 'how creative are you?' (level) (Treffinger, Selby, & Isaksen, 2008).

Cognitive style in creativity research is sometimes also called *creative style* or *creativity style*, and these fall under an umbrella term in general psychology that seems to be gaining consensus: *intellectual styles*. Zhang, Sternberg, and Rayner's recently edited Handbook of Intellectual Styles (2012) shows a considerable effort in trying to unify similar and overlapping constructs from disparate lines of research and various fields. This includes cognitive style, creative style, problem-solving style, learning style, thinking style, decision-making style, and even teaching style (among other constructs), "which [do] not have a unified history and cohesive philosophical and theoretical foundations" (p. 16). In their consolidation efforts, Zhang and Sternberg (2005) found at least one or more of these concepts to underlie most style structures: "one's preference for high degrees of structure versus low degrees of structure, for cognitive simplicity versus cognitive complexity, for conformity versus nonconformity, for authority versus autonomy, and for group versus individual work" (p. 2).

The word *preference* is important to note because it implies a core emotional component to styles. As Zhang and Sternberg (2005) put simply, "In managing our activities, we choose

styles with which we feel comfortable" (p. 11). The presence of this affective element may mean that style has a very important role in regulating interest, attention, and task motivation—and thus creative outcomes. This also implies that a person's style preferences affect their behaviors as they move along various stages of the creative process on their way to creative outcomes. For example, if after a person comes up with a novel idea, they *enjoy* spending time looking at its potential advantages and disadvantages and modifying it before attempting to implement it—then they are theoretically more likely to do so. If instead they might enjoy implementing it immediately before any modifications—then they are more likely to do that instead. These kinds of variations due to personal preferences have been found to affect creative outcomes (Basadur, Graen, & Wakabayashi, 1990; Puccio, 1999).

An issue related to creativity assessment that has resulted in a disparity of views is the controversy of the relationship between creativity styles and creativity level. On the one hand, there are scholars who believe that certain style preferences are related to higher levels of creative ability—or at least are more conducive to creative outcomes (e.g., Zhang & Sternberg, 2005)—while others argue that style and level of creativity are largely independent (e. g., Kirton, 2003). Though this style-level issue (also called the style-ability debate) seems to cause confusion both for researchers and laypeople (Isaksen & Dorval, 1993; Puccio & Chimento, 2001), this clash of perspectives does seem to also inspire fruitful debate. As Neilson (2012) recently put it:

> Concerning the relationship between styles and abilities, the author would not propose putting the discussion of the intricacies of this relationship to bed. To the author's mind, it is very useful to have the discussion ongoing in the field, and it does keep us on our (thinking-wise) toes. (p. 40)

Style preferences are thought to be relatively stable over time and difficult to change (Clapp, 1993; Kirton, 2003; Martinsen & Kaufmann, 1999; Zhang, Sternberg & Rayner, 2012). They are often seen as a component of a larger personality construct, or at the intersection of personality and cognitive processes—however there are many differing and conflicting views on the relationship between style preferences and personality, and this secondary issue also seems far from being settled (for the latest deliberations, see Roodenburg, Roodenburg & Rayner, 2012; Zhang, Sternberg, & Rayner, 2012)

The literature review section of Chapter Two will describe the handful of studies that have examined style among people with ADHD. Below are the two cognitive style assessments that were chosen for the present study: the *FourSight Thinking Profile* (Puccio, 2002b) and the *Kirton Adaption-Innovation Inventory* (Kirton, 1976) and their corresponding hypotheses.

Assessing cognitive style with the FourSight Thinking Profile

The third assessment of the present study was the *FourSight Thinking Profile* (formerly called the *Buffalo Creative Process Inventory,* or *BCPI*), which was originally developed to facilitate and improve group and individual creative problem solving capacities (Puccio, 2002a). This instrument identifies a person's style preferences among four categorized stages of the Osborn-Parnes Creative Problem Solving Process described above: (1) clarification of the problem (*Clarifier*), (2) ideation of solutions through the generation of new ideas (*Ideator*), (3) development and refinement of new ideas (*Developer*), and (4) implementation of new ideas (*Implementer*).

Puccio and Grivas (2009) examined the relationship between FourSight preferences and personality using the DiSC Personal Profile System and found that Clarifier and Ideator had the

strongest relationships to personality. Here they found a Clarifier preference to be "associated with tendencies to be cautious, careful, analytical, accurate and tactful. In contrast, those who express strong preference for the idea generation stage of the creative process are likely to show such traits as willingness to challenge prevailing thought, need for change, and attraction to variety" (p. 247). These latter Ideator descriptions parallel the anecdotal descriptions of people with ADHD, particularly the hyperactive-impulsive subtype. Also, the other three preferences of Clarifier, Developer, and Implementer were related to the Endurance scale of the Adjective Check List (Rife, 2001). This relates to a person's propensity to persist in completing tasks they undertake. By contrast, the Ideator preference was the only one that did not relate to Endurance. As Puccio (2002a) pointed out, "It is interesting to note that Ideator was not related to Endurance, which may indicate that a potential challenge for someone who enjoys ideation is seeing one idea through to conclusion" (p. 30). This is another common challenge faced by people with ADHD.

For these reasons, one might expect people with ADHD to have higher Ideator preferences than people without ADHD. Indeed, this was found to be the case among the ADHD university undergraduates of White and Shah's (2011) above-mentioned study that also assessed creative achievement. One might also theoretically expect to find lower preferences on the other three dimensions than among people without ADHD. However in White and Shah's study, this was only true for the Clarifier and Developer preferences. There was no group difference in Implementer preference, which could be somewhat surprising because this could imply an average level of persistence and enjoyment in "giving structure to ideas so they become a reality" (Puccio, 2002b, p. 7), yet ADHD poses challenges for creating structure and taking action in following-through. (At the same time, "preference does not guarantee ability" [Puccio,

2002b, p. 4], and while they might report an average preference for implementation, ADHD could lower their capacity for it. This caveat should be kept in mind when interpreting all style preference results). Or one could speculate that perhaps this result was somehow reflective of their ADHD sample, who perhaps made it into university because they possessed levels of persistence adequate enough to overcome the academic challenges often brought on by ADHD. Finally, perhaps the hyperactive-impulsivity of some of their ADHD participants may have corresponded to the Implementer tendency to "get impatient and leap to action too quickly" (Puccio, 2002b, p. 7) and somehow evened off the scores.

Another interesting theoretical line related to the Adjective Check List is the relationship between FourSight preferences and Gough's above-mentioned Creative Personality Scale used in the present study. The FourSight Ideator preference had the strongest positive relationship to the Creative Personality Scale—though all four style preferences had a positive relationship (Rife, 2001). This finding, according to Puccio (2002a), indicates the value of all four of these components for full-fledged creative productivity. Apart from the theoretical value of using FourSight, this hints at the practical value of pursuing this area of investigation. Because FourSight was specifically designed to develop self-awareness of one's creative strengths and weaknesses to maximize creativity in group and individual settings, it may be useful in finding ways to do so for the ADHD population.

Given all the theoretical expectations above, would ADHD adults show significantly higher Ideator preferences than Clarifier, Developer or Implementer preferences compared to average non-ADHD population scores? What differences might there be among an adult ADHD group with more diverse education levels and ages than White and Shah's (2011) ADHD university students?

FourSight Thinking Profile Hypothesis: *An ADHD diagnosis will positively correspond with the Ideator preference.*

Assessing cognitive style with the Kirton Adaptor-Innovator Inventory (KAI)

The fourth and final hypothesis of this study is framed by Michael Kirton's Adaption-Innovation theory (Kirton, 1976) and its accompanying instrument: the Kirton Adaption-Innovation Inventory (KAI). First developed in the UK, it has been one of the most frequently used cognitive style measures since the 1970s (Neilson, 2012), and despite being sometimes at odds with mainstream creativity research and theory, continues to enjoy practical use in organizational management, industrial psychology, and in studies of entrepreneurship (e.g., Sayeed & Gazdar, 2003; Buttner & Gryskiewicz, 1993; Engle, Mah, & Sadri, 1997; Rieple & Vyakarnam, 1994). The first thing that puts the KAI model at odds with other theories is Kirton's use of the word *innovator*, which in this context does not necessarily mean one who is more creative, as we will see below. This assessment assumes that everyone has creative potential but in different ways, and locates people on a normally distributed continuum from high Adaptors, who prefer to "do things better" within a prevailing paradigm (or the already established structure), to high Innovators, who prefer to "do things differently," sometimes by radically stretching or disregarding prevailing paradigms and structures (Kirton, 1976, p. 622). Keeping in mind that most people lie near the middle of the continuum—exhibiting both Adaptor and Innovator characteristics—some people can be located at more extreme ends of this continuum.

The high Innovators provide a more radical, revolutionary form of creativity, whereas the high Adaptors' creativity tends to be more evolutionary and incremental (Talbot, 1997). According to this view, true creative output requires a collaborative balance of both producing

novelty by breaking out of established systems and paradigms (Innovator style), and of understanding how to place novelty effectively within prevailing systems and paradigms (Adaptor style). As Kirton (2003) explained:

> The value of adaptors is obvious; they are experts in the current system and dedicated to its continuance and efficiency—no organization can survive long without adaption…By contrast, the more innovative are more liable to detach the problem from the way it is customarily perceived. In doing so they shed varying amounts of the detail that would otherwise help them define it more closely and that would indicate (as well as threaten to confine them to) the more expected avenues of solution. Working from this looser start, they are liable to indulge in wider solution search and so produce solutions that are more readily seen as different. (pp. 48-49)

Through decades of practice and hundreds of KAI studies, people on these further ends (high adaptors and high innovators) have been found to have respective clusters of associated traits (or "extensions" as Kirton [2003] calls them), each with their defining strengths described above—but also potential weakness that can impede creative outcomes. For Adaptors, this happens when they are too "submissive, dogmatic, dull, rigid, risk avoidant, and compliant" (Isaksen & Dorval, 1993, p. 308). When developing the foundational theory to the KAI, these are the managers that Kirton (1976) originally observed as those "who 'fail to see possibilities outside the accepted pattern'" (p. 628). As Talbot (1997) explained, "In organizational contexts, these sorts of personal characteristics might translate to Uncreative Adaptors being too attached to the current way of doing things, too subservient to the powerful, too nit-picky / absorbed in the detail, etc." (p. 179).

A less intuitive insight—and a powerful contribution of KAI theory—is that high Innovators can also exhibit low levels of creativity. This might be seen among KAI Innovators who are, as Isaksen and Dorval (1993) suggested, "reluctant to commit to any particular course of action, impractical, self-centered, abrasive, undependable, capricious risk-taker[s]" (p. 308).

These are the managers that Kirton (1976) originally observed as "'men of ideas,' who fail to exhibit a knack for getting their notions implemented" (p. 628). As Talbot (1997) explained, they:

> might be too far removed from the reality of other organization members, too wedded to their own ideas, too unconcerned with gaining acceptance, more interested in exploring alternatives than implementing solutions, or lack confidence in their ability to promote their ideas, lack certain types of power needed to influence the course of events, or possibly just lack a champion for their ideas. (p. 179)

Think back to Runco's Balanced Ratio of Creativity and Innovation continuum (Figure 1) introduced in the definition of creativity earlier. Setting aside the confusing differences in terminology (like most people, Runco assigns a meaning to the word *innovator/innovation* that is more similar to creativity than does Kirton), there is a parallel notion that when one is too far on either end of the continuum, one is out of creative balance. This happens when there is high originality (as with high KAI Innovators) that it is out of touch with the constraints of reality and has no effectiveness. Inversely, this happens if there is high effectiveness (as with high KAI Adaptors) without originality and only mindless routine problem solving, automaticity or imitation (Runco, 2007). Sternberg and Kaufman's (2010) similar notion of a necessary balance of originality and effectiveness for creativity is worth repeating here:

> The most creative people are those who can be very original and yet work within the constraints of the construct. Those who are imaginative but whose ideas are useless become frustrated dreamers. Those who have useful ideas that are not imaginative become, whether in name or in deed, technicians. (p. 468)

From these perspectives, one can understand how one style might not necessarily lead to higher levels of creativity, and this can help argue for the independence of style and level—a position which Kirton has long vigorously defended (Isaksen & Puccio, 1988; Kirton, 2003). In

fact, KAI theory is an area where a large share of the level-style debate has played out. An example of an opposing position can be seen in Hill and Amabile's (1993) study, where they argued:

> Kirton's aim of recognizing the mutual usefulness of these two ways of thinking and working (innovative and adaptive) is a progressive one. By recognizing these style differences, organizations can better provide for the preferences of their workers, and employees can perhaps better understand differences between one another. However, to insist that adaptors are just as creative as innovators, but in a different way, redefines creativity in a way which makes the concept too broad to be meaningful. (p. 414)

In their study, they even explicitly used the identification of KAI Innovators to identify those with higher creative potential citing it as:

> …a good measure of creativity relevant skills, well reflective of a certain way of doing things which is characterized as innovative, nonconforming, originating ideas, flexible, risk taking, intuitive, perceptive, and tolerant of ambiguity. It was not hypothesized that this way of doing things, nor this measure of it, was necessarily orthogonal to creativity. On the contrary, we used it in this study as a measure of creativity-relevant skills which is hypothesized as a positive predictor of the creativity of an eventual product. (pp. 414-415)

It is beyond the scope of this study to further explore the research supporting various positions of the style-level debate, but as far as laypeople's perceptions goes—KAI Innovators do tend to be perceived as more creative (Puccio & Chimento, 2001). The common metaphor for creativity as 'out-of-the-box' thinking—in other words, thinking outside the constraints of a prevailing system or paradigm—makes it easy to see why. Stevens and Burley (2003) put it bluntly here:

> In plain English, Kirton's 'Innovators' are the group most people would consider to be highly 'creative.' Adaptors, on the other hand, are 'creative' only in the sense that they can find ways to work within the system to solve problems and effect change. In plain English, this is the group most people would consider to be 'not very creative.' Adaptors tend to be good at finishing jobs started by Innovators. (p. 19)

Research on implicit theories of creativity using the KAI has confirmed this (Puccio & Chimento, 2001) —laypeople do perceive KAI Innovators as significantly more creative than Adaptors, even across cultures such as in Argentina (Gonzalez, 2003), Japan (Muneyoshi & Kagawa, 2004), and Singapore (Ramos & Puccio, 2014). An interesting exception was in Saudi Arabia (Alkaied, 2004), in which the sample reported associating higher levels of creativity with Kirton's Adaptor preference.

The parallels to ADHD that motivated this study become especially salient the closer one examines the personality traits that Kirton and others have found to be associated with KAI Innovators, and the ways in which Adaptors and Innovators perceive one another. In "doing things differently" (Kirton, 1976), KAI Innovators tend to not conform to established norms, they are often seen as abrasive by the less innovative, and they also happen to not be very good at following their ideas through to completion. Taking a quick look back at some of the common diagnostic criteria for ADHD discussed above, Table 1 lists these next to the characteristics of KAI Innovators, reorganized here to start with the relatively more comparable. Because ADHD is a framework of disorder, it necessarily only considers negative traits for treatment, whereas the KAI model describes potentially positive and potentially negative traits, and is therefore more extensive.

The further apart from one another KAI Adaptors and Innovators are on the KAI continuum—what has been termed the *cognitive style gap* (Kirton, 2003)—the more misunderstandings arise, and the more trouble they have getting along. Kirton (2003) stated, "As pejorative views emanating from the contrary viewpoints start to multiply, the likelihood of personal conflict and clash increases, impairing healthy disagreement and debate" (p.63). KAI Innovators tend to perceive Adaptors as dull (Isaksen & Dorval, 1993), seemingly "impervious

Table 1 – Comparison of ADHD Characteristics with Kirton's KAI Innovators

ADHD	**KAI Innovators**
N.B. Some of the characteristics below are only true for predominantly Hyperactive-Impulsive ADHD types, others, only for predominantly Inattentive ADHD types. Combined types are more likely to exhibit more of these characteristics	Often challenges rules, has little respect for past custom
	Capable of detailed routine (system maintenance) work for only short bursts. Quick to delegate routine tasks
	Seen as unsound, impractical; often shocks his opposite
	Seen as undisciplined, thinking tangentially, approaching tasks from unsuspecting angles
Frequent rule-breaking	
	Insensitive to people, often threatens group cohesion and cooperation
Difficulty paying close attention to detail	
	In pursuit of goals treats accepted means with little regard
Difficulty sustaining attention on tasks (especially in areas that lack intrinsic appeal or novelty)	
	Queries problems' concomitant assumptions; manipulates problems
Difficulty in completing tasks and organizing ideas	
	Is catalyst to settled groups, irreverent of their consensual views; seen as abrasive, creating dissonance
Tactless in social interactions	
	Could be said to discover problems and discover avenues of solution. Tends to take control in unstructured situations
Interrupts and intrudes on others	
	Appears to have low self-doubt when generating ideas, not needing consensus to maintain certitude in face of opposition
Difficulty following instructions	
	In the institution is ideal in unscheduled crises, or better still to help avoid them, if he can be controlled
Restless	
	When collaborating with adaptors; supplies the task orientations, the break with the past and accepted theory
	Provides the dynamics to bring about periodic radical change, without which institutions tend to ossify
	(Kirton, 1976, 2003)

to boredom" (Kirton, 1976), and their methods tedious (Talbot, 1997). KAI Innovators also "tend to dismiss adaptive change as mere tinkering with or within the current system. Yet these may be crucial changes that improve the system and keep it going" (Kirton, 2003, p.63). From the contrasting perspective of people on the other end of the KAI continuum:

> …adaptors may dismiss much innovative change as irrelevant or wild. Indeed, adaptors…may go a step further by saying that very often the innovators do not follow through in implementing their proposed changes, so in the end, after all the ideational froth, no useful change actually occurs! (Kirton, 2003, p.63).

Kirton (2003) also said, "Adaptors, especially in innovator-oriented settings…claim, to hold the works together and prevent frequently threatened collapse in the teeth of their more innovative colleagues' 'strangely inefficient ways'—as one adaptor phrased it" (p.49).

In a preview of the popular ADHD self-help literature reviewed in Chapter Two, here are more anecdotal clinical descriptions of ADHD adults for comparison to KAI Innovators. In their best-selling book on ADHD, *Driven to Distraction*, ADHD clinicians Hallowell and Ratey (1994) observed that adults with ADHD, "simply live frenetic lives, a whirligig of high stimulation and often high achievement, with an abiding sense that their world is on the brink of collapse" (p. 50). Also, "[t]hey may have fast-track hyperkinetic personalities, be impatient, restless, impulsive, often intuitive and creative but unable to follow through…" (p. 52). And they observed that they have an intolerance of boredom and are marked by a "frequent search for high stimulation…The adult with ADHD is always on the lookout for something novel" (p. 74). They also observed that ADHD adults also have "[t]rouble in going through the established channels, following 'proper' procedure" (p. 74) and explained that:

> Contrary to what one might think, this is not due to some unresolved problem with authority figures. Rather, it is a manifestation of boredom and frustration: boredom with routine ways of doing things and excitement around novel approaches, and frustration with being unable to do things the way they're "supposed" to be done. (p. 74)

Here we also see links to a related group of characteristics; novelty-seeking, sensation-seeking, and risk-taking, all of which have been associated to Kirton's Innovators theoretically and/or through KAI studies using measures of sensation-seeking and risk-taking (see Kirton, 1976,

2003). Kirton (2003) has suggested that this may be related to findings in genetics research potentially associating D4 dopamine receptor genes to these traits and the effects of dopamine regulation on boredom, motivation and behavior. Similarly, these potential associations are beginning to be detected in genetic ADHD research for novelty-seeking (Barkely, 2005; Gizer, Ficks, & Waldman, 2009), and sensation-seeking (Diamond, 2005; Carlotta, Borroni, Maffei, & Fossati, 2011; Shaw & Giambra, 1993). All this leads us to the final research question: will ADHD adults show significantly higher KAI Innovator preferences that the normal population?

> ***KAI Hypothesis:*** *An ADHD diagnosis will positively correspond with Kirton's Innovator preference*.

Recapitulation of the Hypotheses Guiding the Study

> ***Adjective Check List Hypothesis****: An ADHD diagnosis will positively correspond with the following three ACL scoring scales: the Domino Creativity Scale, the Gough Creative Personality Scale, and the Change Scale.*
>
> ***Creative Self-Perception Hypothesis:*** *Most ADHD participants will report being more creative than average, and that others often comment on their creative abilities.*
>
> ***FourSight Thinking Profile Hypothesis:*** *An ADHD diagnosis will positively correspond with the Ideator preference.*
>
> ***KAI Hypothesis:*** *An ADHD diagnosis will positively correspond with Kirton's Innovator preference.*

Statement of Significance

First, hopefully the simple presentation of relevant theories of creativity in this chapter will encourage more explicit conceptualizations and definitions of creativity in future ADHD

studies. This could help reduce misunderstanding and confusion among researchers and the public about this hotly debated area of research.

Second, as the review of ADHD-creativity studies in Chapter Two will further reveal, the principal method of assessing creativity among people with ADHD so far has been through divergent thinking tests. Creativity scholars are virtually unanimous in asserting that creativity can only be understood through multiple assessment approaches and perspectives. To this end, the assessment of creative personality, creative self-perceptions, and cognitive styles among people with ADHD in this study might widen our understanding of their creativity.

Third, results of this study may support the theory that people with ADHD tend to share certain creative personality and cognitive style tendencies. These particular tendencies might lead to behaviors that others could potentially misattribute to neurocognitive impairments. For example, depending on the context and perspective, rule-breaking can be interpreted as either a positive step towards creativity—or a problematic behavior that needs correction. If a person breaks a rule not because of inattentiveness or an uncontrolled impulse, but because of their cognitive style (e.g., he or she feels that it will lead to original and effective outcomes)—it would be very useful to be able to make the distinction. Perhaps the results of this study could even eventually help in developing ways to distinguish ADHD that might be more personality-based from ADHD that might be due to other causes such as from a brain injury or trauma. Knowing the difference could suggest different treatment approaches. It is possible that even the same individual with ADHD might sometimes break rules because of inattentiveness or uncontrollable impulses, but at other times because of differences in their personality or cognitive style. In such a case, being able to make the distinction could potentially help us more precisely treat the problematic neurocognitive impairments that lower one's quality of life, while being careful not

to suppress behaviors that might be motivated by the rightly-held belief that *some* behaviors that may not be palatable to others (e.g., breaking rules, daydreaming) can sometimes lead to original and effective outcomes that can benefit the creativity of the individual and the world at large.

Finally, a body of studies and standard practices has been developed over the decades using the KAI, FourSight, and other assessment tools to maximize creative strengths and minimize weaknesses—this could potentially be tapped to bolster ADHD therapy and coaching practices. Also, because these assessments have been used extensively in organizations, not only to improve creativity, but also to improve interpersonal communications and interactions by developing appreciation for different cognitive styles—this may also extend therapeutic benefits to the workplace. It could conceivably even help in developing more effective educational strategies for ADHD children.

Regardless of whether or not future research will support the notion that people with ADHD are more creative in level, it may continue to uncover associations between ADHD and certain creative style tendencies. For example, it may be that people with ADHD often have preferences that put them at an advantage for generating originality, but at a disadvantage for bringing the effectiveness that would lead to full-fledged creativity. Framing creativity in this way could help such a person better understand their potential creative weaknesses, and harness their potential creative strengths, possibly through collaboration with others who have high levels of effectiveness. This could benefit not only the individual, but also the ultimate creativity and innovation of the groups or organizations in which he or she might work.

Summary

This chapter explained the background and purpose of this study, introduced Attention-Deficit/Hyperactivity Disorder, and laid out some relevant creativity definitions and theories. This was followed by an introduction of the four assessment instruments used in this study to assess creativity among ADHD adults and the four corresponding hypotheses. This chapter concluded with the potential significance of this study. The following chapter delves into the heated public debate around ADHD and creativity, and reviews the relevant literature, including ADHD-creativity studies that have been conducted so far.

Chapter Two: Literature Review

Introduction

This section begins by exploring the current public debate about the creativity of people with ADHD that undoubtedly influences not only the research, but also people's perception of ADHD, the stigma of the disorder, self-esteem, and the likelihood of seeking treatment. This review highlights the fact that popular conceptions of the ADHD-creativity relationship has gotten ahead of the science. Research on creativity in ADHD is still meager and relatively inconclusive, yet the arguments are passionate and often polarized. Following the description of the varying views on the connection between ADHD and creativity is a description of the scientific studies that have explored creativity among people with ADHD. Finally, this chapter ends with some theoretical parallels between ADHD and creativity that have not yet been empirically investigated, but that are potentially promising areas of future research.

Public Debate and the Cultural Context

Creative Because of ADHD

Many people on this side of the debate contend not only that most people with ADHD are highly creative, but that it is largely because of their ADHD. It is common to hear speculation among the authors of ADHD self-help books and giftedness specialists that many of humanity's creative geniuses such as Leonardo da Vinci, Jules Verne, Mozart, or Thomas Edison would have probably met today's diagnostic criteria for ADHD (e.g., Cramond, 1994; Freed & Parsons, 1998; Hallowell & Ratey, 1994, 2006; Hartmann, 2003; Honos-Webb, 2008). As Cramond noted

in her research, "there are so many similarities in the behavioral descriptions of creativity and ADHD that one is left to wonder, could these be overlapping phenomena?" (1994, p. 193). This is reflected in ADHD self-help books with titles such as *The Edison Gene: ADHD and the Gift of the Hunter Child* (Hartmann, 2003), and *The Da Vinci Method: Break Out & Express Your Fire* (LoPorto, 2005).

This notion entered mainstream awareness with the bestselling 1994 publication of *Driven to Distraction: Recognizing and Coping with Attention Deficit Disorder from Childhood Through Adulthood* by Harvard psychiatrists, Edward Hallowell and John Ratey (Hallowell & Ratey, 1994). While they acknowledged that a full definition of creativity was beyond the scope of their book, they did propose one—which is rare in these debates: "For our purposes we define creativity as a tendency to see life's elements in new ways, a tendency to combine bits of personal experience into new forms, a tendency to give shape to new ideas" (p. 176). Here they claimed, "Adults with ADD often have unusually creative minds. In the midst of their disorganization and distractibility, they show flashes of brilliance. Capturing this 'special something' is one of the goals of treatment" (p. 74). Among other traits such as high energy and intuitiveness, here they credited a high tolerance of ambiguity and a greater ability to defer judgment among their ADHD patients as potential traits that lead to higher creativity:

> Several elements of the ADD mind favor creativity. First of all, people with ADD have a greater tolerance of chaos than most. Living in distraction as they do, bombarded by stimuli from every direction and unable to screen out what is extraneous, people with ADD live with chaos all the time. They are used to it, they expect it. For all the problems this might pose, it can assist the creative process. In order to rearrange life, in order to create, one must get comfortable with disarrangement for a while. One must be able to live with the unfamiliar without, to use Keat's phrase, any 'irritable searching after fact and reason.' In bearing with the tension of the unknown or the unfamiliar, one can enable something new to come into existence. If one forecloses a thought too quickly, because it seems too weird or strange or disorganized, then the pattern or beauty that may be hidden within the fantasy will get lost. (pp. 176-177)

In her book, *ADD and Creativity: Tapping Your Inner Muse*, clinician, Lynn Weiss wrote, "Many people with ADD feel so much creative energy bottled up inside that they hardly know what to do with it all" (Weiss, 1997, p. 6). The cover of clinician, Lara Honos-Webb's (2008) book, *The Gift of Adult ADD: How to Transform Your Challenges to Build on Your Strengths* reads, "If you have attention deficit disorder (ADD), you may act impulsively, daydream, and have trouble focusing, but clinical studies suggest that these same symptoms may make you exceptionally creative, intuitive, and energetic." Psychotherapist and radio host Thomas Hartmann's (1997) Time-magazine-featured book, *ADD: A Different Perception*, cited a large reservoir of creativity and the willingness to take risks, "two of the cardinal characteristics" (p. 45) of people with ADHD and observed, "When you read through the list of creative characteristics, it reads almost like a recompilation of the American Psychological Association's assessment criteria for diagnosing ADHD" (p. 74). Anecdotally, he said that, "Many teachers, psychiatrists, psychologists, and others who work with ADD children and adults have observed a correlation between creativity and ADD" (p. 71).

These kinds of unempirical assertions drew contention from some ADHD researchers. However, more recently Hallowell co-authored another book for parents of ADHD children, and holding his ground in response to this criticism, continued to maintain:

> What else makes ADD an advantage in disguise? Energy. Curiosity. Creativity. Some experts say these qualities are no higher in people with ADD than in the general population, but my experience tells me that they are. And the more you notice them and nourish them, the stronger they become. (Hallowell & Jensen, 2008, p. 43)

Many of these clinicians see this purported high creativity as a boon for strengths-based therapy—providing patients with increased self-esteem and hope (Hallowell & Jensen 2008;

Hallowell & Ratey, 2006; Jensen, et al.,1997). Hallowell and Jensen framed creativity as one of several positive "mirror" traits of ADHD's negative diagnostic traits. While acknowledging the sometimes severely disabling aspects of ADHD, they argued:

> This is not spin control. It is the start of unwrapping the gifts that the deficit-based model tends to keep forever wrapped…The more you can reframe your child's symptoms in terms of the mirror trait, the more accurate you'll be in describing the totality of your child, rather than just the problematic part. The deficit-based model ignores strengths. This can be disastrous. Ignoring strengths tend to extinguish them or at best not develop them. (Hallowell & Jensen, 2008, p. 81)

There has also been a related concern since the 1970s that diagnosing highly creative people with ADHD and the ensuing treatment may hamper an inherent creativity (e.g., Cramond, 1994; Harnett, Nelson, & Rinn, 2004; Kaufman & Sternberg, 2010; Krippner, 1977; Krippner, Silverman, Cavallo, & Healy, 1974; Shaw, 1992). This debate has also played out in the media, for example, a Wall Street Journal article entitled, *What if Einstein had taken Ritalin? ADHD's Impact on Creativity* (Zaslow, 2005), cited anecdotal evidence implying that ADHD medication could damper creative genius. It is important to note here that even on this side of the debate, the majority of clinicians and ADHD self-help books still strongly support treatment for ADHD, including the potential use of medication in certain cases.

A related sociological debate has gone on among researchers and scientists. For example, *The British Journal of Psychiatry* published a for/against debate on questions such as, "Are differences in the rate of ADHD a reflection of changes in its incidence or in society's tolerance for behaviour that does not conform?" (Timimi & Taylor, 2004, p.8). Peter Jensen, a clinician and chief research scientist at the U.S. National Institute of Mental Health, lead a paper along with several other prominent scientists (Jensen et al., 1997) proposing that we bring an evolutionary biology perspective to ADHD (this is also proposed by Hartmann's book above).

While allowing for a certain percentage of ADHD to be due to brain injury, genetic abnormalities, or psychological trauma such as child abuse, for example—they theorized that because such a large percent of humanity falls under ADHD's diagnostic criteria (3-5%), there may be another factor to consider to explain the remaining cases. They propose that it could be a mismatch between the hunter-gatherer environment in which our brains evolved for most of our species' history and our current environment. They cite modern schools as one example, where the model of sitting children together to focus for an extended time goes back only a few centuries. They argue that although having such a significant percentage of our species possess traits such as extreme novelty-seeking does not seem to fit our modern workplaces and educational environments—it may have been beneficial to our species for problem solving in a pre-agricultural, pre-classroom environment.

Creative Despite ADHD

The other side of this debate contends that if some people with ADHD happen to be highly creative, it is despite their ADHD. These ADHD research scientists and clinicians oppose the notion that people with ADHD are inherently more creative for several reasons. The first is that there simply is not enough empirical evidence yet to strongly support such claims. The most outspoken critic to the idea that ADHD might confer any potential advantages—including higher creativity—has been Russell Barkley, a psychiatry and pediatrics professor at University of South Carolina, Charleston, who is widely considered one of the world's pre-eminent ADHD researchers. Here he argued in a *New York Times* article:

> This trend of making A.D.D. seem an advantage is highly detrimental. In hundreds of research studies, there is not one shred of evidence that confers anyone with A.D.D. with an increased ability in creativity, intelligence or motor skills. I categorically reject, among

> other myths, that people with A.D.D. are better, for example, at multitasking. I understand that this may be an effort to counter a history of low self-esteem among people trying to cope with the effects of A.D.D., but this sort of folk lore is a dangerous thing. (Garfinkel, 2000)

A second argument against such claims is that the perception that people with ADHD are more creative may be due to a referral bias in the cases that some clinicians observe. Goldstein and Ellison (2002) argued that clinicians who might for example take only cash-paying patients, "will more likely develop a clientele of highly educated and affluent adults with ADHD. Studies based on this sample might conclude that adults with ADHD are more intelligent, entrepreneurial, creative, and successful than the average person" (p. 47). Barkley also argued this point with his colleagues Murphy and Fischer, pointing here to the claims made in ADHD self-help books:

> [F]or all their good intentions, much of what is contained in most of these books is based solely on clinical experience with self-referred adults, often seen in specialty practices and garnered without the benefit of scientific methods. Many of the assertions, especially those made in the popular trade books, about the nature of clinic-referred adults diagnosed with ADHD have not been put to the empirical test of controlled scientific research. For instance, some authors claim that adults with ADHD are more intelligent, more creative, more "lateral" in their thinking, more optimistic, more entrepreneurial, and better able to handle crises than those without the disorder. Similar advocates of adult ADHD have gone so far as to assert that the disorder conveys some positive benefit. To our knowledge, none of these claims have any scientific support at this time. … This is not to say that adults with ADHD do not have positive attributes; they certainly do. Rather, such attributes likely have nothing to do with their disorder.
> (Barkley, Murphy, & Fischer, 2008, pp.1-2)

A third argument against such claims is the concern that if people believe that ADHD comes with any advantages such as creativity, adults who suffer from it and the parents of ADHD children may avoid treatment for fear it will suppress such advantages. Tuckman (2009) explained, "touting ADHD's positive qualities…undermines the need for treatment—after all,

why should we treat something that brings all these benefits? Wouldn't that risk losing the good with the bad?" (p. 223). And there is also a fear that this can lead people to underestimate the often devastating effects of ADHD including academic failure, auto accidents, depression, divorce, job loss, substance abuse, and even suicide (Barkley, Murphy, & Fischer, 2008; Brown, 2005; Hinshaw et al. 2012).

Finally, there is also concern that if the public believes that people with ADHD have an inherent creative advantage, it may discourage societal support for therapeutic research funding, as well as legislation for the academic and occupational accommodations that ADHD children and adults often need. Here, again Tuckman (2009) explained:

> …a lot of people have worked really hard to gain legal protections and accommodations in school and at work for folks with ADHD. To talk about the positive qualities gives ammunition to the critics who would like to remove those protections. After all, why should we spend extra money and force teachers and employers to go out of their way for these blessed individuals? It also hurts researchers who are fighting for precious grant funding. (p. 223)

Now that we have delved into the heated public debate, we turn our attention to what the research on creativity among people with ADHD has actually revealed so far. What sometimes gets lost in this debate is simply how little scientific research has been conducted to come to a strong conclusion for either side of the argument.

Empirical ADHD-Creativity Studies

Only over a dozen small studies have been conducted in the last few decades to directly assess creativity in the ADHD population. The first were motivated by a concern that creativity was being misdiagnosed as disorder among gifted children. Even before the current DSM

diagnostic criteria of ADHD (when similar behaviors were sometimes called *hyperkinetic reaction of childhood*, or *hyperkinesis*), a few small studies were conducted, including on gifted children who had been advised to take stimulant medication (e.g., Krippner, 1977; Krippner, Silverman, Cavallo, & Healy, 1974). Below are research approaches that have been taken to assess creativity after it came to be known as ADD/ADHD.

Real-life Creative Achievement Approach

As mentioned in Chapter One, only recently has this approach been taken to assess creativity among people with ADHD by White and Shah (2011). So far their study seems to make one of the strongest empirical cases for higher levels of creativity. This was conducted among 30 ADHD undergraduate university students with 30 matched controls using Carson, Peterson, and Higgins' (2005) Creative Achievement Questionnaire (CAQ). This is a real-world creativity assessment that is based on self-reports of creative achievements in 10 domains (such as creative writing, scientific discovery, musical composition, etc.), and the degree of recognition their products have received from local to national levels. They found that ADHD students reported overall greater creative achievement than the non-ADHD students.

Style Assessment Approach

White and Shah's (2011) study above also included a style assessment approach by using the FourSight assessment that was used also in the present study. As was described in more detail in Chapter One, they found higher FourSight Ideator preferences, and lower Clarifier and Developer preferences among 30 ADHD university students compared to 30 matched non-ADHD controls.

Another study by a team at Stanford (Simeonova, Chang, Strong, & Ketter, 2005) used the *Barron-Welch Art Scale*. This classic creativity assessment is based on findings that when people are shown various figures, the more creative they are, the more they tend to prefer more complex asymmetrical figures, and the less they tend to prefer simple symmetrical figures. This study was originally intended to assess creativity in Bipolar Disorder (BD) families (whose children are sometimes found to have ADHD as a precursor to BD), but this assessment also found higher preference for complexity and asymmetry among the 20 children of the study who only had ADHD (and even higher preferences among those with BD) compared to healthy control children.

Finally, in a dissertation study of 54 ADHD adults, Alt (1999) used the Myers Briggs Type Indicator (MBTI), which assesses how respondents make decisions and interact with the world. The MBTI is often considered a multi-dimensional assessment, consisting of four style assessments that together make up a kind of personality type (Zhang & Sternberg, 2005). The classic IPAR studies of the highly creative had found a significant positive correlation between levels of creativity and preferences for *perception* (preferring situations and environments that are more open-ended, spontaneous and flexible over those that are more structured) and even more for *intuition* (preferring the abstract general meaning of information patterns over more concrete detailed information gathered from the five senses) (Myers & McCaulley, 1985; Thorne & Gough, 1991, as cited in Alt, 1999; see also MacKinnon, 1965). Alt found significantly higher preferences for *perception* and *intuition* among the ADHD adults compared to controls. Interestingly, studies have also positively associated these two MBTI preferences with the FourSight Ideator preference (see Puccio, 2002a), and the KAI Innovator preference (see Isaksen, Lauer, & Wilson, 2003).

Divergent Thinking (DT) Assessment Approach

Now we move on to review the approach most ADHD-creativity studies have relied on so far: divergent thinking tests. As explained in Chapter One, divergent thinking (DT) tests commonly ask participants to generate as many ideas or solutions as they can in response to open-ended questions under a two- to five-minute time limit (such as finding alternative uses for common household objects) or to come up with as many solutions as they can to a given problem. Participants respond either through the written word (verbal) or by drawing figures (figural). The number of ideas generated, originality of responses, and flexibility of perspective usually determines the level of divergent thinking.

As we examine these DT studies in the following paragraphs, it is good to remember that these tests are "at best measures of a skill or set of skills—divergent-thinking skills—that although theoretically linked to creativity are nonetheless, *at most, just one aspect of creativity, and therefore not actually a measure of creativity itself*" (Baer, 2010, p. 325; emphasis added). One problematic inaccuracy among some of these ADHD studies is that many of the DT results seem to be discussed in a way that could make them seem like assessments of creativity rather than simply DT. It is easy to see how this might be contributing to the confusion in the public debates, particularly whenever these studies are picked up and simplified by the media. Runco (2010) puts this issue in perspective here:

> The importance of DT is implied by the amount of research that has been devoted to it over the years and by the large number of practical applications of the research. Indeed, DT applies to education, organizations, and even the natural environment (everyday creativity) as well as anything in the field of creative studies. There are misunderstandings, the most notable that tests of DT measure creativity, which they do not. It is important to refute such misunderstandings… (p. 413)

Figural DT

Using DT tests, Shaw and Brown conducted studies in the early 1990s (Shaw, 1992; Shaw & Brown, 1990, 1991) on high-IQ children who showed ADHD-like traits, but who were not officially diagnosed. These small samples were found to have higher figural divergent thinking than their high-IQ counterparts who did not have ADHD-like traits.

One of the earliest studies to find higher levels of divergent thinking among normal IQ children under a clinical diagnosis of ADHD was conducted by Cramond (1994). In addition to finding elevated ADHD characteristics among 76 already-identified highly creative children, she found high scores among 34 ADHD-diagnosed children on figural divergent thinking using the classic Torrance Test of Creative Thinking (TTCT). Almost one-third of the 34 ADHD children even scored above the 90th percentile—high enough to qualify for a gifted program.

A year previously, however, Funk et al. (1993), while examining the effects of Methylphenidate (Ritalin) on divergent thinking among 19 ADHD boys had found no differences on the same DT test compared to non-ADHD controls (and that Methylphenidate had no effect on divergent thinking). (In fact, a previous medication study of 19 ADHD children by Solanto and Wender [1989] suggested that when they took Methylphenidate, it improved their baseline DT scores [using the Wallach-Kogan test]. This finding was replicated with 17 ADHD children on much higher doses of Methylphenidate [Douglas, Barr, Desilets, & Sherman, 1995] on a 3-minute DT test [Alternate Uses test]).

Others conducted figural divergent thinking studies similar to Cramond's but could not replicate her findings. Healey and Rucklidge (2005; also reported in 2008), conducted a study on 33 ADHD children, and did not find higher figural DT scores than controls, and White and

Shah's study cited above (2011) also did not find higher figural DT among 30 ADHD college students compared to controls. Other pilot studies using even smaller sample sizes (ranging from 8 to 25 participants), and less well validated DT tests, also did not find higher figural divergent thinking (e.g., Abraham, Windmann, Siefen, Daum, & Guntürkün, 2006; Barkely, Murphy, & Kwasnik, 1996; Swartwood, Swartwood, & Farrell, 2003).

Verbal DT

On verbal divergent thinking tests, Barkely, Murphy, and Kwasnik (1996) also did not find any differences among 25 ADHD young adults compared to controls on a two-minute DT test they created for their study. Abraham et al. (2006) found the same results among 11 ADHD children compared to controls using Wallace & Kogan's 1965 Alternate Uses test. However, on a more robustly validated DT test (TTCT), White and Shah (2006) found higher verbal divergent thinking scores among 45 ADHD college students compared to controls. They replicated their findings in their recent study among 30 university students matched against controls (White & Shah, 2011).

Contradictory findings and divergent thinking testing issues

It is hard to know what accounts for these mixed DT results—and more replication studies may clear these discrepancies—but there are a few issues to consider regarding DT testing as ADHD-creativity research moves slowly forward, while principally using DT tests. First, it is important to consider that the legitimacy of using DT tests as measures of creativity has long been a big issue of serious debate (e.g., see Plucker, 1999; Silvia, Winterstein, & Willse, 2008). Divergent thinking is now generally accepted by most creativity scholars as an

important area of assessment that is strongly related to original thinking, or at the very least, provides useful information, but when used in tandem with other creativity assessments (Kaufman, Plucker & Baer, 2008; Runco, 2010)—not as stand-alone assessments. And there remain many unresolved issues. For example, these tests may be attempting to assess a general creative ability but might not detect domain-specific abilities such as musical creativity (Baer, 2010; Kaufman & Sternberg, 2010). Other criticisms against DT tests (often from Big-C / eminent creativity researchers) include Policastro and Gardner's (1999) argument here, commenting on psychometric creativity tests in general:

> While these measures are sufficiently reliable, their validity has never been adequately accepted, particularly once one transcends the "cocktail party" variety of creative production. Indeed, not only do high scorers fail to distinguish themselves in creations that society prizes, but the very "core" abilities that have been captured in the tests seem remote from the lengthy development of skills, and the risk-taking stance, that emerges from the study of lives of highly creative individuals. (p. 213)

This brings us to another issue from other eminent creativity scholars such as Howard Gruber, who even assert that from a top-down perspective, the most highly creative people rarely use divergent thinking in their creativity (Gruber & Wallace, 1999). He maintained with Wallace that "it is not self-evident how the ability to produce many ideas is related to the ability to produce a few superb ones" and said that we need to ask, "how does the creative person at work go about making use of the ability to produce ideas?" (p. 95). This is very important to keep in mind because the similarities, differences, and potential overlaps between the cognitive processes of the very highly creative and of people with ADHD is not yet understood (Cramond, 1994), and as discussed above, is an overlap that has been widely observed by anecdotal clinical observation and many ADHD self-help authors (e.g., Hallowell & Ratey, 1994). So even if high creativity is not manifested, it is theoretically possible that many people with ADHD share

cognitive mechanisms with the eminently creative, and this may include the propensity that Gruber and Wallace observed—to not necessarily use much DT thinking in their creative endeavors. Or they may simply not be intrinsically motivated enough to focus and diverge on a creativity assessment problem they do not care about. As Helson (1999b) pointed out:

> Many studies have identified young people as creative according to criterion of divergent thinking or high scores on inventory or projective measures of originality. However, eminent creative individuals do not necessarily do well on measures of originality that are used to study creativity in students. They may resist or resent devoting their abilities to artificial tasks, such as thinking of unusual uses for objects. Also, these individuals, perhaps even more than students, show specialization. (p. 367)

Another big issue is that DT test administration methods have been found to greatly influence scores (Davis, 1999b; Kim, 2006; Kim, Cramond, & Vantassel-Baska, 2010; Plucker & Makel, 2010; Runco, 2010; Wallach & Kogan, 1965). For example, if they are administered in a test-like manner rather than playfully, or are administered by a researcher not properly trained in DT test administration—something that was not indicated in most of these ADHD-creativity studies—this could lower scores and account for discrepancies in the results.

A final issue, also related to test administration, is that it has been found that timed tests—as all of these were—produce less creative responses (Plucker & Makel, 2010; Wallach & Kogan, 1965). Batey and Furnham (2006) hypothesized that this timing constraint may be a reason for discrepancies in DT tests results among people with disorders in general: "Creativity tests are usually timed (especially DT tests). Under these conditions, neural efficiency contributes to an increase in DT performance" (p. 381). This is especially salient given the fact that neural efficiency is a potential problem in ADHD (Sikström & Söderland, 2007), and that for similar reasons, one of the main academic accommodations given to ADHD students is to allow more time to take tests at school. Thus it is possible that current DT test administration

procedures would have to be modified for the ADHD population to be at least as valid as for the normal population.

Finally, this touches another point of debate against DT testing even for the normal population. Kagan (2008) argued, after citing six characteristics that Simonton had described as important for coming up with many new ideas and variations, that:

> None of the six cited speed or efficiency of thought presumed necessary to 'be creative' within a 3-minute time span. Therein lays the gulf between DT performance under time-limiting conditions, and the thought processes presumed to underlie real-world creativity. The latter take place over lengthy stretches of time, and generally involve an incubation period in which initially unrelated associations or images come together to solve a creative problem. (p. 101)

Dietrich (2007) cites similar concerns that are even more salient given the nature of ADHD:

> On the one hand, creative insights are associated in the minds of many researchers, to say nothing of the general public, with sudden realizations that occur—mystically, almost—in a state of *aimless daydreaming* [emphasis added]. Indeed, anecdotal reports abound that describe the creative process as automatic and *without attentional effort* [emphasis added]. From Kekule's daydream of whirling snakes forming a (benzene) ring to Coleridge's poem Kublai Khan, among rather many other examples, such flashes of insight are the very cliché of creative genius. Yet, ironically, nearly all psychometric tests of creativity demand of the participant the opposite, the intentional focus on the task item at hand. (p. 26)

Theoretical Parallels Between ADHD and Creativity

Most of the theoretical parallels between highly creative people and people with ADHD that have been observed and discussed have been about personality, as has been discussed throughout the first two chapters. Apart from this, there has been almost no empirical research that has *directly* compared, within the same study, the following theoretical parallels between the

two populations.

Wide Attention and Decreased Latent Inhibition

Highly creative people have been found to have a wide attention or an over-inclusive mode of thinking that absorbs relatively higher amounts of surrounding information (information that could be considered irrelevant to less creative people) (Eysenck, 1993; Kaufman & Sternberg, 2010). Recent experiments have begun to suggest that attention-broadening training significantly increases creative behavior (Memmert, 2007). Breadth of attention is usually measured through tests of latent inhibition, which is a healthy brain's capacity to keep irrelevant stimuli out of conscious awareness, preventing information overload (Carson, Peterson, & Higgins, 2003; Healey & Rucklidge, 2005). This allows one's attention to remain focused on elements relevant to a task at hand. People who are more creative have been found to have a decrease in latent inhibition compared to less creative people (Carson, Peterson, & Higgins, 2003). It is thought that this allows more information to be considered for recombination during the formation of new ideas—leading to higher rates of original ideas, and making creativity more statistically likely. This also seems to allow one to not be as constrained by previous cognitive structures when generating new ideas. Psychologists such as Hans Eysenck and Colin Martindale have even described creativity as a cognitive and behavioral disinhibition syndrome (Martindale, 1999). It has been thought that a similarly decreased latent inhibition or widened attention could help account for the distraction from internal and external stimuli associated with ADHD, and to the lowered behavioral inhibitions associated with impulsive ADHD behaviors (Carson, Peterson, & Higgins, 2003; Hallowell & Ratey, 1994).

Under-arousal and Novelty Seeking

Decreased latent inhibition has been associated with under-arousal, characterized by decreased activity in the brain's frontal lobe, which has also been found both in ADHD (Diamond, 2005) and in highly creative individuals (Reuter, et al., 2005). This under-arousal has been theorized to be behind the motivation of both populations to seek novelty (e.g., Hallowell & Ratey, 1994; Martindale, 1999)—which is a form of sensation-seeking that stimulates dopamine reward pathways and 'awakens' the frontal lobe. (This propensity could theoretically be related to the high rates of addiction found among both populations.) The highly creative have also been observed to sometimes have an addiction-like obsessive relationship to creative endeavors with long periods of perseveration (Eysenck, 1993; Hallowell & Ratey, 1994; Subramaniam, 2009). In ADHD, perseveration is also common—however, it is often seen as a maladaptive repetition of certain inappropriate behaviors or cognitive patterns by ADHD researchers (Barkley, 1997; Hallowell & Ratey, 1994). However, some ADHD clinicians see this as a kind of *hyperfocusing* ability that can indeed be troublesome, but also beneficial at times, as mentioned in Chapter One (e.g., Hallowell & Ratey, 1994).

Atypical Brain Asymmetry

Both the highly creative (Runco, 2007) and those with ADHD (Castellanos, 1997) have been shown to be atypical in their brain asymmetry (also called lateralization). This refers to the specialization of the right and left hemispheres of the brain and how they interact during certain modes of thinking. This is loosely related to popular lay notions of 'right-brained thinking'—associated with creative, holistic, fantasy-based thinking, versus 'left-brained thinking'—associated with logical, analytic and sequential thinking. Popular literature often associates both

ADHD and creativity to 'right-brained thinking,' though research is not yet clear on how their asymmetries might compare. Increased right hemisphere activity has sometimes been found among those who are good at generating new ideas—however creativity is more complex than this, involving interactions between both hemispheres of the brain at various stages of the creative thinking process (see Kaufman et al., 2010).

Entrepreneurial Temperament

Although this is closely related to personality, this merits its own section here because it is common to read in the popular ADHD self-help literature and in the press that many people with ADHD are inherently 'wired' for entrepreneurship (e.g., Beck, 2010; Garfinkel, 2000; Underwood, 2005). Not only has some of the literature noted that many of the most successful entrepreneurs seem to have ADHD, but it is even sometimes implied that entrepreneurship could be a good career choice for some people with ADHD. For example, clinician Kevin Murphy (1995) stated in his self-help book on adult ADHD treatment options, "entrepreneurship—owning one's own business—appeals to many adults with ADD who chafe against other people's rules and regulations" (p. 267). Although entrepreneurship (in the sense of starting an original and effective business) is only one domain of creativity—it has been one of the specific creative domains that seems to have been most talked about in the popular ADHD literature.

Some of the characteristics of ADHD that are commonly mentioned in this literature as providing an advantage for entrepreneurship—but that are not in official diagnostic manuals—are: curiosity, big-picture thinking, high energy, intuitiveness, an ability to generate ideas, a propensity for risk-taking, and an increased sensitivity to the environment and thus a higher ability to detect opportunities (e.g., Murphy, 1995).

One study provides interesting empirical evidence in this area. A team lead by Mannuzza (1993) conducted a 20-year longitudinal study of 91 ADHD boys. In addition to higher rates of substance abuse and criminality than controls, a higher percentage (18%) had started their own businesses than non-ADHD controls (5%). Also a 2008 dissertation on entrepreneurial cognition and opportunity recognition among entrepreneurs (Nixdorff, 2008) unintentionally found that at least 10% of the entrepreneurs studied had been diagnosed with ADHD, and even more exhibited ADHD characteristics, and suggested this as another area of research. Future studies could assess if this truly suggests a propensity for entrepreneurship success among those with ADHD, or if it is because ADHD adults are more likely to start their own businesses because they have trouble holding down a more conventional job that requires complying with expectations set by employers (or some combination).

Summary

To provide context, this chapter laid out the current public debates about ADHD and creativity that continue to influence the research and public understanding of the subject. Then there was a review of the small body of scientific studies that have been conducted. Finally, this chapter concluded with the theoretical parallels between ADHD and creativity that have not yet been empirically investigated.

Chapter Three: Methods and Procedures

Introduction

This chapter describes how the study was conducted, including how the 49 ADHD adults of this study were recruited, what materials were used, and how they were administered. Then the participant sample is described. Finally the study design and analysis approach is explained.

Procedure

Recruitment

Canada

A national Canadian ADHD advocacy and support organization was contacted and agreed to advertise the study via mass electronic mailings (see Appendix A). This mailing led to the study being also advertised on the website of another national Canadian ADHD support organization's website. On this website and in the mailings, the study was described and included eligibility requirements, which were: (1) a clinical ADHD diagnosis, and (2) being at least 18 years of age. Volunteers were instructed to indicate their interest to the researcher via electronic mail and to provide a postal address so that a research packet could be mailed to them. In exchange for volunteering, participants were offered to later receive personalized questionnaire feedback. Organizers of an Adult ADHD support group in the Toronto area were also contacted, and they allowed the researcher to distribute surveys at the tail end of a support group meeting in Toronto, held in a community meeting room at a health facility.

United States

Organizers of an Adult ADHD support group in Northern Virginia were contacted and agreed to advertise the study via electronic mail to its members. In addition, the researcher was allowed to administer the study to volunteers on-site after ADHD support group meetings in a community meeting room in a high school in Falls Church, Virginia, and a community library in Alexandria, Virginia (both suburbs of Washington, D. C.). In exchange for volunteering, participants were offered to later receive personalized questionnaire feedback.

Research Materials and Administration

A total of 67 volunteers were given a research packet—51 of them were returned. Of the returned packets, four participants had been handed these packets on-site to take home and mail back, 12 participants completed them on-site, and 35 were mailed a packet and returned it by mail. To minimize order effect bias, each volunteer participant was given one of six different research packets. The three principal instruments were presented in six different possible configurations in the packets, each with a cover sheet indicating the order in which they were to be completed, and evenly distributed (i.e., *survey packet one order*: ACL, FourSight, KAI; *survey packet two order*: ACL, KAI, FourSight; *survey packet three order:* FourSight, ACL, KAI, etc.). The creative self-perception questions (see Appendix D) were always presented last (with a cover sheet labeled *Part 5*) to minimize any potential priming effect of directly asking a participant their level of creativity. As a further measure in case a participant were to look ahead to this section before answering the other questionnaires, the two direct questions about creativity were obscured by being preceded and followed by bogus questions unrelated to creativity. Below is the presentation of packet materials in the order they were presented:

1. *Cover Letter with Instructions*: First, a cover letter setting up timing and feedback expectations, general instructions, and thanks for participation (Appendix A).

2. *Consent Form for Researcher*: Next was a consent form approved by the university requesting signed confirmation of voluntary participation (Appendix B).

3. *Consent Form for Participant*: Copy for participant's records.

4. *Demographic Questionnaire* (with cover sheet labeled *Part 1*): asking their age, sex, occupation, department, educational status, other (for related data participants might find relevant), confirmation of ADHD diagnosis, diagnosis type, ADHD medication status, and English language proficiency (Appendix C).

5. *Adjective Check List* (or FourSight or KAI, depending on packet order, with cover sheet labeled *Part 2*): This was a paper and pencil questionnaire with a list of 300 adjectives. Instructions included to read the adjectives quickly and put an "x" in the box beside each adjective that the participant found self-descriptive.

6. *FourSight Thinking Profile* (or ACL or KAI depending on packet order, with cover sheet labeled *Part 3*): This was a 37-item Likert-scale questionnaire. For each item, participants were asked to rate how much the preference description was like them, ranging on a ten-point continuum ranging from "Not like me at all" to "Very much like me."

7. *Kirton Adaptor-Innovator Inventory* (or ACL or FourSight depending on packet order, with cover sheet labeled *Part 4*): This was a 33-item Likert-scale questionnaire. Participants were instructed to mark for each question how easy it would be for them to maintain certain behaviors over a long period of time. Each question had a seven-point range from "Very Easy" to "Very Hard."

8. *Creative Self-Perception Questions* (with cover sheet labeled *Part 5*):
As explained with more background in Chapter One, a creative self-perception self-report was created by the researcher to determine whether participants perceived themselves as highly creative and whether others perceived them to be so (Appendix D). It consisted of two target questions, preceded by three bogus questions, and followed by one bogus question, in order to reduce the priming effect the two target questions might have otherwise had as stand-alone questions. Even so, this self-report was only presented after the other assessments were completed, to further reduce the possibility of priming for creativity on the preceding assessments. The core questions were: (1) *How creative do you consider yourself to be?*, with a five-point Likert response choice ranging from "Very Creative" to "Very Uncreative," and (2) *How often have others commented on your creative abilities?*, with a four-point Likert response choice ranging from "Often" to "Not At All."

9. *Final Instructions Checklist* with the following instructions:
(1) Double-check to make sure you have answered all questions, (2) Sign the Informed Consent forms and place one in the self-addressed stamped envelope, (3) Keep one copy of the Informed Consent form, (4) Place the questionnaires (Parts 1 - 5) in the self-addressed stamped envelope, (5) Keep the pen, (6) Mail the envelope & wait for feedback within a few months (Appendix E)

10. Self-addressed stamped envelope (except for those who completed it on site).

Coding

Each research packet was assigned one code, and all materials within the packet were pre-labeled with this code except for the cover letter, the consent forms, and the final instruction checklist. When a completed packed was received, the questionnaires were separated from the envelope containing the address and signed consent form of the participant. The researcher kept records of which code corresponded to which participant until the debriefing materials and questionnaire feedback was mailed back to the participant.

Deception

To minimize response bias, it was not revealed until after all research packets were returned that this was a study of creativity. This was particularly important for the ACL because Ironson and Davis (1979) found that it is possible to "fake creative" scores on this assessment. All references to creativity were omitted during recruitment and administration of the assessments, including the fact that this study was based out of the Creative Studies department. The principal assessments were not believed to seem like obvious assessments of creativity to a participant. Participants were simply informed that the study was designed to examine the cognitive style and personality of Adult ADHD.

Debrief

Participants were debriefed by mail. Debrief included disclosure that creativity was being measured and why they were not told of this, their personal profile results for the KAI and the FourSight. Individual ACL results were withheld because it was believed that low scores on scales associated with creativity could cause distress for a participant. Instead they were presented with the aggregated scores of all participants on the ACL (along with aggregated FourSight and KAI scores).

Sample Description

Sample Size and Ages

This was a sample of 49 North American adults (30 from Canada; 19 from the United States) who reported having been clinically diagnosed with ADHD. The sample consisted of 33 women and 16 men. They were between the ages of 21 and 79, with an average age of 44 years and a median age of 45 years. Two participants did not provide exact age but confirmed on the consent form that they were at least 18 years of age.

ADHD Diagnosis and Subtype

Although an ADHD diagnosis was the condition for participating in the study, and this was repeated in the consent form, a confirmation question was included in the research packet demographic questionnaire. Of the 51 people who returned their packets, 49 confirmed that they

had been clinically diagnosed with ADHD. However, the remaining two indicated that they had not yet received a clinical diagnosis; therefore their packets were not included in the analysis. In addition, ADHD subtype diagnosis was also asked and responses were:

- 5 Predominantly Hyperactive-Impulsive
- 19 Predominantly Inattentive
- 20 Combined (both Inattentive and Hyperactive-Impulsive)
- 5 Unspecified Subtype (either not specified by their clinician, or participant could not remember which subtype)

ADHD Medication Status

Of the 49 confirmed ADHD participants, 44 had been prescribed and taken ADHD medication at some point in their lives, and 33 were on prescription ADHD medication while completing the questionnaire.

Educational Background

Among the responses were seven master's degrees, three law degrees, and two PhDs:

- 29 had completed university
- 12 had not either not pursued, or not completed university education (among these, some indicated that they had not completed high school)
- 4 were university students
- 4 did not answer or did not answer clearly enough to confirm educational background

Occupational Background

The following table is a partial list of represented occupations:

Table 2 - Partial List of Represented Participant Occupations

Accountant	Entrepreneur	Part-time Librarian/Student
Account Executive	Event Planner	Real Estate Developer
Accounts Payable/Cust. Service	Farm Owner/ Operator	Research Physicist
Aerospace Engineer	Finance	Retired Teacher/Artist
Affiliate Professor	Graphic Designer	Sales Representative
Clerical Administrative Support	Homemaker	Senior Civil Rights Policy Advisor
Coach for Underachieving Teens	Human Resources Administrator	Senior Executive Analyst
Computer Architect/Info. Sharing	IT Network and Security Engineer	Sentencing Advocate
Database Administrator/Analyst	Marketing & Communications	Speech-Language Pathologist
Dental Hygienist	Ordained Minister/ Social Worker	Student
Engineer/Life Coach	Office Manager/ Salesperson	Unemployed

English Comprehension

Because the questionnaires were heavily dependent on vocabulary comprehension, level of English proficiency was asked. All but two participants reported native-English comprehension. One of these participants completed the packet on-site and confirmed to the researcher that she was proficient even though English was not her native language. The other non-native speaker completed it via mail and reported having a bachelor's degree in English. Therefore both of these packets were included in the analysis.

Design and Analysis

This was principally a comparative research study comparing the assessment results of ADHD adults to the norms of the non-ADHD population or other sample populations from assessment manuals and other published studies for the three principal instruments: the ACL, KAI and the FourSight. The short creative self-perception question set created for this study was only limited to descriptive analysis (no non-ADHD comparison data available). Further analysis was done to search for any potential significant correlations between assessment results and sub-variables provided by participants such as ADHD subtype, medication status, sex, and level of education.

Summary

This chapter described how the study was conducted. It included recruitment methods, materials used, and their administration. This was followed by a description of the participant sample. Finally the study design and analysis approach was explained. The following chapter presents the research results.

Chapter Four: Results

Introduction

This chapter presents the assessment results of the 49 ADHD adult participants on the *Kirton Adaption-Innovation Inventory* (KAI), the *FourSight Thinking Profile*, and the *Adjective Check List* (ACL) on three scoring keys: (1) Domino's Creativity Scale, (2) Gough's Creative Personality Scale and, (3) the Change Scale. Non-ADHD and general population sample results from assessment manuals and a few other published studies are listed after each assessment for comparison. Finally, creative self-perception results are presented, followed by graphic representations of the relationship between participants' creative self-perceptions and the three principal assessments. Table 3 presents an overview of the general results of the three principal assessments.

Results

Below are the general results of the three principal assessments for the 49 ADHD adults.

Table 3
Mean and Standard Deviation of Main Variables for ADHD Adults

Variable	N	Mean	SD	Min.	Max.
Descriptive					
Age	47*	44.28	12.51	21	79
Adjective Check List					
Domino Creativity Scale	49	55.37	9.99	33	83
Gough Creative Personality Scale	49	52.02	9.78	24	67
Change Scale	49	57.84	10.44	35	73
FourSight					
Clarifier	49	29.84	8.26	13	44
Ideator	49	35.14	6.42	17	45
Developer	49	28.04	8.62	11	45
Implementer	49	27.98	5.89	17	40
Kirton Adaption-Innovation Inventory					
Originality (SO)	49	46.47	8.91	29	62
Efficiency (EFF)	49	26.12	5.81	16	35
Conformity (RGC)	49	43.00	8.22	23	57
KAI Total	49	115.71	18.02	79	149

** Two participants did not provide age*

Kirton Adaptor-Innovator Inventory (KAI) Results

The KAI yielded the most substantial results, with the ADHD participant group scoring a mean KAI total of 115.71 (*SD*=18.02), which is over one standard deviation higher in KAI Innovation than the average non-ADHD population mean of 94.99 (*SD*=17.90). This indicates a greater preference for the ADHD group for 'doing things differently' by stretching and breaking paradigms, rules, and established systems—and a lower preference for 'doing things better' by efficiently using existing paradigms and systems.

KAI scores of the ADHD group were compared to the mean and standard deviation values reported in the KAI Manual (Kirton, 1999b) for the general population on KAI total score, and the *Originality* (or Sufficiency of Originality [SO]), *Efficiency* (EFF), and *Conformity* (or Rule/Group Conformity [RGC]) scales. Independent samples t-tests indicated that the ADHD group had significantly higher KAI scores than the non-ADHD group on KAI total score ($t(609)= 7.77$, $p < .001$, $d=. 63$), and the *Originality* ($t(609)= 4.30$, $p < .001$, $d= .35$), *Efficiency* ($t(609)= 8.74$, $p < .001$, $d= .71$) and *Conformity* scales ($t(609)= 5.99$, $p < .001$, $d= .49$).

The KAI subscales (see also Table 3 and Table 4) are to be interpreted as follows: the higher the *Originality* score, the higher one's preference for generating many original, unique, or unusual ideas to solve problems. This preference for *Originality* was significantly higher for the ADHD group. Take careful note that the score interpretation is inverted for the other two subscales: the higher the *Efficiency* score, the *lower* one's preference for *Efficiency*. Likewise, the higher the *Conformity* score, the *lower* one's preference for *Conformity*. Therefore, the significantly higher *Efficiency* result of the ADHD group indicates they have a *lower* preference for efficient, methodical, detailed, and prudent uses of the current system and precedent to solve problems. With this comes a tendency to disregard prevailing systems and details, detach

problems from their context, and to break paradigms in order to solve problems. The significantly higher *Conformity* result of the ADHD group indicates they have a significantly *lower* preference for conforming to established rules and group consensus. With this comes a tendency to break rules, tradition, and approved custom (and people who are significantly less KAI Innovator are likely to perceive people with this style as being abrasive, undependable, and challenging consensus unnecessarily).

When the analyses were repeated for the predominantly inattentive ADHD and combined-type ADHD (inattentive and hyperactive-impulsive), significantly higher values were found among predominantly inattentive type on the KAI total ($t(579)= 3.13$, $p < .001$, $d= .26$), *Efficiency* ($t(579)= 4.38$, $p < .001$, $d= .36$), and *Conformity* scales ($t(579)= 2.71$, $p < .001$, $d= .22$), but not on *Originality* ($t(579)= 3.13$, $p = .42$, $d= .07$). For the combined type, significantly higher values were found on the KAI total ($t(580)= 7.25$, $p < .001$, $d= .69$), *Originality* ($t(579)= 4.67$, $p < .001$, $d= .39$), *Efficiency* ($t(579)= 7.15$, $p < .001$, $d= .59$), and *Conformity* ($t(580)= 5.61$, $p < .001$, $d= .47$) scales.

Subsequent analysis in Table 4 shows the breakdown of results for the subsamples in the present data set. Figure 2 presents a bar graph KAI score histogram distribution of the entire ADHD group sample (n=49) against a figurative Gaussian bell-curve distribution line of non-ADHD general population scores. Figure 3 presents a bar graph histogram distribution of just the combined-type ADHD participants (n=20) against a figurative bell-curve distribution line of non-ADHD general population scores. This illustrates how the combined-type ADHD participants had a score mean that was an almost 30-point gap from the average population. According to Kirton (2003), 10 points is the ‘just noticeable difference’ and a difference above 20 points often predicts serious communication breakdowns.

Table 4 - Kirton Adaption-Innovation Inventory (KAI) Mean Score Results

Variable	N	Orig.	SD	Effic.*	SD	Conf.*	SD	TOTAL	SD
ADHD Group									
ADHD Group Total	**49**	**46.47**	**8.91**	**26.12**	**5.81**	**43.00**	**8.23**	**115.71**	**18.02**
Predominantly Hyperactive-Impulsive Type	5	43.60	8.20	25.40	5.86	40.80	6.14	109.80	4.44
Predominantly Inattentive Type	19	42.47	9.92	24.53	5.96	40.79	8.35	108.11	20.22
Combined Type	20	50.15	6.44	27.90	5.41	46.25	7.02	124.30	12.96
Subtype Unspecified	5	49.80	8.73	25.80	6.53	40.60	11.63	116.20	23.45
Male	16	46.88	6.24	25.31	5.75	41.69	9.23	114.25	16.95
Female	33	46.27	10.03	26.52	5.88	43.64	7.75	116.42	18.73
Taking ADHD Medication	33	47.52	9.22	25.15	5.76	42.82	7.63	115.48	17.46
Not Taking ADHD Medication	16	44.31	8.08	28.12	5.55	43.38	9.57	116.19	19.71
University Completed**	29	47.86	9.22	27.55	5.65	44.03	8.10	119.45	17.68
University Not Completed	12	45.25	9.71	23.92	5.76	42.83	8.18	112.00	19.09
Attending University	4	44.75	5.19	25.50	3.51	39.75	7.23	110.00	10.65
Non-ADHD Comparisons									
Approximate General Population Means[a]									
UK, USA, Canada, France, Holland, Italy	**562**	**40.78**	**8.89**	**18.82**	**5.59**	**35.39**	**8.56**	**94.99**	**17.90**
Examples of Differences by Occupation[b]									
Bank Branch Managers, Programmers	-	-	-	-	-	-	-	80-90	-
Secretaries, Nurses	-	-	-	-	-	-	-	91-92	-
Teachers	-	-	-	-	-	-	-	93-97	-
R&D Managers	-	-	-	-	-	-	-	101-103	-
Marketing, Finance, Fashion Buyers	-	-	-	-	-	-	-	104-110	-
Other Published Result Samples									
Secondary School Science Teachers, UK[c]	46	-	-	-	-	-	-	91.87	17.25
Physicians (General Practitioners), UK[d]	180	-	-	-	-	-	-	91.90	16.10
Grad./Undergrad. in Teacher Training, US[e]	62	42.37	6.71	17.21	4.19	34.88	8.45	94.63	15.04
Business Employees, US[f]	79	44.88	5.37	17.06	4.83	34.66	7.06	96.14	12.71
Secondary School Art Teachers, UK[c]	53	-	-	-	-	-	-	97.32	19.17
Undergrad. Diverse Majors, US[g]	184	-	-	-	-	-	-	100.02	14.23
Undergrad. Business Students, UK[h]	96	44.88	5.75	18.85	3.81	37.33	6.04	100.37	11.88
Business Owners, US[f]	54	49.06	4.91	18.19	5.89	37.55	7.52	104.82	11.86
Entrepreneurs, US[i]	165	-	-	-	-	-	-	113.90	13.20

*Contrary to the *Originality* subscale, a higher number for *Efficiency* and *Conformity* indicates lower preference.
**Four participants (M=105.50, Orig. SD=6.70, Effic. SD=7.39, Conf. SD=11.23, Total SD=21.30) did not provide education level.
- = information not available.
a. Kirton (1999b). Kirton Adaption-Innovation Inventory (KAI) Manual.
b. Kirton (1999a). KAI Feedback Booklet: "each from studies based on hundreds of people" (p.5).
c. Kirton, Bailey, & Glendinning (1991).
d. Salisbury, Bosqnauet, Wilkinson, Bosanquet, & Hasler (1998).
e. Houtz, Selby, Esquivel, Okoye, Peters, & Treffinger (2003).
f. Engle, Mah, & Sadri (1997).
g. Isaksen & Puccio (1988).
h. Goldsmith (1987).
i. Buttner & Gryskiewicz (1993).

Figure 2 - ADHD KAI Score Histogram Distribution Against General Population KAI Score Distribution

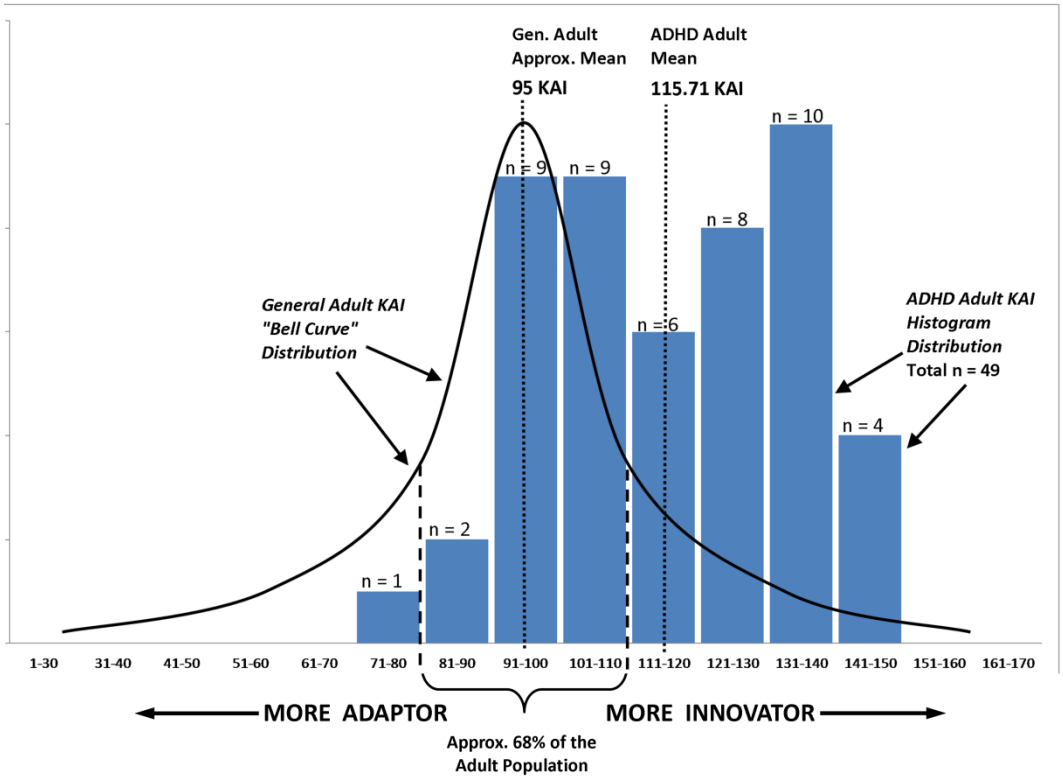
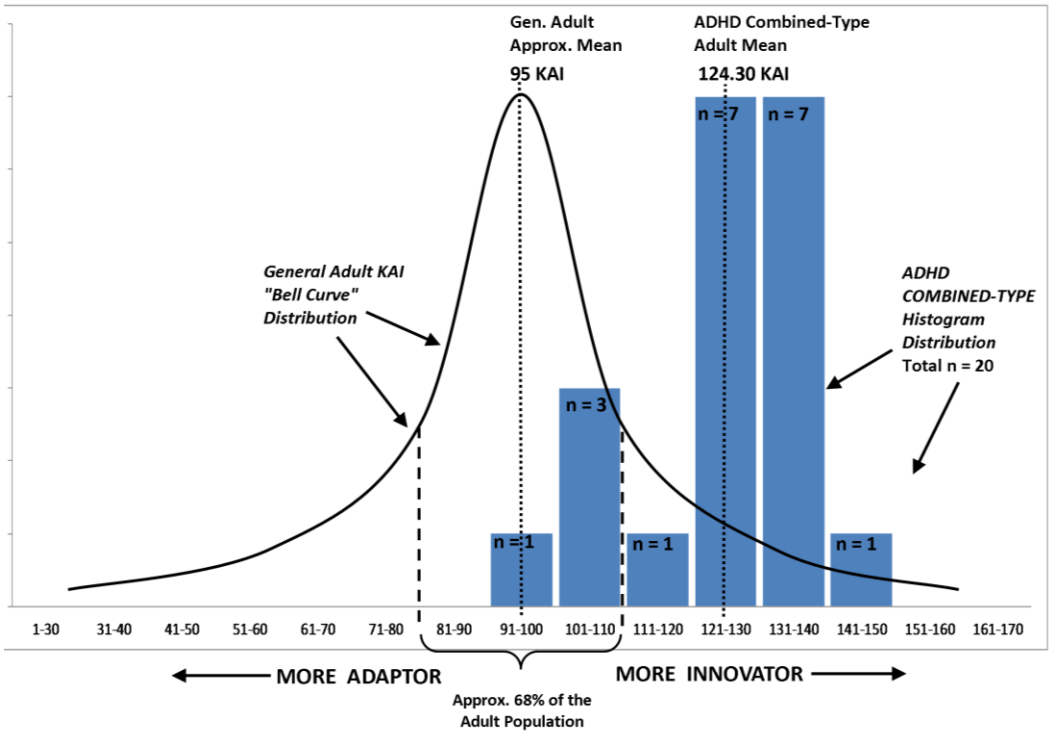


Figure 3 – Combined-Type ADHD Group KAI Score Histogram Distribution Against General Population KAI Score Distribution



FourSight Thinking Profile Results

Using previously reported general population FourSight data (Puccio, 2007) as the norm group, independent samples *t*-tests were performed for total ADHD scores, for ADHD subtype scores, as well as for scores from participants who were on ADHD medication and those who were not. Analyses for the primarily hyperactive-impulsive type and the unspecified subtype were not performed because of the very small sample sizes (n=5) for these two groups. Mean scores of the ADHD group on the four individual FourSight scales (Clarifier, Ideator, Developer, Implementer) were compared to those of the non-ADHD scores as reported in previous studies.

The ADHD group had a significantly lower Clarifier score average than the non-ADHD group ($t(584)=2.11$, $p < .03$, $d=.17$), indicating a lower preference for spending time to clearly understand an issue or context before generating new ideas. This difference was even more obvious for the combined type ($t(555)= 3.28$, $p < .001$, $d=.28$) whereas it disappeared in the primarily inattentive type ($t(554)=.13$, $p < .89$, $d=.01$). The difference was significant for those not on medication ($t(551)=2.24$, $p < .03$, $d=.19$), but not significant for those on medication ($t(568)=1.10$, $p < .27$, $d=.10$).

Comparison of the Ideator scores revealed that the ADHD group had a significantly higher score average ($t(584)=2.55$, $p < .01$, $d=.21$) than the non-ADHD group. This indicates a preference for generating and playing with new ideas, stretching the imagination, and thinking in intuitive, global, and abstract terms. It also indicates a propensity to overlook details, and to jump from one idea to the next without following through. The combined type had a significantly higher score average ($t(554)=2.23$, $p < .03$, $d=.19$) than the non-ADHD group but no significant difference was found for the primarily inattentive type ($t(554)=1.42$, $p < .16$, $d=.12$). The

difference was significant for those on medication ($t(568)=2.38$, $p < .02$, $d=.20$), but not for those not on medication ($t(551)=1.14$, $p < .26$, $d=.10$).

Similar to the Clarifier results, the ADHD group had a significantly lower score average on Developer ($t(584)=2.78$, $p < .02$, $d=.23$) than the non-ADHD group. This indicates a lower preference for developing and refining new ideas into workable solutions, and examining their strengths and weaknesses. The combined type had a significantly lower score average on Developer than the non-ADHD group ($t(555)=3.62$, $p < .001$, $d=.31$), but inattentive type did not ($t(554)=1.32$, $p < .19$, $d=.11$). The difference was significant for those not on medication ($t(551)=2.34$, $p < .02$, $d=.20$), and was marginally significant for those on medication ($t(568)=1.88$, $p < .06$, $d=.16$).

The ADHD group score average on Implementer was significantly lower than the non-ADHD group ($t(584)=4.82$, $p < .001$, $d=.40$). This indicates a lower preference for taking action to turn new ideas into tangible outcomes. Both the primarily inattentive type ($t(554)=2.78$, $p < .001$, $d=.24$) and combined type ($t(555)=2.33$, $p < .02$, $d=.20$) had significantly lower group scores on Implementer than the non-ADHD group. The difference was also significant both for those on medication ($t(568)=4.41$, $p < .001$, $d=.37$) and for those who were not ($t(551)=2.78$, $p < .03$, $d=.24$).

Table 5 shows the breakdown of preference score averages for the subsamples in the present data set, including the ADHD subtypes. Figure 4 shows total ADHD group means relative to general population means, and Figure 5 shows a breakdown of the ADHD subtype mean scores relative to general population means. Table 6 and Figure 6 show the distribution of the participants' predominant FourSight preferences. Of the 49 participants, 41 had a single predominant preference, and of those, 23 (46.94%) had an Ideator preference. The remaining

eight participants each had two equally predominant preferences. All eight had Ideator as one of their two predominant preferences. Also in Table 6, and displayed in Figure 7, the multiple preferences were consolidated for a total sum of 57 preferences among the 49 participants. So for example, if a participant had an equally high preference for Clarification and Ideation, both preferences were noted.

Table 5 - FourSight Thinking Profile Means Score Results

Variable	n	Clarifier		Ideator		Developer		Implementer	
ADHD Group		**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Total ADHD Group	**49**	**29.84**	**8.26**	**35.14**	**6.42**	**28.04**	**8.62**	**27.98**	**5.89**
Primarily Hyperactive-Impulsive Type	5	28.40	4.16	31.80	5.59	31.60	6.88	25.20	1.30
Primarily Inattentive Type	19	31.68	7.66	34.84	7.24	28.79	8.38	27.63	6.36
Combined Type	20	27.10	8.62	36.00	6.21	25.40	8.39	29.10	5.63
Subtype Unspecified	5	38.75	6.40	35.75	5.68	34.75	10.72	29.25	8.30
Male	16	30.43	7.63	36.43	6.75	29.63	6.71	27.81	5.66
Female	33	29.54	8.66	34.52	6.26	27.27	9.40	28.06	6.08
On ADHD Medication	33	30.61	7.93	35.42	6.50	28.58	8.94	27.55	5.75
Not on ADHD Medication	16	28.25	8.99	34.56	6.42	26.94	8.08	28.88	6.27
University Completed*	29	30.35	8.85	35.76	6.07	27.97	8.96	28.24	5.80
University Not Completed	12	29.33	6.61	33.83	7.80	24.42	9.05	29.92	5.55
Attending University	4	34.25	7.84	35.00	6.30	32.00	6.38	24.25	3.59
Non-ADHD Comparisons									
General Population[a]	**537**	**31.88**	**6.30**	**32.77**	**6.20**	**30.82**	**6.50**	**32.22**	**5.90**
Graduate Students, Mixed Majors[b]	69	31.70	5.60	30.30	5.50	29.80	5.50	32.00	5.50
Graduate and Undergraduate Students[c]	147	31.78	5.95	32.04	6.88	29.72	6.67	32.18	5.80
Graduate and Undergraduate Students[d]	84	35.70	6.80	36.20	7.00	34.10	7.30	36.60	7.20
Hospital Staff [e]	137	35.37	5.63	33.88	6.51	32.85	6.69	33.56	5.00

*Four participants did not indicate level of formal education. Mean scores were: Clarifier: M=23.25, SD=7.32, Ideator: M=34.75, SD=6.40, Developer: M=23.50, SD=7.00, Implementer: M=24.00, SD=7.70

a. Puccio (2007).

b. Richards (2006).

c. Steele (2003). Included 58 grad. and 89 undergrad. students; most (n=127) enrolled in Creative Problem Solving courses.

d. Puccio, Wheeler, & Cassandro (2004). Included 73 grad. and 11 undergrad. students enrolled in Creative Problem Solving courses.

e. Puccio & Grivas (2009). Participants included hospital supervisors, managers, department heads and senior administrators enrolled in a leadership development course.

Figure 4 - FourSight Preference Means for Total ADHD Group

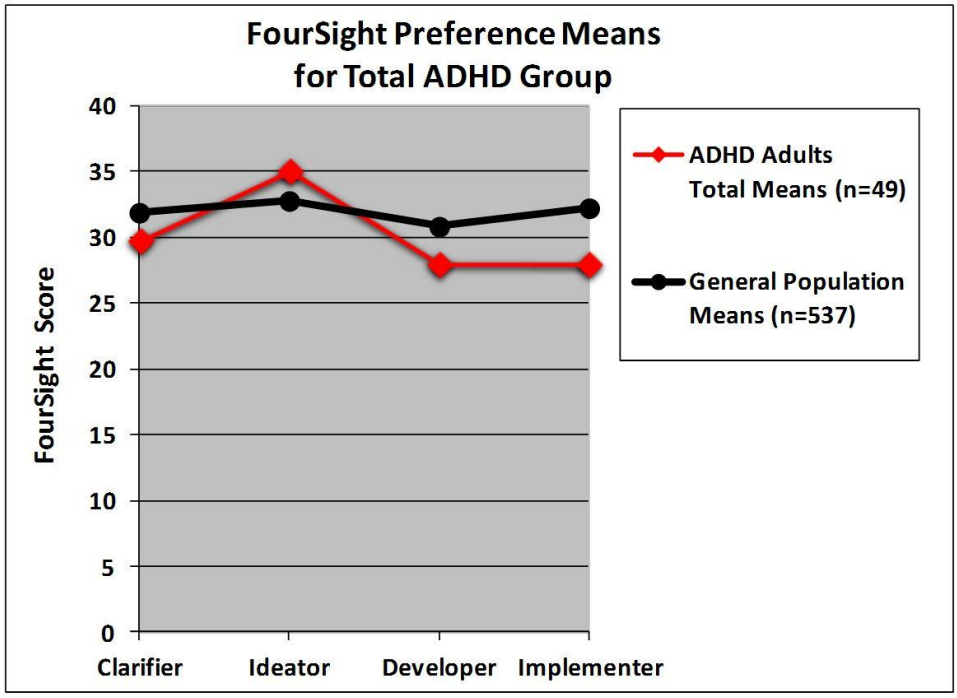
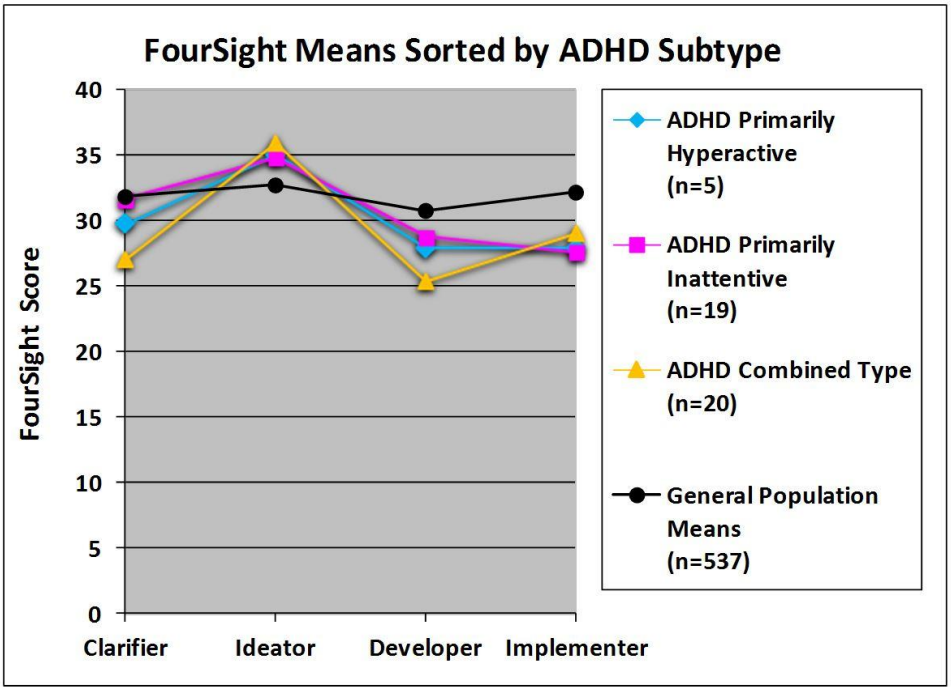


Figure 5 - FourSight Preference Means Sorted by ADHD Subtype*



*Unspecified ADHD subtypes (n=5, not shown here) had a very high Clarifier mean score (M=38.75, SD=6.40). Ideator mean (M=35.75, SD=5.68), like the other subtypes, was higher than general population means, Implementer was lower (M=29.25, SD=8.30). However, contrary to other ADHD groups, Developer (M=34.75, SD=10.72) mean was higher than average.

Table 6 – ADHD FourSight Preference Distribution

Highest FourSight Preference	n	Percentage of Total
Single Preference	**41**	
Clarifier	9	18.37%
Ideator	23	46.94%
Developer	5	10.20%
Implementer	4	8.16%
Multiple Preferences	**8**	
Clarifier-Ideator	4	8.16%
Ideator-Developer	1	2.04%
Ideator-Implementer	3	6.12%
Consolidated Single and Multiple	**57***	
Clarifier	13	22.81%
Ideator	31	54.39%
Developer	6	10.53%
Implementer	7	12.28%

*Multiple preferences were consolidated for a total sum of 57 preferences among the 49 participants. For example, if a participant had an equally high preference for Clarification and Ideation, both preferences registered a hit.

Figure 6 - Single Preference Distribution

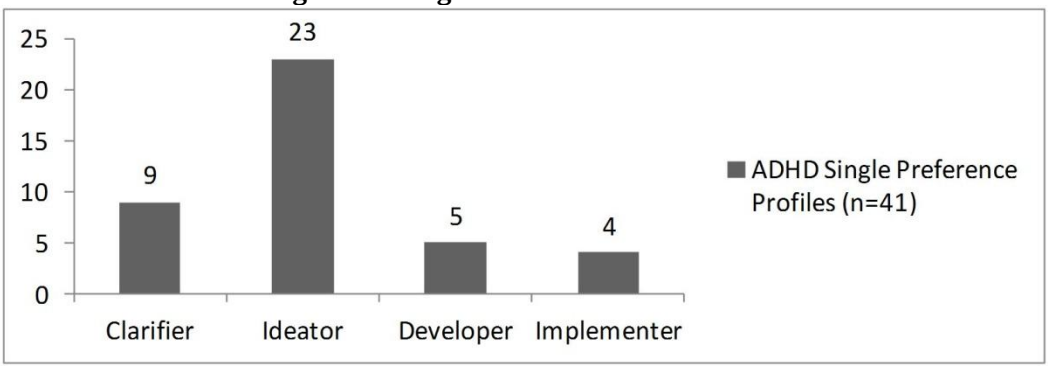
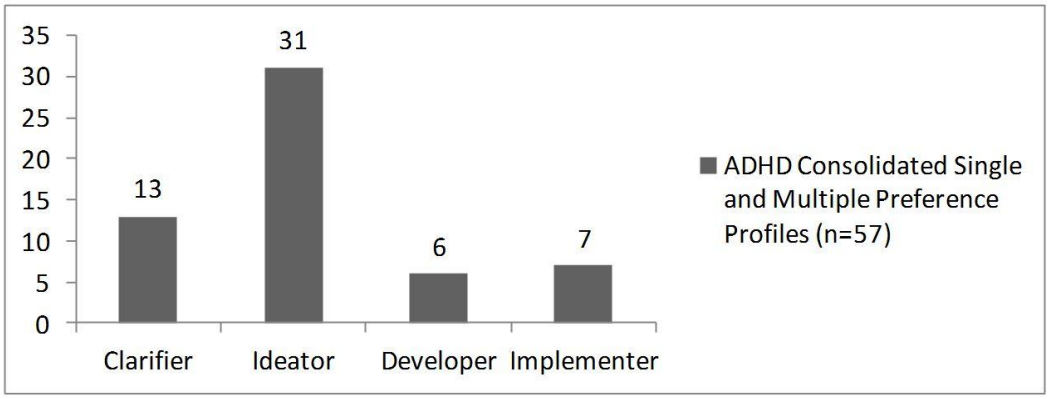


Figure 7 - Consolidated Single and Multiple Preferences



Adjective Check List (ACL) Results

The ACL Manual reported descriptive statistics of the Gough Creative Personality Scale and the Change Scale for male university students, female university students, male adults, and female adults separately. Because the present study's ADHD sample was largely female adults, the values associated with female adults in the ACL Manual were used for non-ADHD comparison group data. For the Domino Creativity Scale, the descriptive values of non-inventors reported by Albaum and Baker (1977) were used as non-ADHD comparison group data.

The ADHD group scored significantly higher on the Domino Creativity Scale than the comparison group ($t(121)= 5.20$, $p < .001$, $d= .95$). The difference was significant for both the primarily inattentive ($t(91)= 3.15$, $p < .002$, $d= .66$) and combined types ($t(92)= 4.33$, $p < .001$, $d=. 90$) as well as for those on medication ($t(105)=4.97$, $p < .001$, $d= .97$) and those not on medication ($t(88)=2.87$, $p < .001$, $d= .61$).

Comparison on the Gough Creative Personality Scale also showed that the ADHD group had significantly higher scores than the non-ADHD group ($t(247)=2.18$, $p < .03$, $d=. 28$). The combined type had significantly higher scores ($t(218)= 2.79$, $p < .01$, $d=. 38$), but no significant difference was found for the primarily inattentive type ($t(217)= .31$, $p < .76$, $d=.04$). Those on medication ($t(231)= 2.11$, $p < .04$, $d=.28$) had significantly higher scores whereas those not on medication did not ($t(214)= .94$, $p < .35$, $d=.13$).

The ADHD group also scored significantly higher on the Change Scale than the non-ADHD group ($t(247)= 6.14$, $p < .001$, $d=.78$). Both the primarily inattentive ($t(217)= 1.97$, $p < .05$, $d=.78$) and combined type ($t(218)=6.71$, $p < .001$, $d=.91$) had significantly higher scores

than the non-ADHD groups. The difference was also significant for those on medication ($t(231)=5.31$, $p < .001$, $d=.70$) and those not on medication ($t(214)=3.69$, $p < .001$, $d=.50$).

Table 7 shows the total ADHD group means on all scales and a breakdown of scores for the subsamples in the present data set, including ADHD subtype. Included in this table are ACL manual norms for the Gough Creative Personality Scale and the Change Scale, as well Domino Creativity Scale mean scores of non-ADHD samples from other published studies.

Figure 8 displays the total ADHD group score on the Domino Creativity Scale relative to other published studies of non-ADHD samples. Figure 10 displays the total ADHD group score relative to ACL manual norms. As described in Chapter One, these personality scales theoretically predict a person's level of creative ability. Therefore, both scale results suggest slightly elevated levels of creative personality tendencies among the ADHD participant group.

The largest group score difference relative to manual norms and other published studies was on the Change Scale, as displayed in Figure 12. This scale assesses the tendency to seek novelty and avoid routine. High-scorers on the Change Scale take pleasure in change and variety. They also tend to be perceptive, spontaneous, confident, aesthetically minded, comprehend problems quickly, and to welcome the challenges brought about by disorder and complexity.

Figure 9 displays a breakdown of ADHD subtype means on the Domino Creativity Scale. Figure 11 displays a breakdown of ADHD subtype means on the Gough Creative Personality Scale relative to ACL manual norms. Figure 13 displays a breakdown of ADHD subtype means on the Change Scale relative to ACL manual norms. When subtypes were taken into account, the combined-type ADHD group showed the largest differences on all three scales among the specified subtypes.

Table 7 - Adjective Check List (ACL) Result Means and Standard Deviations

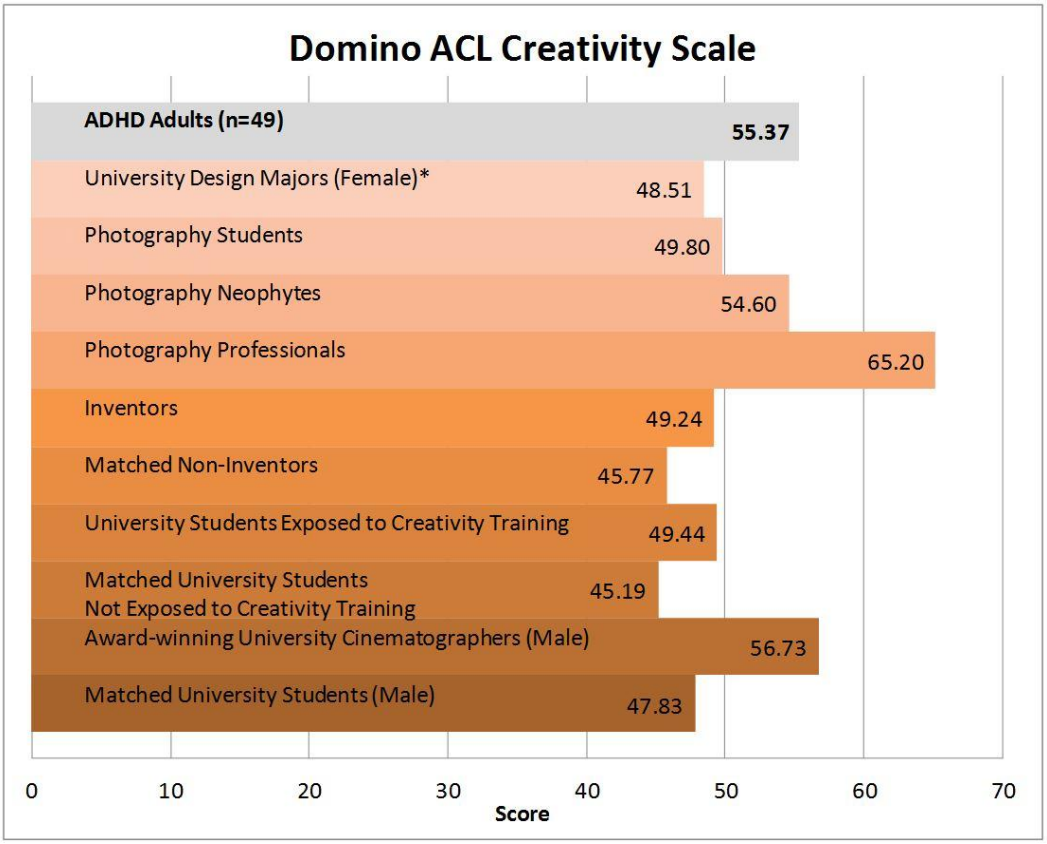
Variable	n	Domino Creativity Scale	SD	Gough Creative Personality Scale	SD	Change Scale	SD
ADHD Group							
ADHD Group Total	**49**	**55.37**	**9.99**	**52.02**	**9.98**	**57.84**	**10.44**
Primarily Hyperactive-Impulsive Type	5	52.20	6.72	48.40	16.27	56.80	13.91
Primarily Inattentive Type	19	53.84	9.60	49.05	10.51	52.79	11.26
Combined Type	20	56.85	10.52	55.30	7.43	63.15	5.60
Subtype Unspecified	5	59.00	14.76	53.00	2.45	54.25	11.32
Male	16	53.19	11.14	49.56	8.50	57.00	13.62
Female	33	56.42	9.38	53.21	10.24	58.24	8.71
ADHD On Medication	33	56.12	9.70	52.55	9.59	57.91	9.80
ADHD Not On Medication	16	53.81	10.72	50.94	10.38	57.69	11.98
University Completed*	29	55.10	9.71	54.45	9.72	60.03	9.78
University Not Completed	12	57.58	12.04	48.25	10.29	55.67	10.35
Attending University	4	48.00	3.65	49.75	9.07	58.00	6.38
Non-ADHD							
ACL Manual Norms[a]							
University males	262	-	-	48.62	9.85	49.78	10.24
Adult males	**198**	-	-	**49.58**	**10.68**	**49.65**	**10.15**
University females	261	-	-	48.49	10.61	51.05	9.80
Adult females	**200**	-	-	**48.24**	**11.07**	**48.06**	**9.89**
Male Graduate Art Students[b]	24	-	-	-	-	48.25	-
Female Graduate Art Students[b]	36	-	-	-	-	53.33	-
Female University Design Majors [c]	39	48.51	9.16	-	-	-	-
Photography Students[d]	17	49.80	-	-	-	-	-
Photography Neophytes[d]	46	54.60	-	-	-	-	-
Photography Professionals[d]	49	65.20	-	-	-	-	-
Inventors[e]	103	49. 24	9.53	-	-	-	-
Matched Non-inventors[e]	74	45.77	10.06	-	-	-	-
University Students Exposed to Creativity Training[f]	70	49.44	9.82	-	-	-	-
Matched University Students Not Exposed to Creativity Training[f]	57	45.19	11.52	-	-	-	-
Award-winning Male University Cinematographers[g]	17	56.73	7.62	-	-	-	-
Matched Male University Students[g]	17	47.83	9.50	-	-	-	-

*Four participants did not indicate level of formal education. Mean scores were: Domino Creativity Scale: M=58.00, SD=8.37, Gough Creative Personality Scale: M=48.00, SD=5.94, Change Scale: M=48.25, SD=15.12

- = information not available or not applicable.

a. Gough & Heilbrun (1983).
b. Whitesel (1984).
c. Meneely & Portillo (2005).
d. Domino & Giuliani (1997).
e. Albaum & Baker (1977).
f. Davis & Bull (1978).
g. Domino (1974).

Figure 8 – Domino Creativity Scale Means for ADHD Adults and Comparison Groups



*See Table 7 above for non-ADHD comparison group sizes and study references.

Figure 9 - Domino ACL Creativity Scale Means by ADHD Subtype

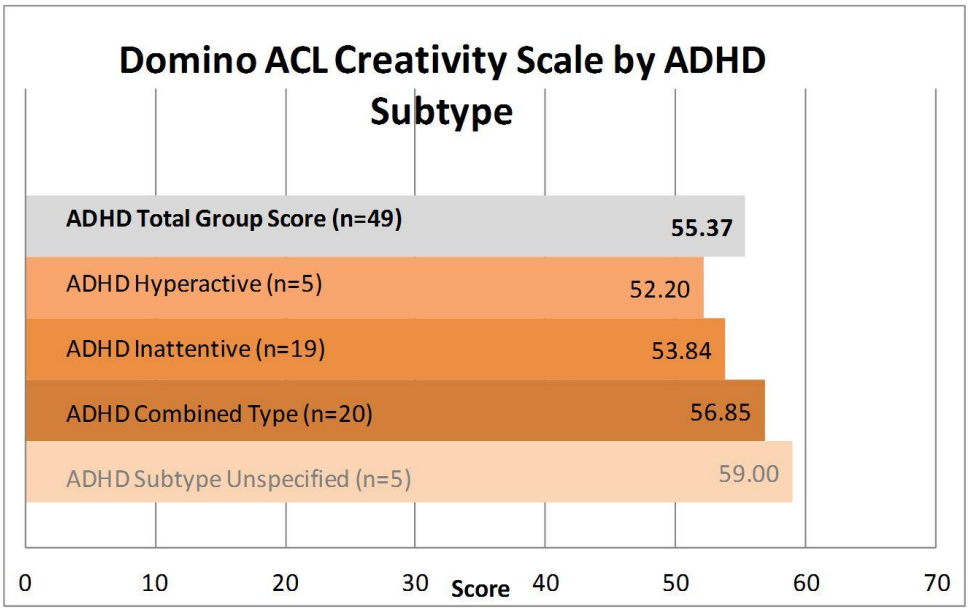


Figure 10 – ADHD Gough ACL Creativity Scale Means for ADHD Males and ADHD Females and ACL Manual Norms (Gough & Heilbrun, 1983)

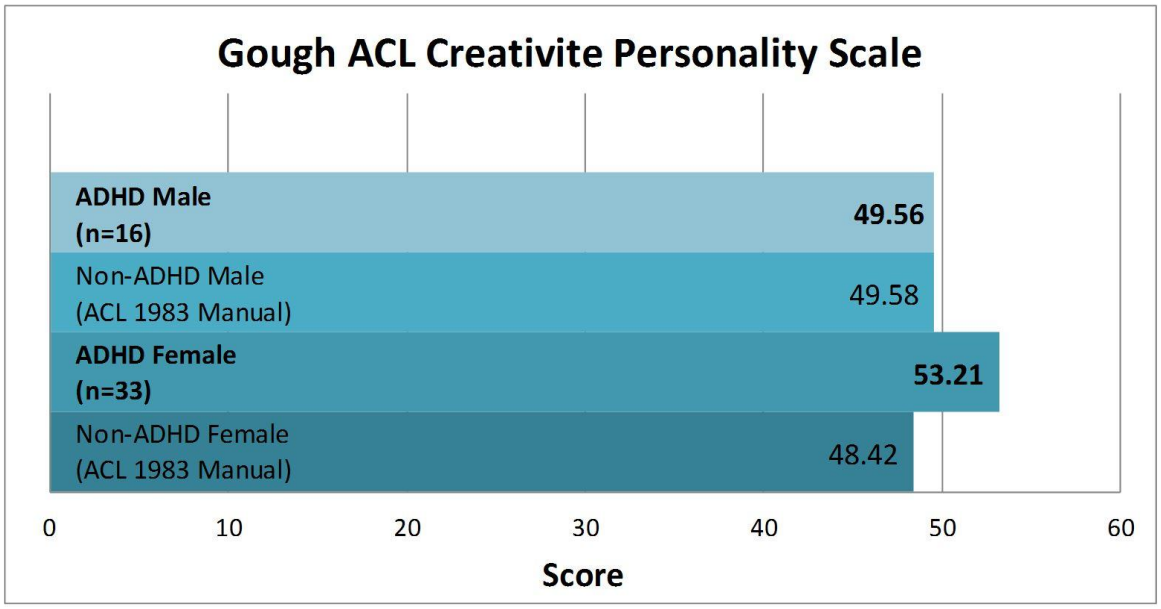


Figure 11 – Gough ACL Creativity Scale Means by ADHD Subtype

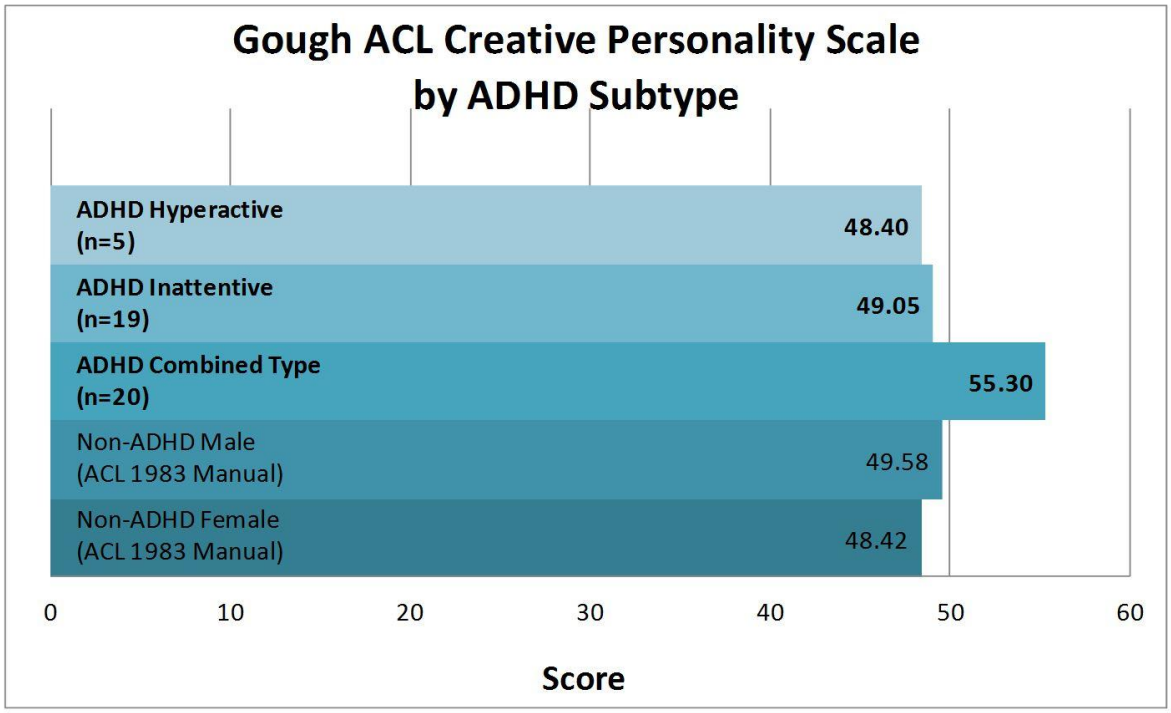


Figure 12 - ADHD ACL Change Scale Means for ADHD Males and ADHD Females and ACL Manual Norms (Gough & Heilbrun, 1983)

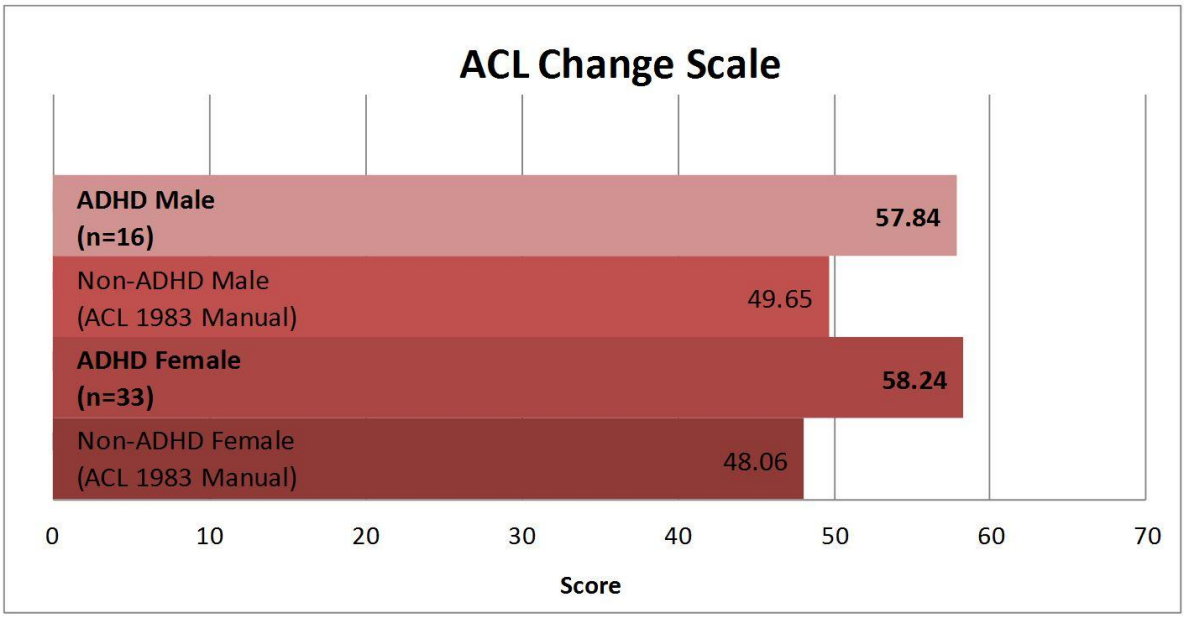
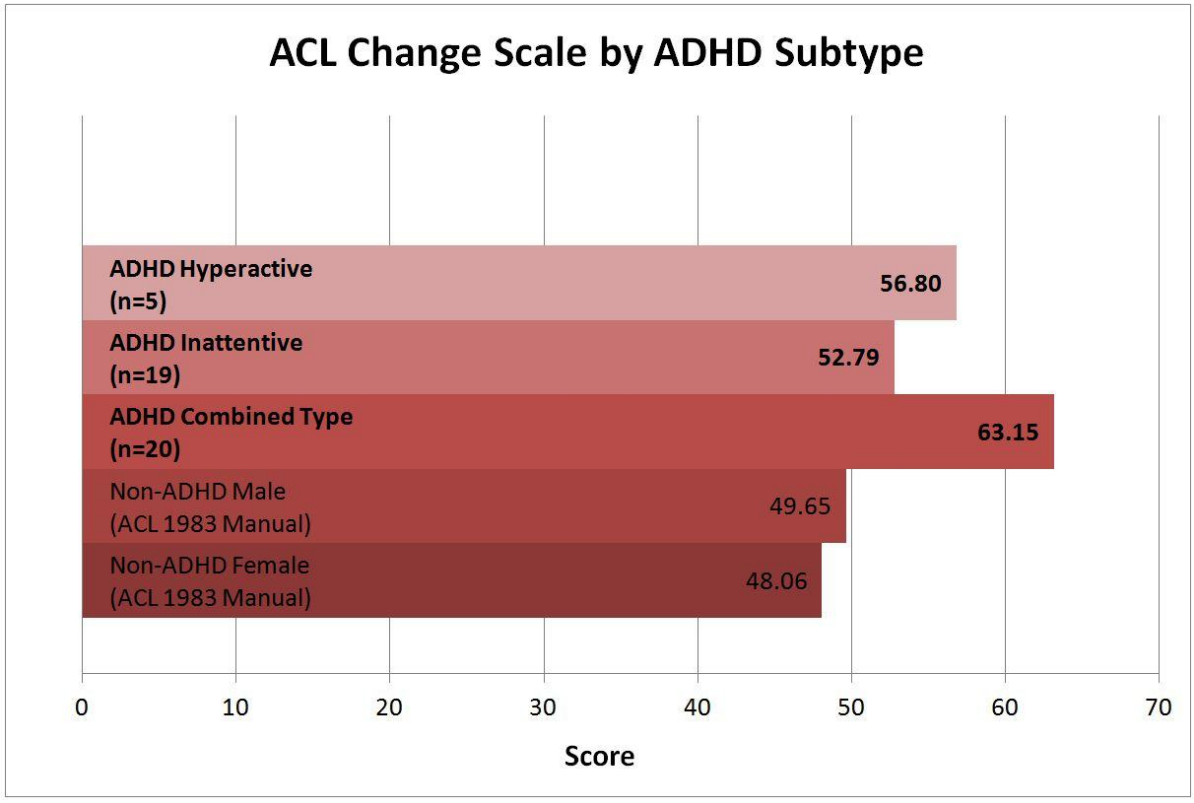


Figure 13 – ACL Change Scale Means by ADHD Subtype



Creative Self-Perception Results

Below are the results of the creative self-perception questions. Again, this consisted of two questions: one about a participant's perception of his or her level of creativity; and one about the perception others held about a participant's level of creativity. These were embedded among four additional unrelated bogus questions to mask the fact that this was an overall study of creativity. Figure 14 and Figure 15 represents how creative, with respect to level or amount, participants believe they are compared to average. Figure 16 and Figure 17 illustrate the participants' report of how often others comment on their creative abilities.

The results for self assessment of one's own creativity show a clear tendency on the part of the participants to see themselves as being more creative than the average person. Forty-two of the 49 participants rated their own creativity as above what they consider average in the general population (see Figure 14). There was a dramatically low number of participants who thought themselves to be average in their level of creativity (n=4), and even fewer who thought they were somewhat less creative than average (n=2) or uncreative (n=1). Figure 15 shows the analysis for this question across the ADHD subtypes. Given the participants' overwhelming view that they are more creative than average, the present sample showed a strong tendency towards a positive self-perception of creative ability. Similar to self-perception, the participants tended to report that others viewed them as being highly creative. Specifically, Figure 16 shows that more than half of the sample indicated that others "Often" commented on their creative abilities (26 out of 49). Figure 17 shows the analysis for this question across the ADHD subtypes in the present study.

Figure 14 - Creative Self-Perception of ADHD Participants

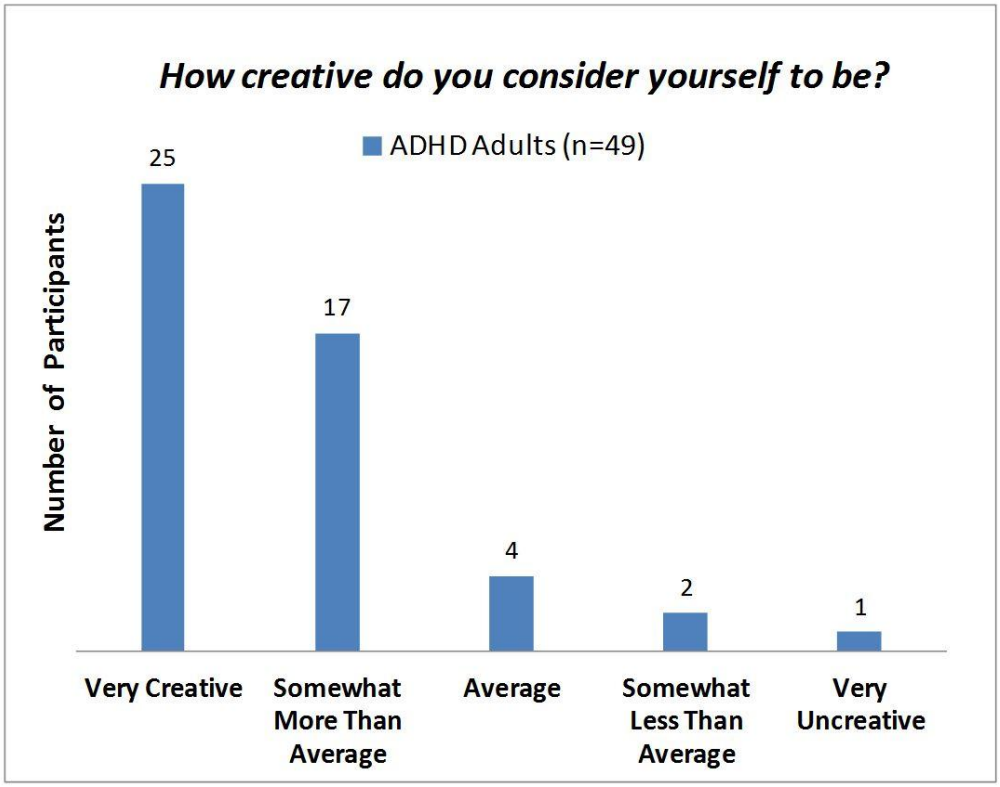
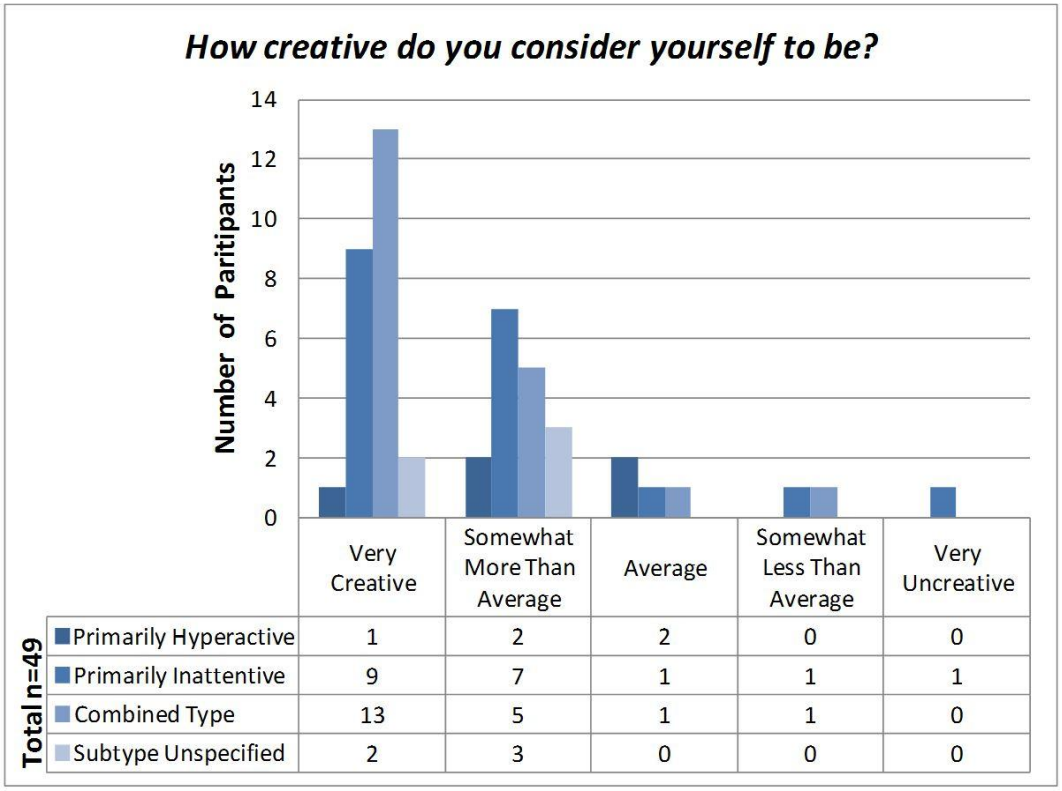


Figure 15 - Creative Self-Perceptions by ADHD Subtype



Total n=49	Very Creative	Somewhat More Than Average	Average	Somewhat Less Than Average	Very Uncreative
Primarily Hyperactive	1	2	2	0	0
Primarily Inattentive	9	7	1	1	1
Combined Type	13	5	1	1	0
Subtype Unspecified	2	3	0	0	0

Figure 16 – Reported Perceptions Others Hold of Participants' Creativity

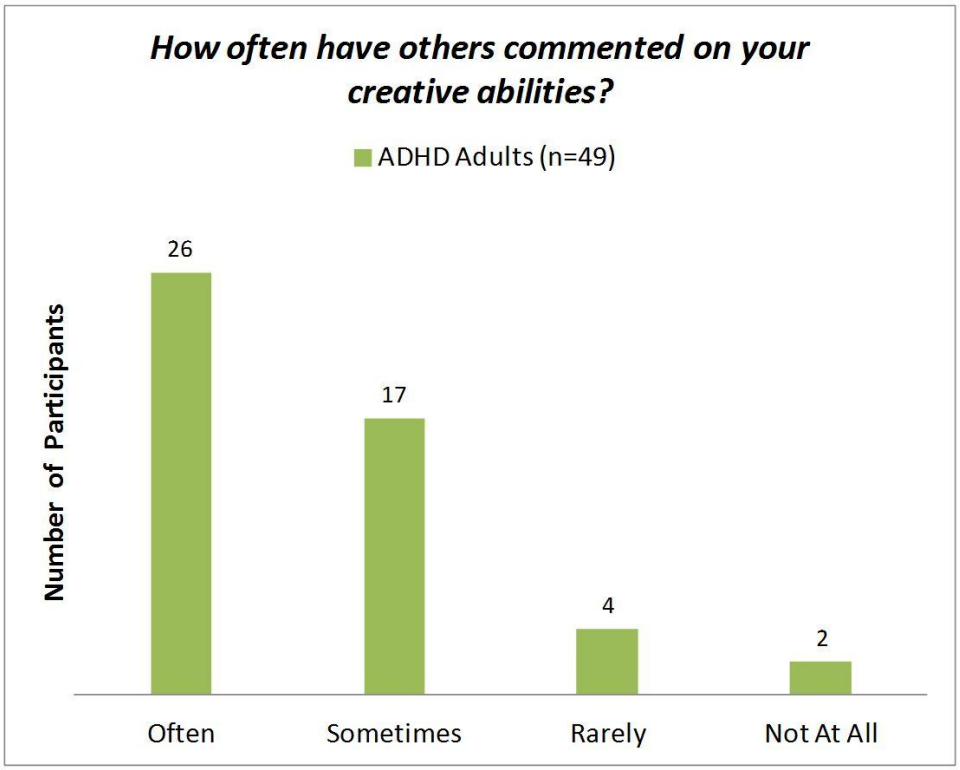
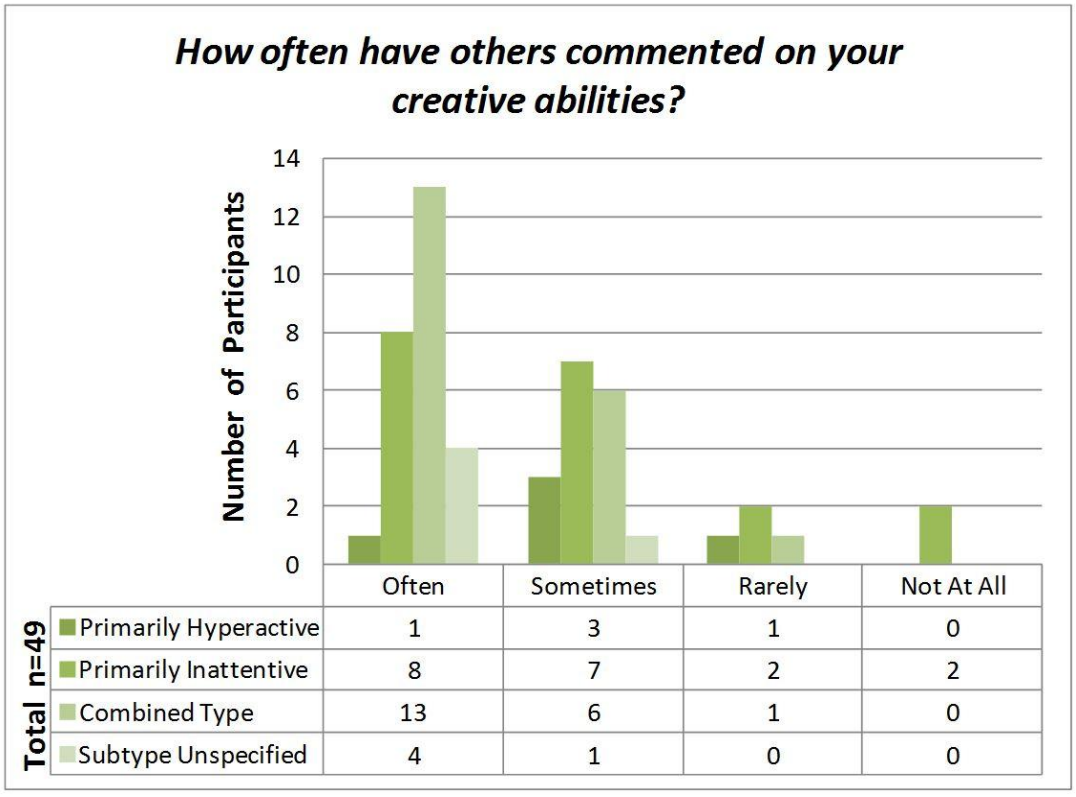


Figure 17 – Reported Perceptions Others Hold of Participants by ADHD Subtype



Total n=49	Often	Sometimes	Rarely	Not At All
Primarily Hyperactive	1	3	1	0
Primarily Inattentive	8	7	2	2
Combined Type	13	6	1	0
Subtype Unspecified	4	1	0	0

The remaining figures in this chapter represent both the participants' creative self-perception in relation to the three principal instruments (the KAI, FourSight, and ACL), and the perception others hold of the participants' creative abilities (at least according to the research participants) in relation to the three principal instruments. While interpreting the results in all the following figures, it is important to remember that few of the 49 ADHD participants saw themselves as being average in their level of creative ability, that even fewer saw themselves as somewhat less creative than average, and that only one participant reported being very uncreative. Therefore, the results displayed at these lower ends of the creative self-perception chart are less generalizable, and should be interpreted more carefully. This caveat also applies to the figures representing other's perception of the participants' creative abilities—again, very few participants reported that others rarely (n=4) or never (n=2) comment on their creative abilities.

Figure 18 shows a breakdown of self-perception of creative ability plotted in reference to the KAI continuum. A clear and intriguing pattern is evident in this figure. Specifically, the higher participants rated their own creativity, the comparatively higher their score tended to be in Kirton's Innovator style of creativity. Figure 19 shows a similar pattern for participants' responses to the question focused on the degree to which others comment on their creative abilities.

Figure 20 shows a breakdown of self-perception of creative ability plotted in reference to the FourSight preferences. Another clear and intriguing pattern emerges in this figure. The FourSight Ideator dimension appears to most correspond with creative self-perception. The group who saw themselves as very creative (n=25) had a much higher-than-average Ideator mean, those who saw themselves as somewhat more creative than average (n=17) had a slightly

higher-than-average Ideator mean, the few (n=4) who saw themselves as average had practically the same Ideator mean as the general population, and the even fewer (n=3) who saw themselves as somewhat less creative than average or very uncreative had a much lower-than-average Ideator mean. Figure 21 shows a similar pattern for research participants' responses to the question focused on the degree to which others comment on their creative abilities. This seems to suggest that the Ideator dimension corresponds most to the implicit theories of creativity held by the ADHD participants and the people with whom they interact.

Figure 22 shows a breakdown of self-perception of creative ability plotted in reference to the Domino Creativity Scale, the Gough Creative Personality Scale, and the Change Scale of the ACL. Again, a similar pattern emerges in this figure. The higher a participant's perception of their own creativity, the comparatively higher their score tended to be on all three scales. Figure 23 shows a highly comparable pattern for research participants' responses to the question focused on the degree to which others comment on their creative abilities.

Figure 18 – KAI Score Means Sorted by Creative Self-Perception

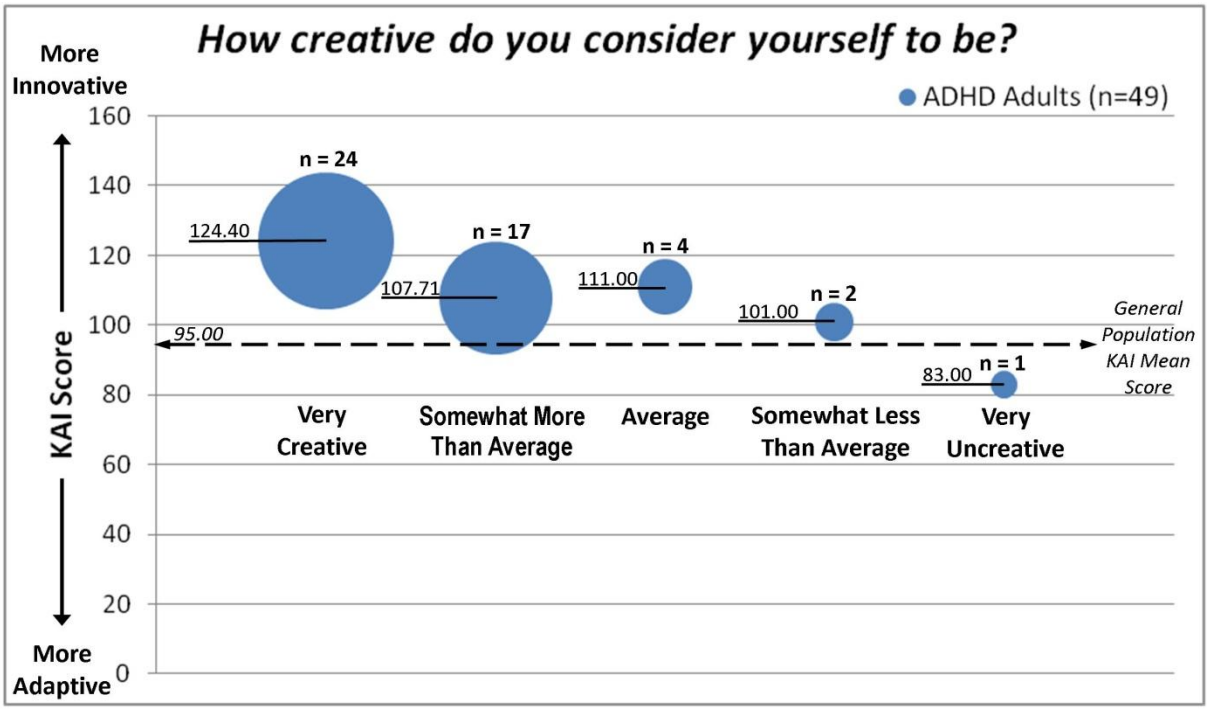


Figure 19 – KAI Score Means Sorted by Perception from Others

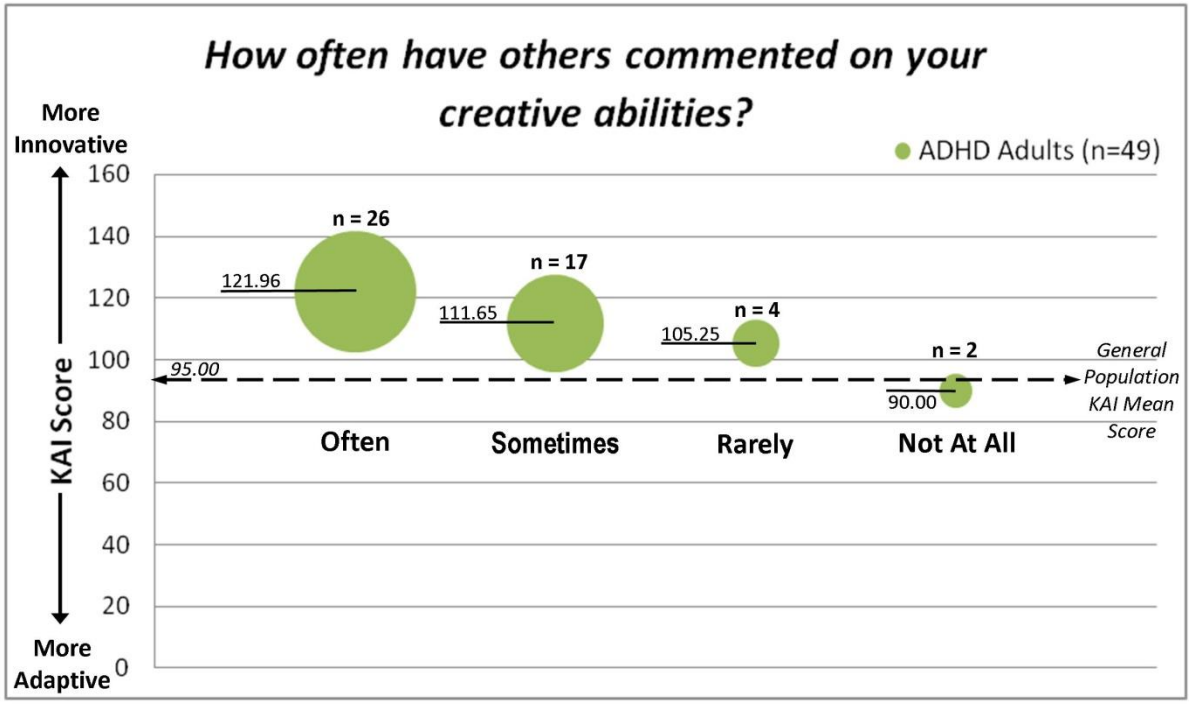


Figure 20 – ADHD FourSight Means Sorted by Creative Self-Perception

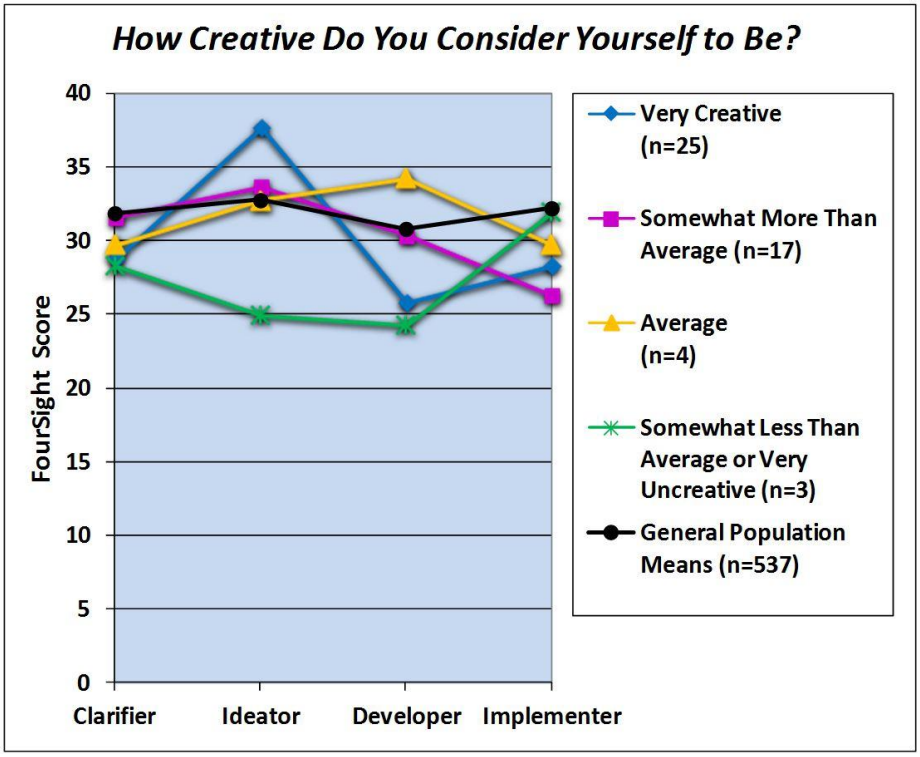


Figure 21 – ADHD FourSight Means Sorted by Perception of Creativity by Others

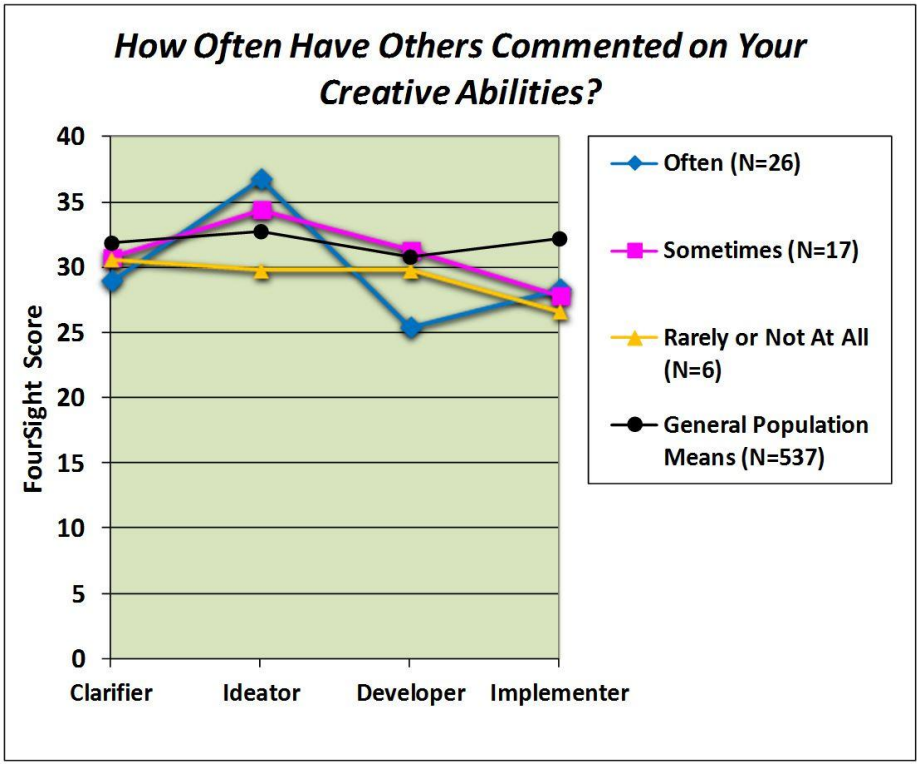


Figure 22 – Total ADHD ACL Means Sorted by Creative Self-Perception

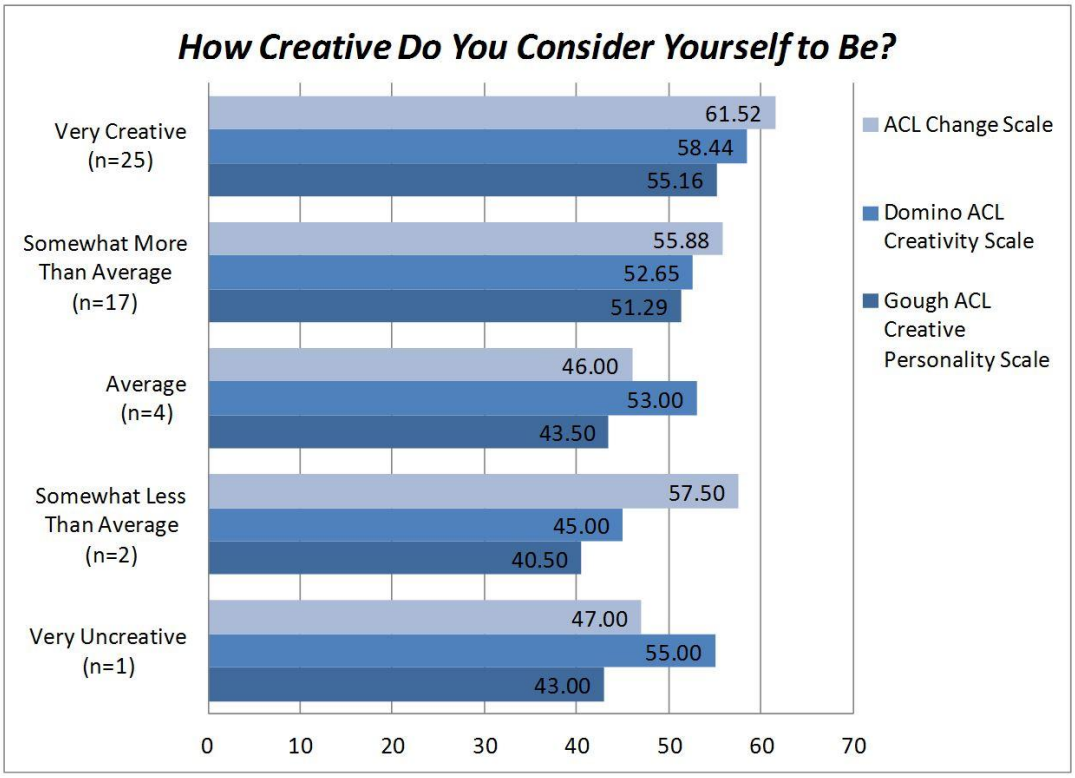
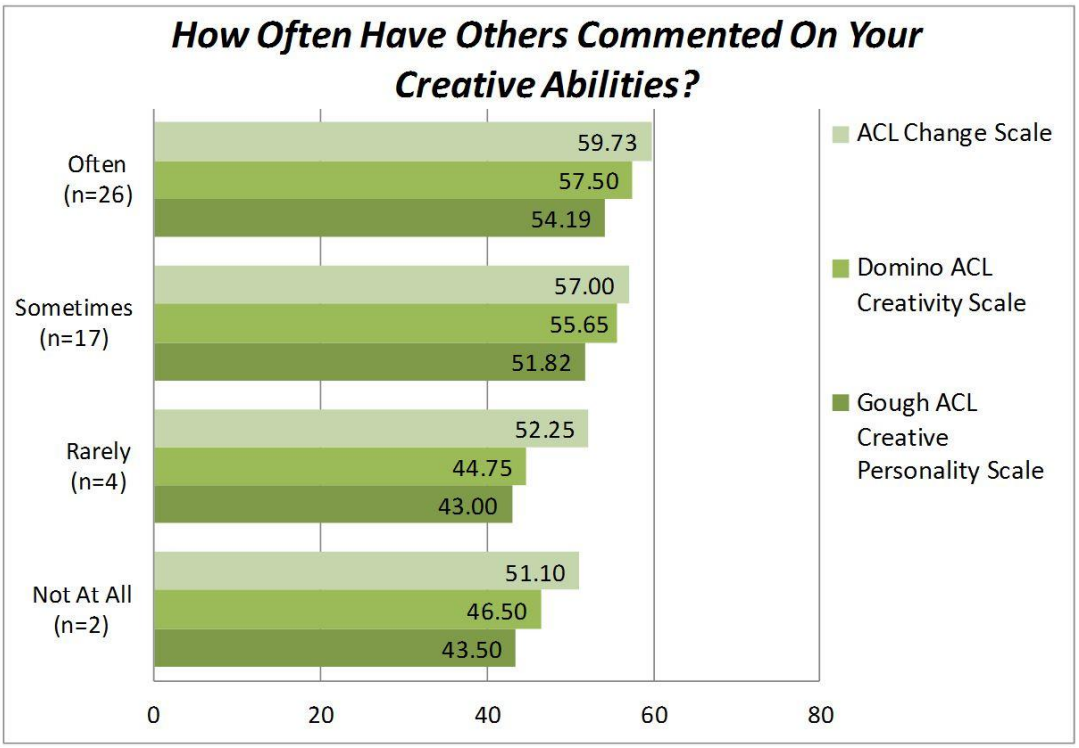


Figure 23 – Total ADHD ACL Scores Sorted by Others' Perception of ADHD Creativity



Summary

This chapter presented the results of the assessments of the 49 ADHD adult participants and provided some comparisons with normal population scores in assessment manuals and other published studies of non-ADHD population samples. Chapter Five will interpret the results.

Chapter Five:
Result Implications, Recommendations, and Conclusions

Introduction

The results of this study supported the existence of distinct cognitive style and personality tendencies among its ADHD adult participants. This chapter revisits the four hypotheses of this study and their corresponding research results. This is followed by an interpretation of the results from the standpoint of both explicit theories and implicit perceptions of creativity—and a discussion of how understanding the discrepancies between these perspectives offers potential insight into the public debate and confusion about the creativity of people with ADHD. Then there is a discussion of how the data collected from the diverse assessment approaches of this study might give us insight into how to maximize the creativity of ADHD adults, and even potentially help conceptually distinguish personality and style from disorder. If the findings of this study generalize to the wider ADHD population in future studies, this might help us more accurately distinguish ADHD behaviors that are truly maladaptive from behaviors that may simply seem maladaptive or annoying to people of a different style—but that can play a valuable role in creativity (such as a tendency to 'rock the boat' and go against convention). Finally some of the principal limitations of the study are discussed, followed by recommendations for future research.

Interpretation of the Research Outcomes

Adjective Check List Creative Personality Hypothesis

As hypothesized, an ADHD diagnosis did positively correspond with slightly elevated

scores on the Domino Creativity Scale, the Gough Creative Personality Scale, and the Change Scale of the ACL. When subtypes were taken into account, the ADHD combined-type showed the largest significant differences. The absolute largest differences were on the Change Scale. According to the ACL Manual (Gough & Heilbrun, 1983) this scale assesses the tendency to seek novelty and avoid routine and high-scorers on the Change Scale are described as:

> Taking pleasure in change and variety, persons high on [the ACL Change Scale] are typically perceptive, spontaneous, and aesthetically-minded. They comprehend problems and situations rapidly and incisively, and they have confidence in themselves and welcome the challenges found in disorder and complexity. The low-scorer seeks stability and continuity in the environment, avoids ill-defined and risky situations, and tends to lack verve and imagination. (p. 13)

It may be this tendency to seek novelty and avoid routine (that theoretically increases the likelihood of being original) that accounts for the elevated creative personality scores on the other two ACL scales. However, because doing something new for the sake of novelty and breaking routine is not sufficient to qualify as creativity by most definitions—this could also theoretically be interpreted as a kind of pseudo-creative personality tendency, similar to what was described in Chapter One.

Creative Self-Perception Hypothesis

As hypothesized, most ADHD participants reported that they were more creative than average (85.71%), and even more reported that other people around them comment on their creative abilities (87.76%). Over half of the research participants reported being *very* creative (51.00%) and that people *often* comment on their creative abilities (53.06%). These results must be interpreted especially carefully here. First, there was no control group, nor were there theoretical comparison assessment results available. Second, as discussed in Chapter One,

studies have shown that children with ADHD have a positive illusory bias that inflates their self-perceptions of competence, as measured by comparisons of their self-perception against that of parents, teachers, and others (Hoza et al., 2004). A few studies have shown this to be true for ADHD adults as well (e.g. Knouse et al., 2005; Prevatt et al., 2012). This is the reason participants were also asked how often *others* comment on their creative abilities—to try to mitigate this potential phenomenon.

That being said, self-reported levels of creativity here did correspond to all the other measures in the expected directions (when implicit theory research is taken into account). For example, participants who reported the highest creative self-perception correspondingly had the highest KAI Innovation scores, FourSight Ideator scores, and scored higher on all three ACL scales related to creative personality. One of the more interesting results was the relationship between creative self-perception and FourSight Ideator scores (which is most associated with the KAI, and thus theoretically the FourSight dimension most sensitive to implicit perceptions of creativity). Again, compared to general population means, those who saw themselves as very creative (n=25) had a much higher-than-average FourSight Ideator mean, those who saw themselves as somewhat more creative than average (n=17) had a slightly higher FourSight Ideator mean, the few (n=4) who saw themselves as average had practically the same mean as the general population, and the even fewer (n=3) who saw themselves as somewhat less creative than average or very uncreative had a much lower FourSight Ideator mean.

FourSight Cognitive Style Hypothesis

As hypothesized, an ADHD diagnosis did positively correspond with high FourSight Ideator preferences. This indicates a preference for generating and toying with new ideas,

stretching the imagination, and thinking in intuitive, global, and abstract terms. It also indicates a propensity to overlook details, and to jump from one idea to the next without following through (Puccio, 2002a, 2002b). This ADHD group also had significantly lower preferences on the other three FourSight dimensions (Clarifier, Developer, and Implementer) than average population scores. Lower FourSight Clarifier scores indicates a low preference for spending time to clearly understand an issue or context before generating new ideas. The lower FourSight Developer scores indicate a low preference for developing and refining new ideas into workable solutions, and examining their strengths and weaknesses. The lower FourSight Implementer scores indicate a low preference for taking action to turn new ideas into tangible outcomes.

When sorted by ADHD subtype, above finding held true for the 20 combined-type ADHD participant group. However, the 19 inattentive ADHD types did not have a significantly lower Clarifier mean score relative to the non-ADHD population comparison group, nor significantly higher Ideator scores, nor significantly lower Developer scores. Only the Implementer mean score was significantly lower. This may be an indication of significant style differences between the ADHD subtypes that future studies might consider.

However, the overall ADHD group results of the present study generally align with results obtained by White and Shah (2011) except that their ADHD university student sample did not have a lower FourSight Implementer group preference than their non-ADHD control group. As was speculated in Chapter One, this may be somehow reflective of their ADHD sample, who perhaps were able to pass university admissions because they possessed levels of persistence and follow-through adequate enough to overcome the academic challenges often brought on by ADHD.

KAI Cognitive Style Hypothesis

As hypothesized, an ADHD diagnosis did positively correspond with a high KAI Innovator preference. This assessment yielded the most substantial results, with the ADHD participant group scoring 115.71 (*SD*=18.02), which is over one standard deviation higher in KAI Innovation than the approximate average population score of 94.99 (*SD*=17.90). This indicates a preference for 'doing things differently' by stretching and breaking paradigms, rules, and established systems—rather than 'doing things better' and efficiently by using existing paradigms and systems. Their preference suggests a higher-than-average likelihood of generating numerous original ideas, but that others are more likely to see their ideas as irrelevant, impractical, unsound, or risky (Kirton, 2003). According to Kirton (2003), "Innovators are essential in times of radical change or crisis, but may have trouble applying themselves to managing change within ongoing organizational structures" (p. 55).

Although all ADHD subtypes had significantly higher KAI Innovator group preferences, the group of 20 participants diagnosed with combined-type ADHD had markedly higher KAI Innovator scores. Their KAI mean score was 124.30 (*SD*=12.96), which brings them close to a 30-point difference from an approximate general population score of 94.99 (*SD*=17.90). Although all ADHD types were more KAI Innovator than the general population, the combined-type ADHD group were so much higher that problems in communication and collaboration stemming from cognitive style differences could be theoretically expected even between this group and the other ADHD subtypes in this sample, such as the 19 inattentive-type participants, who had a mean score of 108.11 (*SD*=20.22).

Theoretical Implications

Result Implications through the Lens of Implicit Theory

Using implicit theory research to interpret the results of this study might offer insight about the heated public debate about the creativity of people with ADHD (*implicit theories* were defined in Chapter One as the tacit assumptions or folk conceptions that laypeople hold about psychological constructs versus the explicit theories that scientists and researchers use to define and assess these same psychological constructs). Specifically, it might help us understand why people with ADHD are often described as highly creative in the press and in many ADHD self-help books and articles written by clinicians and other advocates despite the fact that other clinicians and researchers strongly disagree—and that research has not clearly shown them to be much more creative than average so far. The results of this study suggest that the answer may lie somewhere in the middle of these two positions.

The ACL personality scale results from this study suggest that there is indeed a slight but significant tendency among ADHD adults to possess personality traits that are associated with high levels of creativity, especially from their tendency to seek novelty and avoid routine. However, the KAI and FourSight results were much clearer, showing distinct cognitive style tendencies among ADHD adults that theoretically engender more *originality* than the general population. On the other hand, they also displayed distinct cognitive style tendencies that theoretically hamper *effectiveness* necessary for full-fledged creativity, such as their lower-than-average preferences for using or appreciating existing paradigms and systems to develop and refine original ideas once they have been generated.

Explicit scientific theories tend to include a balance of originality *and* effectiveness when

defining creativity, while implicit lay theories tend to primarily emphasize originality (see Chapter One). Explicit theories of creativity, however, are not widespread in the public discourse—and sometimes not even among researchers. Therefore people who hold an implicit theory of creativity that appreciates originality but ignores effectiveness might overestimate the creative levels of ADHD adults. They might also underestimate the extent to which co-existing cognitive style tendencies of ADHD adults (*apart* from the impairments that come from the disorder) might hamper the effectiveness necessary for creative outcomes. These potentially inaccurate estimations may also be happening among ADHD adults themselves because—according to the creative self-perception assessment results of this study—they also tend to see themselves as highly creative, and they presumably also hold implicit theories of creativity that emphasize originality over effectiveness. However, this does not settle the issue because this brings us to another unsettled debate within the field of creativity described in Chapter One—the style-level debate (i.e., whether or not style and level of creativity are independent), and how this plays into the definition of creativity.

Result Implications through the Lens of the Style-Level Debate

The theoretical levels of creativity among ADHD adults—as assessed here using the ACL personality scales—were significantly elevated but not dramatically so. Therefore, if one takes a cautious stance until more robust research and philosophical deliberation settle the style-level debate within the field of creativity, it seems at least two general positions can still be taken. KAI will principally be used below to outline the arguments because it has been an instrument at the center of this debate and has undergone empirical style-level scrutiny over the decades:

<u>Position One</u>: Cognitive style and creative level are independent. As Kirton asserted, having a high KAI Innovator style does not predispose one to higher levels of creativity.

Therefore

Because results of this study suggest that ADHD adults have a propensity to be high KAI Innovators—their cognitive style is likely leading to overestimations of their levels of creativity by many laypeople, ADHD self-help authors, some researchers, clinicians and advocates, and people with ADHD. Although ADHD adults may have a cognitive style preference for originality, it does not necessarily mean they have a higher creative potential.

As we saw in Chapter One, when laypeople are shown descriptions of high KAI Innovators and high KAI Adaptors, they usually perceive the Innovators as having a higher level of creativity (Gonzalez, 2003; Muneyoshi & Kagawa, 2004; Puccio & Chimento, 2001; Ramos & Puccio, 2014). However, Kirton's theory maintains that KAI Adaptors and Innovators have an equal level of creative potential, but that they manifest in different ways. Kirton's KAI theory can seem counter-intuitive to the uninitiated, and is an area of great disconnect between implicit and explicit theories of creativity. As was explored in more depth in Chapter One, it can sometimes be hard to see how a KAI Adaptor (who prefers to stay within paradigms and who is, for example, "characterized by precision, reliability, efficiency, methodicalness, prudence, discipline, conformity," [Kirton, 1976, p. 623]) can be more creative than a KAI Innovator (who prefers to break paradigms, who is "seen as undisciplined, thinking tangentially, approaching tasks from unsuspected angles" [Kirton, 1976, p. 623]). (The subtitle of Talbot's 1997 article on the impact of Kirton's KAI theory on creativity research touches the heart of the issue: *How to get used to the idea of Creative Adaptors and Uncreative Innovators*.)

Going back to what was reviewed in Chapter One, according to Kirton's theory, high KAI Innovators can exhibit low levels of creativity when, among other things, they are too "reluctant to commit to any particular course of action, impractical, self-centered, abrasive,

undependable," and, "capricious risk-taker[s]" (Isaksen & Dorval, 1993, p. 308). One could even test the hypothesis that if future research does not detect significantly higher *levels* of creativity among people with ADHD, many of them may be representative of the "Uncreative Innovators" that Talbot (1997) lamented are usually overlooked by creativity researchers. Again, these correspond to the managers that Kirton (1976) originally observed as "'men of ideas,' who fail to exhibit a knack for getting their notions implemented." (p. 628). And again, as Talbot (1997) elaborated, they:

> might be too far removed from the reality of other organization members, too wedded to their own ideas, too unconcerned with gaining acceptance, more interested in exploring alternatives than implementing solutions, or lack confidence in their ability to promote their ideas, lack certain types of power needed to influence the course of events, or possibly just lack a champion for their ideas. (p. 179)

Bringing this to a more explicit definition of creativity—originality that is effective—think back once more to Runco's *Balanced Ratio of Creativity and Innovation* continuum (Figure 1) introduced in Chapter One. Again there is a parallel notion that when one is too far on either end of the continuum—one is out of creative balance. This happens when there is high originality (like with high KAI Innovators) that it is out of touch with the constraints of reality and has no effectiveness—and inversely, if there is high effectiveness (like with high KAI Adaptors) without originality and only mindless routine problem solving, automaticity or imitation (Runco, 2007). Sternberg and Kaufman's (2010) similar notion of a necessary balance of originality and effectiveness for creativity may be worth repeating once more (n.b., this does not necessarily mean that Runco, Kaufman, or Sternberg have supported the independence of style and level):

> The most creative people are those who can be very original and yet work within the constraints of the construct. Those who are imaginative but whose ideas are useless become frustrated dreamers. Those who have useful ideas that are not imaginative

become, whether in name or in deed, technicians. (p. 468)

People with ADHD may sometimes be displaying a kind of pseudo-creativity—which was defined in Chapter One as behaviors that can look like creativity but arise simply from a lack of inhibition or contrarianism. What might also play into this is their disposition for seeking novelty and avoiding routine, as was found in the present study via the ACL Change Scale results. But again, as Runco asserted—if potentially original behavior has no effectiveness in self-expression or problem solving—it cannot be called truly creative.

<u>Position Two</u>: Cognitive style and creative level are <u>not</u> independent. Contrary to Kirton's assertion, having a KAI Innovator style can predispose one to higher levels of creativity.

Therefore

Because results of this study suggest that ADHD adults have a propensity be high KAI Innovators—their cognitive style is being correctly perceived as a predisposition to higher levels of creativity by many laypeople, ADHD self-help authors, and some clinicians, advocates, researchers, and people with ADHD.

Here the explicit definitions and implicit lay perceptions of creativity are more congruent. Even though implicit perceptions may still cause laypeople to overestimate the creativity of people with ADHD, nevertheless, because ADHD adults tend to have cognitive styles that favor originality—they have a higher creative potential. Kirton's assertion of the independence of style and level has not been widely accepted by creativity researchers. For example, Kaufmann (2003) has argued:

> The problems involved in Kirton's distinction are also seen in a closer examination of the core logical formula that makes up the concepts of innovative and adaptive creativity. Whereas innovative problem solving logically requires creativity, adaptive problem solving does not. It could be just 'efficient' or 'intelligent'. Thus, from a purely conceptual point of view, innovative and adaptive modes of problem solving cannot be

> treated as symmetrically distributed over levels of creativity. The innovative orientation, as measured by the KAI self-report questionnaire, is, in fact, significantly and often substantially positively correlated with various indicators of level of creativity (Goldsmith & Matherly, 1987; Isaksen & Puccio, 1988). This raises the question of whether the KAI measure of cognitive styles really is an indicator of level rather than mode of creativity. (pp. 242-243)

Though Kaufmann has cited some of the values of the KAI style-level distinction, he also argued:

> Problems arise, however, through the absolutist way Kirton treats the distinction. If the term creativity is to cover the whole range of behaviour from patient conformity to paradigm breaking, the question is what creativity is *not*. It seems that this question would be a difficult one to answer and that Kirton's concept of creativity consequently is totally unconstrained, and therefore devoid of meaning. (p. 242)

Remember from Chapter One, Hill and Amabile (1993) similarly not only hypothesized that KAI style is not independent from levels of creativity but even used the KAI as a measure of level of creativity in their study, with a higher KAI Innovator style "hypothesized as a positive predictor of the creativity of an eventual product" (p. 415). They stated:

> While it is true that the *way* (style) in which people approach a task is important, and that some ways of doing things may indeed be unrelated to the level of creativity of the outcome, it is equally true that *some ways of doing things will lead to more creative products.* (p. 414)

In this view, a disposition toward originality is given more importance in the conception of creativity than a disposition toward effectiveness. Here various style preferences are not "symmetrically distributed" as Kaufmann put it—some preferences carry more weight towards higher levels of creative potential. From this perspective, although everyone is capable of creativity, higher levels of creativity are more likely from Kirton's (1976) "'men of ideas,' who fail to exhibit a knack for getting their notions implemented" than from those "who 'fail to see

possibilities outside the accepted pattern'" (p. 628). As was discussed in Chapter One, Feist (1999) argued that research has demonstrated over the decades that, "The creative personality does exist and personality dispositions regularly and predictably relate to creative achievement in art and science" (p. 290). Interpreting the results from this perspective could suggest that ADHD adults tend to have more of these creative personality dispositions.

But if people with ADHD do have a higher-than-average creative potential, then why has the ADHD-creativity research not clearly supported this? One could argue here that it would be premature to conclude that people with ADHD do not have higher creative potentials given the limited amount of research. This also takes us back to the limitations of the research that were introduced at the outset of this paper: the lack of clear definitions of creativity in ADHD studies, the relative lack of assessment diversity and heavy reliance on divergent thinking tests, and the potential limitations of these divergent thinking tests for people with ADHD. (However, White & Shah's [2011] study may be slowly tipping the evidence to this position by finding higher real-world creative achievement among university students with ADHD in tandem with collectively higher FourSight Ideator style preferences.)

The usefulness of Runco's dimension of *creative potential* defined in Chapter One can best be appreciated here. This dimension was delineated to allow for "research on everyday creativity and creative potentials of children and others who may have most of what it takes but require educational opportunities or other support before they can perform in a creative fashion" (Kozbelt, Beghetto, & Runco, 2010, p. 25). In this case, the support might be in the form of ADHD therapy and coaching that is mindful of creativity. Though high creative levels may not always manifest—indeed, because of the inherent challenges of ADHD such as difficulties with time management or getting organized—being able to identify certain style preferences and

predispositions could potentially help us detect and channel high latent creative potential that might only surface once the ADHD challenges are successfully managed.

Practical Implications

Regardless of the position one takes in the style-level debates, the attempt to conceptually distinguish style from disorder has potential practical implications. Non-ADHD adults who have the same cognitive style tendencies that were found among the ADHD adults of this study face challenges that appear to overlap some of the challenges that are associated with ADHD. Some of these challenges have already been identified in the cognitive style literature—and cognitive style assessment practitioners have developed strategies to deal with them. The practical value here is that we can now design experiments to see if these strategies are helpful for dealing with the apparent overlapping challenges that are commonly found among people with ADHD. Because cognitive style is not theoretically amenable to drugs or therapy, being able to distinguish which challenges might be due to cognitive style rather than neurocognitive impairments may help us delineate the limits of ADHD medication and therapy. Below we explore more specifically how cognitive style could account for ADHD-like challenges, and potential strategies to deal with them.

Wide Cognitive Style Gaps

The cognitive style gap concept (briefly introduced in Chapter One) was broken down into two kinds by Kirton (2003)—the first being "the distance between one's preferred style and the behavior that appears to be needed in some situation" (p. 248). The second kind of cognitive gaps are "the distance in social interaction, between preferred styles of: (a) two people, (b) a

person and a group, or (c) two groups." (p. 248). The further apart people are from one another on the KAI continuum, the more friction and misunderstandings arise, and the more trouble they have getting along. These problems that can arise from gaps are found even between two people who are both considered more KAI Innovative (or both more KAI Adaptive) than the average population KAI score of approximately 95 (for example, between a person with a KAI score of 115 and one with an even higher score of 135). Even a small 10-point difference between two people or between a person and the average of a group with whom they are interacting can be noticeable, as Kirton (2003) explains here:

> If 10 points difference between individuals is, in psychology terminology, the 'just noticeable difference,' 20 points is very clearly noticeable and large enough to require care to avoid breakdowns in communications (e.g. McCarthy, 1988). A gap of 30 or 40 points can cause real problems; such a gap needs constant attention to avoid misunderstanding and friction (Lindsay, 1985; Kubes & Spillerova, 1992; Rickards & Moger, 1994). (p. 67)

With a group average KAI score of over 115, this brings the participants of this study to an approximate 20-point gap from the average general population score of approximately 95. Even more striking were the 20 ADHD participants who were diagnosed with combined hyperactive-inattentive subtype who had an average KAI score of over 124—bringing them close to a 30-point gap from the average population. The implication here is that even if these participants were not suffering from ADHD, KAI theory predicts these kinds of score gaps would lead to serious complications in their interactions with people operating within an average 95 score range.

Theoretically, there are comparable cognitive style gap dynamics among people with contrasting FourSight styles (and future research might identify scale-point thresholds that lead to similar progressive degradations in group and individual functioning). An example of

cognitive style gaps in FourSight might include a person with a very high Ideator preference but a very low Developer preference collaborating with a person with inverse preferences. It is likely that unless they are aware of cognitive style differences, the Ideator will get frustrated because the Developer might seem too nit-picky, too locked into one approach, and annoyingly finds flaws in others' ideas—while the Developer could get frustrated because the Ideator might seem to draw too much attention to themselves, too impatient when others do not understand their ideas, too off-the-wall, too abstract, and not able to stick to one idea (Puccio, 2002b).

Coping Behavior Resulting from Wide Cognitive Style Gaps

In order to collaborate with others or deal with situations with which one has a wide cognitive gap, one must use what is called *coping behavior* in the KAI literature. Here this means behaving outside one's preferred style in order to bridge the cognitive gap—which is uncomfortable and is thus done as little as possible (Kirton, 2003). Kirton (2003) explained that, "all behaviour costs effort, but working in a style away from one's preferred style is additionally expensive" (p. 254), and observed that as the cognitive gap widens, coping behavior becomes possibly exponentially more challenging and unlikely to continue.

A critical thing to keep in mind is that coping behavior is not believed to get easier over time nor with practice. According to Kirton and others, cognitive style is deep-seated, determined early in life, possibly inherited, and very resistant to change (Clapp, 1993; Kirton, 2003). And according to reports from KAI practitioners over the years, training has no effect on changing one's cognitive style preferences (though this is an area that needs more empirical research) (Kirton, 2003). Becoming aware of cognitive style gaps may help motivate people to overcome them, but as long as there is a wide cognitive gap, uncomfortable coping behavior is

required for it to be bridged.

Implications of Wide Cognitive Style Gaps for ADHD Medication and Therapy

Research has shown that ADHD medication and therapy can be very effective in reducing the negative impact of living with ADHD, as was discussed in Chapter One. For example, ADHD stimulant medications are theorized to arouse the executive functioning parts of the brain that give a person with ADHD more control over certain behaviors—such as having one's mind wander in the middle of important conversations or classroom activities, or being so disorganized and losing track of time to the point of missing important appointments, or thoughtlessly following an impulse that tactlessly interrupts others in conversation. These behaviors in access can lead to social rejection, intimate relationship problems, job loss, and educational failures that can significantly reduce one's quality of life.

However, even though ADHD medication and therapy have been shown to help with some elements of the behaviors that may stem more from neurocognitive challenges—they seem theoretically unlikely to alter a person's core cognitive style preferences (again, this does not imply no interaction between neurocognitive challenges and the development of certain cognitive style preferences). If cognitive style preference is determined early in life, is possibly inherited, and is deep-seated and resistant to change (Kirton, 2003)—this could imply that *some* of the negative behaviors seen among people with ADHD that are due to cognitive style preferences (rather than neurocognitive impairments) are not likely to be modified over long periods of time through ADHD medication or therapy.

For example, ADHD medication and therapy seem unlikely to change a high KAI Innovator with ADHD (e.g., most of the adults in this study, especially the combined subtype)

into having a cognitive style preference for conformity, prudence, precision, reliability, efficiency, and discipline. Regardless of medication and therapy, it seems likely that such a person will never feel comfortable in situations where they have to cope this way. Such a person will theoretically always have a cognitive style preference for challenging conventions and rules and thinking tangentially. Also they might always seem annoyingly undisciplined, impractical or unsound to those who are not high KAI Innovators. And if the cognitive style gap is wide enough between the person and the environments, social groups, and jobs in which they often find themselves—it seems that they would still be susceptible to losing their jobs, being ostracized, and having their relationships break down. Though these are common consequences of ADHD—in these instances, they might not be due to the neurocognitive challenges of ADHD per se, but instead from deep-seated cognitive style differences.

If future research bears out the deep-seated nature of cognitive style and thus the potential limitations of medication and therapy—cognitive style could be an important area to consider in future investigations of why people discontinue ADHD treatment, or for when treatment is simply not effective. For example, perhaps sometimes people with ADHD take medication and follow therapy but sense that their quality of life has not sufficiently improved—unwittingly because they are constantly coping with wide cognitive gaps in their various life settings. Thus cognitive gap management strategies may prove to be an important area of future research and development to find ways to compliment current ADHD management strategies. For example, in organizational settings, Kirton (2003) outlined some general solutions for dealing with cognitive gaps. Warning of the dangers of not dealing with cognitive gaps, he went on to suggest, “There are many ways to assist in closing or avoiding cognitive gaps, such as changing jobs, changing the job, delegating, reorganising roles in a team, and other such commonplace

ploys" (p. 248). These strategies speak to what in organizational psychology is called finding *cognitive fit*, which falls in the area of *person-environment fit* (see Cools, Van den Broeck, & Bouckenooghe, 2009). In educational settings, similar strategies are sometimes termed *style matching* (e.g., Fan & He, 2012). A powerful first metacognitive step in any setting is to simply develop an awareness of cognitive style. Below we explore these approaches and the most promising directions for future research. Understanding cognitive style might help us determine which ADHD-associated challenges are better suited to these methods rather than (or in addition to) current therapeutic approaches.

Developing Style Awareness

Simply becoming aware of cognitive style can have a positive impact (Parnes, 1999; Puccio, 1999; Riding & Sadler-Smith, 1997; Talbot, 1997; Treffinger, Selby, & Isaksen, 2008). At the individual level, Riding and Sadler-Smith (1997) found that a "recognition of the strengths and weaknesses of one's own style naturally leads to the formation of strategies" (p. 206). At the interpersonal level, when people are not aware of style differences, misunderstandings and even outright hostility can arise between them (DeCusatis, 2009; Kirton, 2003). On the other hand, "[w]hen teams are aware of their preferences, conflict can be diffused or leveraged as creative tension, producing a potentially more synergistic result" (Decusatis, 2009, p. 162). Parnes (1999) described the impact of using cognitive style assessments in creativity and innovation training programs:

> When these are used at the start of a program, participants gain understanding and appreciation of each other's strengths and weaknesses. They learn to better appreciate and support one another. Instructor/ facilitators can group people effectively to build better learning and problem-solving teams. (p. 476)

Similarly, in organizational contexts, Talbot (1997) said, "Awareness of the style concept, coupled with a respect for the different strengths and weaknesses of each style, can help considerably in generating a collaborative problem-solving strategy in organizations" (p. 183). In a meta-analysis conducted by Treffinger, Selby, and Isaksen (2008), they concluded that these benefits extend beyond corporate settings to school settings at many levels (from primary school to university). The impact of simple style awareness on a person seems a very fruitful area of future research that is still quite limited even for the general population (Riding & Sadler-Smith, 1997) and has not yet been studied among those with ADHD.

Below are more specific examples of the kind of insight style-awareness might bring to the many ADHD participants of this study who had high FourSight Ideator preferences. The impact that Puccio, Wheeler, and Cassandro (2004) found in the non-ADHD population was that:

> Ideators, for example, seem to be quite comfortable with their ability to generate ideas; however, they appear to recognize the need to spend more time refining and developing the plethora of ideas they generate. To further enhance their creative output, Ideators also understand that they need to be more persistent in following through on their ideas. (p. 213)

Within the KAI paradigm, the many high Innovators found among the ADHD participants of this study could develop an appreciation for people who are more on the Adaptor end of the continuum, who they previously might have dismissed as boring, conformist, and working too much "within the system." With style awareness, KAI Innovators may come to appreciate the Adaptor's skill in bringing effectiveness and follow-through to new ideas, and understanding how to integrate new ideas into existing structures. On the other hand, people who are more on the KAI Adaptive end of the continuum may come to appreciate that the undisciplined, nonconforming, and sometimes abrasive style of Innovators may be a necessary

catalyst for bringing in originality that could lead to creativity.

Another way to facilitate communication and awareness between styles is to find people who might be willing to serve as *bridgers*. A bridger is described by Kirton (2003) as a person with a cognitive style somewhere between two extremes who can understand both extremes better than they can understand one another, and can therefore facilitate interactions. For example: person with a KAI score of 85 will probably have a very hard time collaborating with a person scoring 115 (30-point gap)—but a person with a score of 100, who is 15 points away from either side, could theoretically get along well enough with the other two people to facilitate better interactions between them. And according to Kirton (2003), bridging skills can be improved through training.

Finding Cognitive Fit

Understanding that coping behavior can be very psychologically fatiguing for a person who has a wide cognitive gap from their environment—and how this increases likelihood that they might give up and revert to behaviors that might not be appropriate for their environment—points to how important it may be to find the right environment. This, rather than only trying to fit a person to the environment in which they happen to find themselves through ADHD therapy and medication. We now have preliminary tools (such as KAI and FourSight) to potentially operationalize, research and refine this strategy to help us better identify the kinds of environments that would more likely be a good fit for many people with ADHD. The goal in finding cognitive fit would not be to *eliminate* the need for coping behavior because "the usual array of diverse problems the individual needs to solve" (Kirton, 2003, p. 254) requires every human to stretch beyond their preferred cognitive style at times. Instead, the goal would be to

reduce a person's immersion in environments and situations where coping behavior would be needed so much as to cause problems. And there is plenty of anecdotal observation to point researchers in potential directions of investigation such as this one by ADHD clinician, Kevin Murphy (1995):

> High-risk, fast-paced industries such as sales, advertizing, and the creative arts, in fact, do seem to attract a high percentage of men and women with ADD, and these people appear to succeed better than their ADD peers who have jobs requiring more structure and administration. (p. 267)

Beyond the implications of cognitive gaps between coworkers, between employers and employees, or between individuals and the problem-solving situations in which they find themselves—we can also consider wide cognitive gap implications between spouses, teachers and students, parents and children, judges and defendants, and even between patients and clinicians (whose role it is to diagnose and treat ADHD). Although the FourSight and KAI were primarily designed for use on the job, they have been suggested as useful tools in managing a multitude of human dynamics, including marriage (Kirton, 2003; Puccio, 2002b). The potential importance of maximizing cognitive fit for people with ADHD might be surmised from this statement by ADHD clinicians Hallowell and Ratey (2006): "Marrying the right person and finding the right job are probably the two most important 'treatments' for adults" (p. 27).

White and Shah (2011) also discussed in their ADHD study described in Chapter Two that, "Vocational matching using creative style may be especially beneficial for adults with ADHD, given that attentional deficits pose significant risk to job success (Kessler et al., 2006)" (p. 676). Based on their results, they cited entrepreneurship as an appropriate example, which is especially relevant in light of the KAI results of the present study and entrepreneurship studies that have used KAI. Consider the following examples: Engle, Mah, and Sadri (1997) found that

entrepreneurs (defined in their study as business owners) had significantly higher KAI Innovator scores than employees (M = 104.82 versus M = 96.14), and concluded that results "confirmed the use of the KAI as a scale that will distinguish people with entrepreneurial characteristics" (p.48). Given the high KAI Innovator results among the ADHD adults of this study, this may help somewhat support claims of the benefits of ADHD for entrepreneurship made in the media by high-profile entrepreneurs and found in some of the ADHD self-help literature described in Chapter Two. This also speaks to the importance of future experimentation and research in this area.

Buttner and Gryskiewicz (1993), not only found a higher overall KAI mean score for their entire group of entrepreneurs (M = 113.9) compared to previously established mean scores among U.S. managers in large organizations (M = 96), but their study found differences even among these KAI Innovator entrepreneurs. The entrepreneurs with a slightly lower KAI score were more likely to continue with their business venture as it became more routine and administrative, matured, and required a more KAI Adaptive style of problem-solving. On the other hand, the entrepreneurs with higher KAI scores were less likely to continue with the business, and were more likely to sell off the business or fail as the venture became more administrative and routine. Relatedly, they found a significant difference between the entrepreneurs who had started a single business (M = 110.7), versus the serial entrepreneurs who had started two or more ventures (M = 122.6).

Within established organizations, higher KAI Innovator scores have also been helpful in identifying *intrapreneurs*, defined as entrepreneurs who launch initiatives within established organizations (e.g., Rieple & Vyakarnam, 1994; Sayeed & Gazdar, 2003). For the long-term success of an organization, bringing in style diversity is thought to bring long-term success—as

long as the diverse parties are aware of and respect one another's differences (Puccio 2002b). Certain styles may be better for specific, short-term problems. For example, KAI Innovators might enjoy and be more adept at leading original initiatives within an organization; and a team leader looking to generate new product ideas might look to FourSight Ideators, and once new ideas have been generated, turn to FourSight Developers and FourSight Implementers to refine and carry out these new ideas (Puccio, 2002b). But again, over time, a wider diversity of styles allows a group to solve a wider variety of inevitable problems that will arise, thus increasing the group's chances of long-term survival (Kirton, 2003).

In education, the similar concept of style matching looks at how the match or mismatch between a teacher and a student's style can predict success in school. Though the body of empirical research here is also still small and inconclusive, Sternberg and Grigorenko (1995) found for example, that teachers seem to prefer students whose style is more similar to their own. In a recent review of research on influence of style on academic achievement, Fan and He (2012) found that some studies showed that matching student and teacher style had a significant impact on school success while other studies showed little to no effect. They also found that developing style awareness was also shown to lead to higher academic achievement in some studies, though other studies did not. They concluded that more studies are necessary to resolve these issues.

Though it may seem obvious that it is beneficial for people to find an environment and job that fits their style—it might not be given the attention that it potentially warrants in current ADHD research. If developing style awareness and finding cognitive fit helps diminish problems among people with ADHD, it might even help us determine which ADHD-associated problems might largely be consequences of cognitive misfit rather than neurocognitive impairment. This might save us the unnecessary pain of trying to 'treat' problems that might be inevitable

consequences of coping behavior due to being in the wrong environment—and could also save us time and resources that could better be used to target remaining problems that might be largely consequences of neurocognitive impairments, such as working memory problems. However, much research is needed in this area, as Cools, Van den Broeck, and Bouckenooghe (2009) recently pointed out, remarking that although there is a lot of theoretical work that emphasizes the importance of cognitive fit, few empirical studies have investigated the outcomes of cognitive fit or cognitive misfit. The current lag in robust research on the effectiveness of style matching and training on vocational and educational outcomes (versus its face value importance and how it is touted by experienced style practitioners) could hamper its systematic application as a potential mainstream therapeutic strategy for ADHD.

Limitations of the Study

The following are a few of this study's many limitations: First, because of limited resources, participant scores had to be compared to non-ADHD population score norms provided in the assessments' manuals, or from published scores of past studies of other populations, rather than a matched control group.

Second, a convenience sample was used, so results should be interpreted carefully. Participants were contacted through ADHD support groups, and this may have selected for participants who were more open to experience (experiences such as joining a support group and participating in a study), which is associated with higher levels of creativity. It may have also excluded people with more severe levels of ADHD, who may have been too disorganized to join a support group, or follow through on participating in the study (e.g., contacting the researcher, completing all of the research assessments, mailing back the research packet).

Third, the assessments were all based on reading and relatively strong vocabulary comprehension. This could have been a limitation because there are higher incidences of dyslexia and reading problems in the ADHD population (Brown, 2005). This could have also played into recruitment limitations because many participants were recruited through the written word online.

Fourth, because the research packet took an estimated average of 30 minutes of attention to complete, this may have excluded people with more severe ADHD, who may have received a research packet, but may have had difficulties in completing the assessments and following through on returning their research package.

Finally, all assessments were through self-report. This included the ADHD diagnosis because there were not enough resources to conduct an individual diagnosis of each participant. Participants simply confirmed that they had received a professional diagnosis.

Future Research Recommendations

Most ADHD participants of this study implicitly perceived themselves to be more creative than average. As was discussed in Chapter One, perceiving oneself as creative is often considered an important basic element in actually being more creative than one might otherwise be (regardless of one's innate abilities). With this basic creativity consciousness apparently often already in place, the results of this study might lead to a few rudimentary suggestions that may prove beneficial for maximizing the creativity of ADHD adults. These speculations are presented not as confirmed effective strategies, but as recommended areas of research to test for potential effectiveness.

As with the general population, it may be useful to develop an awareness of cognitive

style. For example, the many high KAI Innovators and FourSight Ideators among the ADHD adults in this study might develop a deeper confidence and appreciation of the value of their preference for generating many original ideas—and learn not be discouraged by the heightened probability that others might judge their ideas as impractical or outlandish. People with this style may also begin to realize that their original ideas might benefit from more patient development, refinement, and persistence in their implementation. They may also come to appreciate that the rules, structures, and systems upheld by others—that they might dismiss as annoying and getting in the way of their creativity—may on the contrary, sometimes be the very elements that could help their originality become full-fledged creativity. In addition, if people around them also develop style awareness so that there is reciprocal respect and appreciation for one another's strengths and weakness, it might lead to fruitful creative collaboration. Even apart from the efforts to maximize creativity discussed here, developing an appreciation of structures and systems in general is already considered an integral part of successful ADHD therapy and coaching. Here, ADHD clinicians Hallowell and Ratey (1994) explain:

> Once the individual understands the importance of structure and goes to the trouble of setting up a solid system of organization for himself, he often finds that the system keeps collapsing, or that his attempts to abide by the system repeatedly fail. This is where a coach can be invaluable. Rather than letting the system collapse, the coach can help the individual revise the system, or can offer encouragement to stay within the system. It is not surprising, after all, for it to take a while for the new system to start to work; it is replacing a lifetime of no system. However, the person with ADD can get discouraged very quickly, not wanting to experience another failure, and so back away. At these moments the coach can intervene, offering reassurance, support, and hope. (p. 267)

If one hopes to maximize one's creativity, it is probably critical that an individual find a way to overcome the common ADHD characteristics that might get in the way of creativity such as extreme disorganization and poor time management. As Nickerson (1999) explains here:

> Creative pursuits are time consuming. If one wants to write poetry or compose music, one must find time—lots of time—to write or compose. It is not surprising to discover that many eminently creative people have structured their lives so as to ensure the availability of time for their creative activities on a regular basis. Time management can be learned. And learning it is probably quite important for anyone who desires to become more proficient at some creative endeavor. Without skill at time management, it is easy to find oneself continually in react mode or frequently engaged in activities that have no purpose other than that of 'killing time.' (p. 417)

If one wants to go beyond just maximizing one's everyday creativity and ever aspire to reach high-level creativity, one not only needs time, but much effort, persistence and perseverance to master any domain (Runco, 2007). According to Nickerson (1999), "As a rule, great artists have mastered the prevailing techniques of their art form before they have begun to innovate and influence its further development" and that "One cannot expect to make an impact in science as a consequence of new insights unless one has a thorough understanding of what is already known, or believed to be true, in a given field" (p. 409). But even if one simply wants to increase opportunities for everyday *little-c* creativity in one's career—prioritizing strategies to overcome ADHD learning challenges in order to acquire fundamental domain knowledge and skills may help one avoid a kind of catch-22 that Murphy (1995) identified:

> Too often, adults with ADD are prevented from getting ahead in the workplace by the lack of a high school, college, or advanced degree. Ironically, the kinds of jobs that are available to people without advanced skills tend to be those requiring speed, organization, and repetition—just the skills that most adults with ADD may often lack. Conversely, the jobs most attractive to adults with ADD—those that involve creativity and flexibility—are usually the ones that require more education. (p. 271)

Finally, Collins and Amabile (1999) said that "motivation that stems from the individual's personal involvement in the work—love, if you will—is crucial for high levels of creativity in any domain" (p. 297) and consequently that "the best way to help people maximize

their creative potential is to allow them to do something they love (Amabile, 1996; Runco & Chand, 1995; Torrance, 1995)" (p. 305). This may be particularly important for people with ADHD because, as was explained in Chapter One, ADHD symptoms can worsen when in situations of little intrinsic appeal, whereas they may seem to diminish or disappear when pursuing an area of interest. Identifying areas that are strongly intrinsically motivating to a person with ADHD could conceivably help drive the persistence necessary to overcome ADHD challenges in order to pursue these passions. As Runco (2007) mused, "It is possible that creative individuals are not so much persistent as they are intrinsically motivated, but they appear to be persistent because they are so motivated" (p. 295).

As the popular discourse continues to influence the research, it may be good for researchers to keep the following issues in mind. To avoid adding confusion to the debates—particularly in light of the results of this study suggesting significantly higher preferences for originality among ADHD adults—Eysenck's (1993) recommendation here seems especially relevant:

> In order to avoid using the term *creativity* in two different senses, it might be useful to use the term *originality* instead of *creativity as a trait*. Obviously, it is possible to be original (i.e., to present unusual solutions, associations, etc.) without being creative in the achievement sense. Creativity implies that the original responses are relevant, and the production of creative objects requires a lengthy process of constructive work, defense against critics, and so forth. Originality by itself is not enough to be considered creativity; much more is required. A psychotic person's responses are original (in the sense of unusual), but they are hardly ever creative. (pp. 152-153)

In terms of methodology, because the relationship between ADHD and creativity is still poorly understood, it might be useful to consider Ruth Richards' (2010) typology of relationships of creativity to problems or pathologies. This typology could help us test and develop hypotheses around the following possibilities: (1) ADHD leads to creativity, (2) ADHD leads to a third

factor that leads to creativity, (3) creativity leads to ADHD, (4) creativity leads to a third factor that leads to ADHD, (5) a third factor that can affect both creativity and ADHD.

Also, Silvia and Kaufman (2010) recently advised creativity researchers to take care not to commit the *fallacy of the inverse*, where two conditional probabilities are confused. They used the example that "if someone has a beard, the probability of being a man is quite high; but if someone is a man, the probability of having a beard is quite low" (p. 385). In this case, although a study might show that ADHD adults have more creative accomplishments than people without ADHD—a study of adults with high creative accomplishments might find that they are less likely to have ADHD than people without creative accomplishments. The small body of ADHD-creativity studies have so far principally taken ADHD samples and tested for creativity. Top-down studies that sample highly creative people and test for rates of ADHD are a new direction that researchers could explore.

Similarly, historiometric research could be instructive, such as the work conducted by Dean Simonton (1999) using historical archives and the biographies of the eminently creative who have changed history. Although admittedly a difficult and problematic research approach (see Silvia & Kaufman, 2010), it could allow for serious attempts to retroactively diagnose creative figures such as Thomas Edison and Leonardo da Vinci—who are so often touted as the poster children of ADHD in the self-help literature.

Furthermore, in recommending the assessment of both clinical and subclinical samples in this kind of creativity research, Silvia and Kaufman (2010) suggested, "People with subclinical trait levels may be more creative but, at the same time, people with the full-blown disorder may not be, owing to greater impairment." (p. 390). Therefore, in assessing the severity of ADHD, research might find that having some ADHD characteristics or mild ADHD might be related to

higher levels of creativity, but having severe ADHD would not.

Future studies could also control for other factors such as IQ and affect or emotion. For example, Healey and Rucklidge (2008) hinted that it might be the interaction of high IQ with ADHD that impacts creativity. Also, for example, depression can have a significant impact on creativity and ADHD is associated with high rates of depression (Hallowell & Ratey, 1994, 2006; Solanto et al., 2008). Many adults come in for an ADHD diagnosis because they are suffering from serious failures in major life areas such as employment, marriage, and education—the kind of problems that are associated with depression (Solanto et al., 2008). Long-term studies could also assess the creativity of people with ADHD who have found treatment programs that have allowed them to successfully manage their ADHD symptoms. Do levels of creativity significantly increase once the more debilitating aspects of ADHD are adequately managed?

Summary and Conclusion

After revisiting the four hypotheses that guided this study, this chapter examined the theoretical implications of the results through implicit versus explicit theories of creativity, and then in the context of the creative level-style debate—hopefully providing useful new perspectives for the even more controversial debates about the creativity of people with ADHD. Then the practical implications of the results were explored, including the potential for developing cognitive-style-based approaches for dealing with certain ADHD-associated challenges. This was followed by a list of some of the principal limitations of this study. Finally, future research recommendations were suggested, first, for finding ways to maximize creativity among ADHD adults, and then for gaining a better basic understanding of the potential

relationship between ADHD and creativity.

Hopefully by having introduced a few relevant theories and definitions of creativity in the context of ADHD, this paper might encourage more rigorous definitions of creativity in future ADHD-creativity research—which might in turn reduce public controversy and confusion. One's conclusions about the creativity of people with ADHD can vary widely based on one's definition of creativity. Also, having expanded the cognitive style research and having introduced assessments of creative personality and creative self-perception seems to have yielded fruitful insight and new avenues for future research. Finally, regardless of whether or not future research will demonstrate that people with ADHD have higher-than-average levels of creative potential, the gathered assessment data seems to suggest that it might eventually be possible to conceptually distinguish cognitive style from the neurocognitive impairments of ADHD. This might help us understand how to best design ADHD therapies that maximize creativity, and help those who may be "frustrated dreamers" become truly creative contributors to the world.

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14 March 2008

Learn about yourself - Adult ADD/ ADHD Personality Style Study

Greetings,

I am conducting a study in Canada and the United States on the cognitive style and personality of adults with Attention Deficit Hyperactivity Disorder (ADD/ ADHD) through the State University of New York College at Buffalo.

If you have been professionally diagnosed with ADD/ ADHD (with or without Hyperactivity) and are at least 18 years of age, your participation would be extremely valuable in helping us understand some under-explored dimensions of ADD/ ADHD. Insights from research of this nature often help in the development of mainstream and alternative coping methods and therapies.

Participation entails answering one set of short questionnaires for about 30 minutes (which will be post-mailed to you) and mailing them back at my expense. In return, you will learn about yourself for free. Some high-quality questionnaires are included, for which you would normally have to pay. You will get personalized feedback within a few weeks.

Over the years, most people (with or without ADD/ ADHD) have found these scientific questionnaires not only interesting and fun, but also very useful in improving their self-awareness and consequently, their self-management. They also provide insight into understanding how to best interact with other people.

As a graduate researcher [redacted], I am very sensitive to the importance of confidentiality. Rest assured that your identity and your participation in this study will be kept highly confidential. If you would like to participate, please provide your postal address to issajj74@mail.buffalostate.edu so that the questionnaires can be mailed to you.

Your participation would be greatly appreciated!

Sincerely,

Jean-Pierre Issa

Buffalo State
State University of New York

INFORMED CONSENT

Assessing the Cognitive Style and Personality of Adult ADHD

Participation in this research study is completely voluntary. Please read the information below and ask questions about anything that you do not understand before deciding if you want to participate. A researcher listed below will be available to answer your questions.

RESEARCH TEAM AND SPONSORS

Principal Investigator: Jean-Pierre Issa
247 Chase Hall, Buffalo State College, 1300 Elmwood Ave, Buffalo, NY 14222
Telephone: (703) 342-6996, Email: issajj74@mail.buffalostate.edu

Faculty Advisor: Dr. Gerard Puccio
247 Chase Hall, Buffalo State College, 1300 Elmwood Ave, Buffalo, NY 14222
Telephone: (716) 878-6223, Email: pucciogj@buffalostate.edu

Study Locations: Via post-mail throughout the United States and Canada, but principally in the areas surrounding Buffalo, New York and Toronto, Ontario.

PURPOSE OF STUDY

The purpose of this research study is to examine the cognitive style and personality of Adults with Attention Deficit Disorder with or without Hyperactivity (ADHD).

PARTICIPANTS

Inclusion Requirements

You are eligible to participate in this study if you are at least 18 years of age or older and have been clinically diagnosed with Attention Deficit Disorder with or without Hyperactivity (ADD/ ADHD).

Exclusion Requirements

You are not eligible to participate in this study if you have not been clinically diagnosed with Attention Deficit Disorder with or without Hyperactivity (ADD/ ADHD). You are also not eligible if you are 17 years of age or younger.

Number of Participants

This study will include approximately 72 participants.

PROCEDURES

You have received this packet of questionnaires because you have indicated interest in participating in this study. After carefully reading this consent form, if you want to participate, please sign both copies of the consent forms and keep one for your records.

Then, you are asked to complete the questionnaires in the envelope. Then you will be asked to place all of the completed questionnaires *along with a signed copy of this consent form* in the pre-paid self-addressed envelope and drop it in a mailbox.

Within a few months after you mail back your completed questionnaires, you will be sent personalized feedback for the two principal questionnaires that have well-developed feedback reports. These are the reports which you would most likely find helpful in learning about your cognitive style. In order for you to receive feedback, your answers must be clearly and completely marked so that a valid assessment can be made.

Total Time Commitment
This study will involve approximately 30 minutes of your time.

RISKS AND DISCOMFORTS
There are no known risks to participating in this research.

BENEFITS
Benefits to the Participant
The possible benefits you may experience from the procedures described in this study include developing better self-awareness and consequently, better self-management. It may also provide some insight into how to best work with other people.

Benefits to Others or Society
One potential benefit could be a better understanding of some under-explored dimensions of ADHD. This could benefit others by leading to the development and/or improvement of mainstream and alternative coping methods and therapies for ADHD.

ALTERNATIVES TO PARTICIPATION
The alternative to the procedures in this study is to not participate in this study.

COMPENSATION, COSTS AND REIMBURSEMENT
Compensation for Participation
There will be no monetary forms of compensation. However, you will receive personalized feedback. Normally you would have to pay to learn about yourself through these questionnaires.

WITHDRAWAL OR TERMINATION FROM THE STUDY AND CONSEQUENCES
You are free to withdraw from this study at any time. If you decide to withdraw from this study, simply use the included self-addressed pre-paid envelop to return your incomplete and/or complete questionnaires and notify the principal investigator as soon as possible. If you do not complete the questionnaires, your feedback scores cannot be accurately assessed and you therefore will not be able to receive personalized feedback.

CONFIDENTIALITY
Data Storage
Your research records will be stored in the following manner:

- All study data will be kept under lock and key and only authorized research team members will have access to it so that this information will be protected and kept confidential.

- All data will be retained for at least three years, in compliance with federal regulations.

- Your research records will be stored with all identifiable information about you removed, with only a code to identify you. The code that links your name to the data will be kept separate from the study data.

- The researchers plan to maintain your identifiable research data until your feedback has been sent to you and the research is published.

NEW FINDINGS

If, during the course of this study, significant new information becomes available that may relate to your willingness to continue to participate, this information will be provided to you by the research team listed at the top of the form.

IF YOU HAVE QUESTIONS

If you have any comments, concerns, or questions regarding the conduct of this research, please contact the research team listed at the top of this form.

If you are unable to reach a member of the research team listed at the top of the form and have general questions, or you have concerns or complaints about the research study, research team, or questions about your rights as a research participant, please contact The Research Foundation of SUNY/Office of Sponsored Programs by phone, (716) 878-6700 or by e-mail at gameg@rf.buffalostate.edu or in person at Bishop Hall, Room 17, 1300 Elmwood Avenue, Buffalo, NY 14222.

VOLUNTARY PARTICIPATION STATEMENT

Participation in this study is voluntary. You may refuse to answer any question or discontinue your involvement at any time without penalty or loss of benefits to which you might otherwise be entitled. Your decision will not affect your future relationship with Buffalo State College. Your signature below indicates that you have read the information in this consent form and have had a chance to ask any questions that you have about the study.

SIGNATURE LINES

_____ _____

Participant Signature* **Date**

_____ _____

Researcher Signature* **Date**

Assessing the Cognitive Style and Personality of Adult ADHD

Thank you for taking the time to participate in this study. Remember that this information is strictly confidential and that the results reported from the information obtained will not identify you in any way. ***Please answer the following:***

Date: _____

Age: _____ **Sex** (please check one)**: Male____ Female____**

Occupation/Title: _____

Department: _____

Educational Status:_____

Other: _____

1.) Have you been clinically diagnosed as having Attention Deficit Disorder, with or without Hyperactivity or ADHD (sometimes also called ADD)? (please check one):

YES_____ **NO_____**

1a.) If **YES**, which type? (please check one):

_____Hyperactive Type

_____Inattentive Type

_____Combined Inattentive and Hyperactive Type

_____Do not know

1b.) If **NO**, do you believe that you have undiagnosed Attention Deficit Disorder, with or without Hyperactivity or ADHD (sometimes also called ADD)? (please check one):

YES_____ **NO____**

2.) Have you ever taken ADHD/ ADD medications? (please check one):

YES_____ **NO_____**

3.) Are you currently taking ADHD/ ADD medication? (please check one):

YES_____ **NO_____**

4.) Are you as proficient in the English language as a native speaker? (please check one):

YES_____ **NO_____**

Code ___ ___ ___ ___ ___ ___ ___

Please quickly answer the following six questions. Do not worry about answering them perfectly:

1.) Do you consider yourself more of a shy or outgoing person *overall?* (please check one)

___Shy ___Outgoing ___Not sure

2.) How often do you find that you make decisions based on intuition or "gut feelings"? (please check one)
___Often
___Sometimes
___Rarely
___Not at all

3.) Do you consider yourself to be an organized person *overall*? (please check one)

___Yes ___No ___Not sure

4.) How creative do you consider yourself to be? (please check one)
___Very creative
___Somewhat more creative than average
___Average
___Somewhat less creative than average
___Very uncreative

5.) How often have others commented on your creative abilities? (please check one)
___Often
___Sometimes
___Rarely
___Not at all

6.) When do you feel you have the most energy? (please check one)
___Morning
___Afternoon
___Evening
___Late night

THANK YOU *VERY MUCH* FOR YOUR PARTICIPATION!

Final Instructions Checklist:

- Double-check to make sure you have answered all questions
- Sign the Informed Consent forms and place one in the self-addressed stamped envelope
- Keep one copy of the Informed Consent form
- Place the questionnaires (Parts 1 - 5) in the self-addressed stamped envelope
- Keep the pen
- Mail the envelope & wait for feedback within a few months

THANK YOU!