PREFERENTIAL SEATING FOR COLLEGE STUDENTS WITH ADHD: IS IT AN EFFECTIVE ACCOMMODATION?

Except where reference is made to the work of others, the work described in this dissertation is my own or was done in collaboration with my advisory committee. This dissertation does not include proprietary or classified information.

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PREFERENTIAL SEATING FOR COLLEGE STUDENTS WITH ADHD: IS IT AN EFFECTIVE ACCOMMODATION?

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John Lloyd Clifton, son of the late Bruce Burdette Clifton and the late Ruth (Craine) Clifton was born April 4, 1963 in St. Paul, Minnesota. He graduated from Henry Sibley High School in 1981. He attended the University of Puget Sound in Tacoma, Washington, and graduated with a Bachelor of Arts degree in Religion in 1986. After working for many years as a professional SCUBA diving instructor, manufacturer's representative and underwater photographer, he obtained a Masters degree in Clinical Psychology at Minnesota State University-Mankato in 2000. He entered the Doctoral program in Clinical Psychology at Auburn University in August 1999. He married Joanne Kurzmann on October 15, 2005.

DISSERTATION ABSTRACT

PREFERENTIAL SEATING FOR COLLEGE STUDENTS WITH ADHD:

IS IT AN EFFECTIVE ACCOMMODATION?

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Doctor of Philosophy, December 17, 2007
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Given that adjusting student seating is a frequent intervention recommended for many students with ADHD, one would expect solid empirical evidence to support this recommendation. However, the available literature is not clear on whether it is the seating location in the classroom, seating location at the beginning of the semester, or some other factor that is related to student success. This dissertation addresses the relationship among attention variables, scholastic attitudes, and classroom seating choice as defined by distance from the center of the front row.

In study one, students in an introductory psychology class were administered the CAARS-S:L rating scale and the ADHD behavior checklist, along with the Learning and Study Skills Inventory (LASSI), and a demographic questionnaire which included self-report of ADHD diagnosis and any medications taken at the beginning of the semester. Students were allowed to choose their own seats at the beginning of the semester and

were required to occupy those seats for the rest of the semester. Correlations among grades, scale scores, diagnosis, attendance, and seating distance were performed at the end of the semester. 350 students participated in this part of the study in two classes. 43 individuals self-disclosed a diagnosis of ADHD. Small negative correlations were obtained for distance and grade; however, these were surpassed by the correlation between number of absences and grade. Correlations for grade and distance were more significant for ADHD participants. Attention variables did not correlate with distance. Scholastic attitudes of time management and use of support materials were negatively correlated with distance.

In study two, participants were given the same instruments as described above and then exposed to a classroom lecture on an obscure psychiatric disorder. After a 20 minute break, participants were asked to take a quiz to determine their retention of the information. This was done three times, with three lectures on equivalent but different disorders. Individuals took part in three conditions, near, middle, and far distance and the order in which they are exposed to these conditions was randomized using a latin square technique. Seventy-six students completed the experiment. Four of these individuals had a previous diagnosis of ADHD and one gave responses on the CAARS consistent with a possible diagnosis of ADHD. The results show a non-significant trend towards better performance on quizzes the closer participants sat to the front. These results generally support the notion of using preferential seating as an accommodation for college students with ADHD as part of a part of a larger accommodation package.

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I. INTRODUCTION

Preferential Seating for College Students with ADHD:

Is it an Effective Accommodation?

Still (1902, pp. 1011) first described clinical cases consistent with the modern conception of ADHD as "abnormal deficits in moral control," "wanton mischievousness," or "destructiveness." He attributed these problems to "defect of cognitive relation to the environment," "defect of moral consciousness," and "defect in inhibitory volition." At the root of these deficits in moral control was a lack of volitional inhibition, the ability to suppress one's own desires and intentions for the good of all. Still described 43 child cases that he had seen in his clinical practice. He noted the heightened emotionality of these children and that their behavior rarely responded to punishment. He also delineated the chronic nature of the disorder and reported the risk for criminal behavior in some of these cases over time. Still noted physical and psychological abnormalities accompanying the disorder: enlarged head size, a tendency to be accident-prone, and tic disorders in some patients. He observed that first-degree relatives of patients often had increased rates of substance abuse, criminal behavior, mood disorders, and suicide. Still excluded clients with obvious brain damage from his diagnosis and those who may have come from homes with poor child-rearing practices.

He argued that the underlying nature of the condition was neurological in nature and could either be hereditary or the result of prenatal or neonatal injury.

In the 100 years since Still's observations, ADHD has been known by a variety of designations including "minimal brain damage/dysfunction (MBD)," "hyperkinetic reaction of childhood," "minimal cerebral dysfunction," and "hyperkinesis" (Wender, 1995). The Diagnostic and Statistical Manuals of Mental Disorders (*DSM*s) have reflected the changing conceptions of the disorder through time. In *DSM-II* (APA, 1968) the disorder was referred to as "Hyperkinetic Reaction of Childhood disorder," and defined as, "… overactivity, restlessness, distractibility, and short attention span, especially in young children; the behavior usually diminishes by adolescence" (p. 50).

Proposed Models and Etiologies for ADHD

Still (1902) viewed patients that would now be diagnosed with ADHD as having impairments in three specific areas, in order of decreasing severity: cognitive relation to the environment, moral consciousness, and inhibitory volition. Still saw these deficits as interrelated, neurological in nature, and likely either hereditary or due to some prenatal or neonatal injury.

For most of the first half of the twentieth century, research focused on areas similar to Still's (1902) original conception. Researchers viewed hyperactivity and inattention as evidence of some form of minimal brain injury, with or without any corresponding clinical evidence or history. This perspective gave rise to the concept of "the brain injured child" (Strauss & Lehtinen, 1947). In fact, many current approaches to

dealing with these children (e.g., smaller class size, and distraction free environments) originated with Strauss.

By mid-century the research began to shift toward what was considered "hyperkinetic impulse disorder" (Laufer, Denhoff, & Solomons 1957). Focusing their research on the thalamic area of the central nervous system, these authors used an attention task and EEG monitoring as dependent measures while administering Metrozol, a drug was known to affect the thalamic area. The authors noted that hyperkinetic children required less Metrozol administration than controls before producing muscular and EEG patterns associated with lapsed attention. This study produced the first firm evidence that cortical overstimulation—thus the decreased need for Metrozol—was the neurological basis for hyperactivity.

Barkley (1998) noted that the concept of minimal brain dysfunction "MBD" or the brain injured child, although valuable for emphasizing neurological over ill-defined environmental factors, was fraught with conceptual problems including an overabundance of symptoms—99 at one point—and was too vague to be of prescriptive value. By the early 1960s, at about the same time that MBD was falling out of favor as a useful diagnostic label, Chess (1960) and others began to conceive of a "Hyperactive Child Syndrome." This syndrome was characterized by hyperactivity, required objective evidence of symptoms beyond subjective reports of parents or teachers, was not seen as the result of poor child rearing, separated hyperactivity from the broader category of brain damage, and was seen as usually diminishing by adolescence (Barkley 1998). Chess (1960) also noted the frequently associated features of educational and social difficulties as well as oppositional-defiant behavior, impulsiveness, and aggression.

Wender (1971) offered a theory of MBD consisting of six symptom clusters: (a) motor behavior, (b) attentional-perceptual cognitive function, (c) learning difficulties, (d) impulse control, (e) interpersonal relations, and (f) emotion. Dysfunction in these areas was accounted for by three primary deficits: (a) decreased experience of pleasure and pain making them less susceptible to social influence, (b) generally high and poorly modulated level of activation expressed as hyperactivity, and (c) extroversion. Emotional reactivity, low frustration tolerance, and volatile temper were also associated with poor modulation of activation. For Wender, poor inhibition is at the heart of both attention and activation deficits, although it is somewhat surprising that this perspective was not explicit in his model (see also Barkley, 1998).

Until the 1970s, attention, as a distinct construct apart from hyperactivity, was rarely the focus of scientific inquiry. Douglas (1972) is credited with introducing the idea that deficits in sustained attention and impulse control, as opposed to hyperactivity alone, more likely account for the problems noted in children. Douglas' research showed that hyperactive children were not necessarily more distractible than normal children and that attention problems could arise even in an environment free of significant distractions. Douglas' model (as described in Barkley, 1998) includes four major deficits accounting for the symptoms of ADHD: (a) the investment, organization, and maintenance of attention and effort, (b) the inhibition of impulsive responding, (c) the modulation of arousal levels to meet situational demands, and (d) an unusually strong inclination to seek immediate reinforcement. Barkley (1998) largely credited Douglas for the DSM shift in nomenclature (DSM-III, APA, 1980) from Hyperkinetic Reaction of Childhood Disorder to Attention Deficit Disorder: ADD, and Attention Deficit disorder with Hyperactivity:

ADD-H. The relative significance of hyperactivity and attention deficits continue to be debated. Barkley (1998) noted that this model falls short of adequately accounting for the behavioral deficits seen in ADHD children as well as the effects of stimulant medication.

By the late 1970s, brain damage was seen as having a relatively minor role in the etiology of hyperactivity/MBD (Barkley, 1998), though neurotransmitter deficits and other deficiencies (Wender, 1971) were seen as increasingly important. The research emphasis also began to shift toward environmental factors, particularly diet (Grossman, 1982) and child rearing. Barkley (1998) noted that, although the construct of attention deficit was an important addition to our conceptualization of these disorders, experimental evidence for it as a central factor was highly inconsistent. This view led to debates whether ADD was primarily a disorder of attention, hyperactivity, motivation, or stimulus control over behavior, and whether these deficits were neurological in nature or the result of deficits in responding to behavioral contingencies and poor training of children by parents. There was also increasing research on the role that ADD played in the child's social, family, and school environment and the influence stimulant medications had on those interactions (Whalen & Henker, 1980).

In the late 1980s, Quay (1987, 1988, 1997) proposed that the neuropsychological model that Gray (1982) had proposed to control anxiety could also be applied to the poor inhibition found in ADHD cases. Gray hypothesized that two systems, a behavioral activation system (BAS) and a behavioral inhibition system (BIS) regulate human behavior. The BAS responds with approach, avoidance, or escape to signals of reward, or the lack thereof, or aversive consequences. Similarly, the BIS responds to the conditioned stimuli of signals of impending punishment and frustrative non-reward by inhibiting

behavior. Quay proposed that ADHD was a disorder of diminished activity in the BIS, with its expression being impulsivity. Quay's model made several predictions regarding the behavior of individuals with ADHD. Thus far, the research has been inconsistent in verifying these predictions.

Figure 1. Hybrid model of executive functions (Barkley 1998).

Currently, one of the most comprehensive models for the etiology of ADHD is Barkley's model (1998; 2006; see Figure 1). Barkley noted that most current research on ADHD is nearly atheoretical in its approach to the etiology of ADHD, and has focused primarily on syndromal description. Building on existing theories that deficits accompanying ADHD are rooted in a central deficiency in response inhibition in the prefrontal cortex (Milich, Hartung, Matrin, & Haigler, 1994; Quay, 1988; Schachar, Tannock, & Logan 1993; Sergeant & van der Meere, 1988), Barkley argued that these delays in inhibitory processes disrupt the development and performance of self-regulation. In Barkley's model, the capacity for behavioral inhibition is critical to proficient performance of the four primary executive functions: non-verbal working memory, internalization of speech (verbal working memory), self-regulation of affect/motivation/arousal, and reconstitution.

Barkley used reconstitution to describe the analysis and synthesis of information and behavior (i.e., goal-directed behavioral flexibility and creativity). The behavioral inhibition system permits the internalization of behaviors that constitute these executive functions, which transfer control of behavior from the environment to internal forms of information by their influence over motor control. The role of sustained attention in Barkley's model (1998; 2006) essentially represents resistance to interference—internal and external distractions—during task performance or pursuit of a goal. A second role of sustained attention in this model is that of goal-directed, internally guided persistence. This type of persistence maintains itself in the absence of immediate external reinforcement or contingency.

According to Barkley's model (1998; 2006), the essential feature of ADHD is a kind of "temporal neglect, time blindness, or temporal myopia," (1998, p. 247) in which the control of behavior is often shifted from internal guidance to external control. This transfer of control results in "a renegade motor control system that is not under the same degree of control by internally represented information, time, and the future as would be evident in the normal peer group of that ADHD individual" (1998, p. 249). Without a fully functioning temporal sense, the inhibitory functions and adaptive functioning in multiple areas begin to break down. Barkley's view on the treatment implications of his model stresses that stimulant medication temporarily corrects the underlying neurological deficit, but that real treatment, using a chronic disease model, rests on externalizing sources of information aimed at controlling the individual's behavior. In other words, what for most people would be internal long-range goal-directed motivation must be made short-term external contingencies for those with ADHD.

Experimentally, Barkley, Murphy, and Bush (2001) compared 104 individuals, aged 17 to 28 years, with an ADHD diagnosis with 64 normal controls on tasks of time estimation and time reproduction. After controlling for IQ and comorbid ODD, depression, and anxiety, individuals with ADHD made shorter time reproductions and more reproduction errors relative to controls. Reproduction errors reliably increased as time intervals increased. No reliable differences in time estimation occurred when IQ was controlled. This finding supported Barkley's theory that a deficit in sense of time is central to the inhibitory deficits seen in ADHD. However, this deficit is not so much the perception of time but rather the retention of a temporal interval in working memory so as to manage behavior relative to that temporal interval. Interestingly, there were no

significant differences in temporal reproduction seen between ADHD-I and ADHD-C subtype participants. Barkley ascribed this finding to the frequently observed trend for hyperactive symptoms to decline as age increases. Thus, many of the ADHD-I participants may, in fact, have been sub-threshold ADHD-C individuals.

Nigg et al. (2002) compared high functioning young adults with a diagnosis of persistent ADHD to normal controls on two established measures of inhibitory control, the antisaccade (eye movement) task and a negative priming task (Stroop color naming). Individuals with persistent ADHD had deficits in effortful motor inhibition as measured by antisaccade task but not in cognitive inhibition as measured by the negative priming task. This finding was seen as supporting the theory that persistent ADHD is related to executive motor inhibition deficits in the prefrontal cortex (Barkley, 1998). Although the authors controlled for comorbid depression, a minor effect on the antisaccade task was observed, but it did not account for the main effect of ADHD diagnosis.

Milich, Balentine, and Lynam (2001) reviewed the literature on ADHD/I and ADHD/C and argued that the two are distinct and unrelated disorders. They observed that, conceptually, ADHD/C and ADHD/I have no defining features in common (e.g. sluggishness vs. disinhibition), and that when comorbid conduct disorder is parsed out of the analysis, the two sub-groups have little in common. They also noted that the demographics of the two sub-groups are different. Individuals with ADHD/C are more likely to be male, experience earlier onset of symptoms, suffer social rejection, and have comorbid externalizing disorders (i.e., CD or ODD). The inattentive subgroup is more likely to have a math disability and have later onset of symptoms. They argued that these characteristics hint at core differences in processing deficits between the two disorders.

There was some evidence that the inattentive group was also more prone to internalizing disorders such as depression and to have relatives with similar problems. Rather than being actively rejected, these children appear socially withdrawn. There was also suggestive evidence that the inattentive subgroup was less responsive to stimulant medication, but if responsive, may exhibit an effective response at lower doses. Milich et al. (2001) concluded that there is likely a continuum along the lines of externalizing-internalizing, disinhibited-inhibited, hyperactive-hypoactive etc. with CD, ODD, ADHD/H and ADHD/C clustered at one end and ADHD/I at the other. They argued that removing ADHD/I from the ADHD cluster—and possibly renaming it as well—would clarify research on both disorders.

In a commentary on Milich et al.'s (2001) work, Barkley (2001) agreed that it may be time to abandon the DSM criteria for the primarily inattentive type (PIT), at least for the time being. Barkley stated that the inhibitory deficits on which much of his theoretical work on ADHD is based do not as readily apply to PIT. He recalled that much of the reasoning behind including inattention under the ADHD cluster in DSM-III was based on initially anecdotal evidence. Barkley noted that there are numerous neuropsychological components of attention, and thus there should be different types of attention and consequently different disorders of attention as well, certainly more than are reflected in the current DSM. At the very least, this perspective suggests that much of the developmental course of PIT and its longitudinal consequences need to be investigated in new research or parsed out from existing studies.

These arguments clearly reflect the relative dearth of studies on the inattentive subtype and may partly explain the relative lack of adult studies. However, several

alternative explanations present themselves: First, ADHD/I and ADHD/C may be comorbid in childhood and ADHD/C gradually disappears as people mature while ADHD/I remains. Second, those individuals displaying remitting hyperactive symptoms as they mature may represent a subthreshold group of ADHD/C cases. Third, those individuals with the most severe cases of ADHD/C may tend to be diagnosed with Conduct Disorder or even Antisocial Personality as adults and also may be more likely to have associated problems such as substance abuse or legal troubles. Fourth, the majority of individuals with ADHD/I have potentially gone unnoticed in the research literature thus far due to being classified with other internalizing disorders and not inattention.

Prevalence and Conceptual Issues

ADHD is classed among those disorders first diagnosed in infancy, childhood, or adolescence (*DSM-IV-TR*, American Psychiatric Association: [APA], 2000). It affects an individual from an early age and causes significant and developmentally inappropriate impairment of functioning in multiple areas, including school and family life. Although the general concept of what is now termed ADHD has been in the scientific literature for over 100 years (Still, 1902), the idea that the disorder might be present in adults is relatively recent (APA, 1980). Due to the disruptive behavior of young children with ADHD, the bulk of ADHD research has been conducted in elementary-aged children. To understand the influence of ADHD in adults, it is useful to have an understanding of the disorder in children.

The prevalence of ADHD according to the DSM-IV (APA, 1994) is approximately 3-5% among school age children. Some studies have shown prevalence in

individual school districts at two to three times this rate (e.g., LeFever, Dawson, & Morrow, 1999), a finding echoed frequently in the press. The media has reported that ADHD is becoming "stigma free" due to the large numbers of students receiving the diagnosis (e.g., Kissinger, 1998). The idea would appear to be that if everyone has it, then there is no negative stigma associated with it. In contrast to this conventional wisdom, a more recent large-scale study of the prevalence and diagnosis of ADHD (Spencer, Biederman, & Wilens, 2000) concluded that there is little evidence to support this claim nationwide, and asserted that ADHD is in fact more carefully diagnosed than many medical conditions. Barkley (1998, p. 79) argued for a prevalence rate among school-aged children of 3-5% but noted that, "this number greatly hinges, however, on how one chooses to define and measure ADHD, the population studied, the geographic locale of the survey, and even the degree of agreement required between parents, teachers, and professionals."

Wender (1995) raised several conceptual issues relevant to discussing the prevalence of ADHD in any population. He noted that the use of the term "diagnosis" is misleading in psychiatry due to its use in other areas of medicine where signs and symptoms may be validated against an independent criterion (e.g., a broken leg may be confirmed by x-ray). Wender also pointed out that the majority of functional psychiatric disorders including ADHD still lack a "gold standard" against which diagnoses may be confirmed. Wender argued that the prevalence of ADHD often depends on the criteria used and the rigor with which they are applied. He likened the process to "measuring amoebas with a rubber ruler" (1995, p. 42) and argued that these difficulties in assessment lie at the heart of the frequent debates on the subject. Although this point may

make the layperson question the usefulness of such diagnoses, Wender argued that medicine still contains many such syndromal classifications (e.g., Rheumatic fever, COPD, fibromyalgia, Alzheimer's Disease, etc.) and that these classification systems help further both our knowledge of disorders and our treatment of them. Wender accepted a prevalence rate for ADHD of between 6-10 % based on his experience and reviews of the psychiatric literature. However, he also warned against discounting studies with higher rates, noting the artificiality of deciding that 6-10 % of the population is pathological. He cautioned against confusing "average" with "optimal" and argued that non-optimal conditions (e.g., hypertension, obesity) are often common even if they are closer to the mean than two standard deviations. His essential conclusion is that attention difficulties and hyperactivity are fairly common and often problematic. Some of these problems meet criteria for an ADHD diagnosis, but many do not.

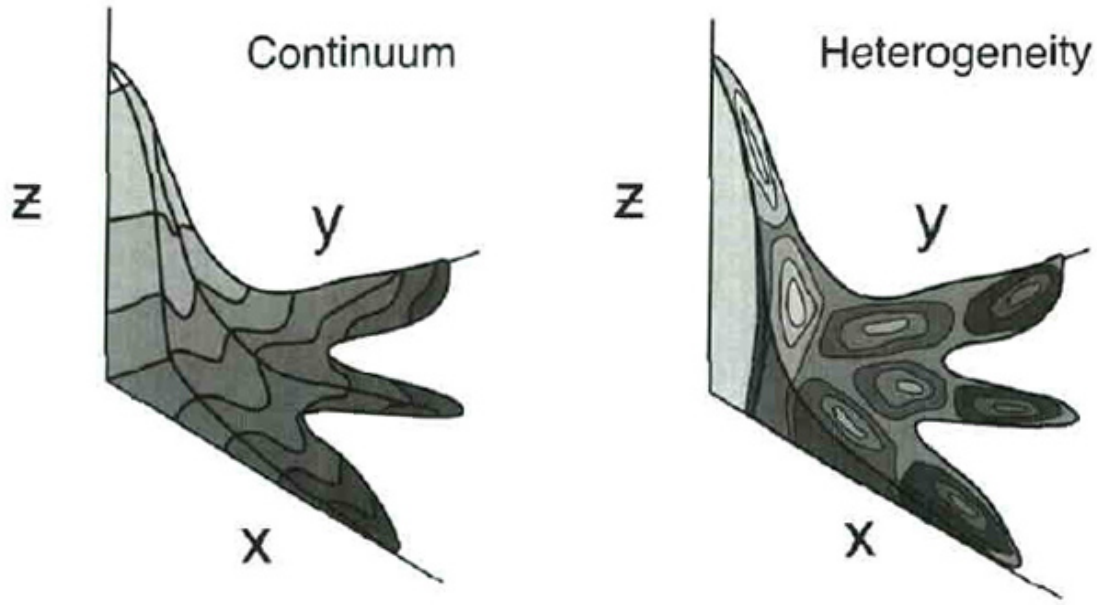

Figure 2. Continuum vs. heterogeneity models for ADHD subtypes (Todd, 2000) where Z = prevalence, X = inattentive symptoms, and Y = Hyperactive Symptoms. In the continuum model there are smooth transitions between subtypes. In the heterogeneity model distinct genetic risk factors contribute to the observed distribution of phenotypes.

ADHD is now widely seen as having a strong genetic component. Todd (2000) examined the concept of using a continuum model of ADHD symptoms (as per Wender, 1995) versus a continuum-heterogeneity model (see Figure 2). Using twin-study data, Todd asserted that ADHD is underdiagnosed, has complex mechanisms of comorbidity, and is heterogeneous. Todd identified several genetically distinct forms of ADHD, and in particular, a relatively rare form of female ADHD-HI among the twins studied. These forms differ in the severity of the symptom forms found in the DSM-IV and cast doubt on its utility for further genetic studies. Todd's conceptualization of multiple subtypes along

multiple dimensions may also help to explain the extreme variability in treatment response seen even among those diagnosed with the same ADHD subtype.

Comorbid Conditions

When discussing the general concept of other psychiatric diagnoses comorbid with ADHD, it is important to bear two things in mind. First, ADHD shares many symptoms with other disorders. For example, difficulty concentrating, trouble making decisions, and affective lability are also characteristic of both mood and anxiety disorders. The challenge in formulating a diagnosis is to develop the most parsimonious explanation for the client's symptom presentation. Second, ADHD is by definition a chronic condition that causes impairment in multiple areas. As such, it is possible that an afflicted individual may develop another disorder in reaction to his or her experience with ADHD. Other psychiatric disorders typically associated with ADHD include learning disorders, conduct problems, sexual disorders, and communication disorders. In addition, ADHD is also common among those suffering from Tourette's disorder and may be a precursor of it (DSM-IV, 1994).

Mood and Anxiety Disorders

Many epidemiological studies have been conducted to assess the prevalence of comorbid disorders with ADHD (e.g., Anderson, Williams, McGee, & Silva, 1987; Bird et al., 1988; Cohen, Velez, Brook, & Smith, 1989; Jenson et al., 1988; Munir, Biederman, & Knee, 1987; Szatmari, Offord, & Boyle, 1989). In a review of the literature, Biederman, Newcorn, and Sprich (1991) found studies reporting between 15-75% of those children diagnosed with ADHD also met criteria for major depression or mood

disorders (dysthymia). They also reported that the majority of the studies indicated rates between 9-32% for major depression and noted a range for anxiety disorders of between 10-40% with an average of approximately 25% of those with a diagnosis of ADHD also meeting criteria for one or more anxiety disorders.

The relationship between Bipolar Disorders (BP) and ADHD has also been studied. For example, Faraone et al. (1997) suggested a combined ADHD+BP subtype of ADHD, and noted that this subtype may be closely related to CD. Bipolar disorders, particularly manic episodes, share several symptoms with the hyperactive subtype of ADHD (DSM-IV, 1994). Milberger, Biederman, Faraone, Murphy, and Tsuang (1995) used statistical measures to assess this overlap and suggested that the actual comorbidity of the two disorders is approximately 6%.

Substance Abuse

Wender (1995) noted that one key aspect of ADHD in adults and adolescents is affective lability. He noted that ADHD differs from the cycles of depression/mania seen in bipolar or cyclothymic individuals in that the patient experiencing a "down" is not completely anhedonic but rather suffers from a fit of "boredom" or "restlessness." Patients may seek to alleviate these "downs" through substance use. In the first reported use of stimulant pharmacotherapy in adults, Hill (1947) working with what he termed "adult psychopaths capable of warm interpersonal relationships" (i.e., cases that would soon be described as MBD), noted that three of his eight patients had histories of alcoholism, arson, and petty theft prior to intervention (p. 50). He reported complete remission of these symptoms after treatment with amphetamine. Schubiner et al. (1995) studied three alcohol-dependent ADHD cases in detail. Each case reported using alcohol

to self-medicate for ADHD symptoms. Each individual had made several attempts at alcohol treatment, none of which were successful until treatment for ADHD was undertaken.

Sekim, Asarnow, Hess, Zaucha, and Wheeler (1990) profiled 56 adults presenting with ADHD (DSM-III-R criteria), and found 34% had a history of alcohol abuse or dependence, 30% drug abuse, 25% dysthymic disorder, and 25% cyclothymic disorder. Biederman et al. (1995) compared 120 referred adults with a childhood diagnosis of ADHD with 268 non-ADHD diagnosed adult relatives of ADHD probands. The authors derived a lifetime risk for Psychoactive Substance Use Disorder (PSUD) of 52% for those diagnosed with ADHD versus 27% in the control group. Although the two groups' risk was the same for alcohol, the ADHD group was higher for drug plus alcohol use. At a 4-year follow up, Biederman (1997) found significantly shorter transition time from abuse to dependence for the ADHD group. Milberger, Faraone, Biederman, Chu, and Wilens (1998) used a family study method to compare ADHD and non-ADHD probands with and without PSUD with their first degree relatives, a total of 973 individuals. After stratifying for PSUD, the authors compared the four resultant groups and determined that ADHD and PSUD are transmitted independently among families, although they noted that the ADHD groups were considerably younger than the PSUD groups. Thus, the hypothesis that ADHD and PSUD share an underlying cause could not be ruled out.

Sexual Disorders

Although under-researched, there is evidence that paraphilias and non-paraphilic forms of sexual impulsivity are comorbid with ADHD. Kafka and Prentky (1998) assessed 60 males, aged 15-59 years; 42 of the subjects met criteria for paraphilias (PA)

while 18 were classified as having paraphilia related disorders (PRD). Diagnosis of ADHD was made using the Wender Utah Retrospective Scale (Wender, 1995). Subjects in both PA and PRD groups reported a lifetime incidence for mood disorders of 71%, anxiety disorders 43%, psychoactive substance use disorders 45%, and impulse control disorders 17%. Retrospectively diagnosed ADHD distinguished the two groups significantly. Half of those in the PA group met WURS criteria for ADHD while only 16.7% of the PRD group qualified for this diagnosis. Those individuals meeting a diagnosis for ADHD also reported a greater history of educational problems, lower mean current income, and more social and legal problems associated with antisocial impulsivity, cocaine abuse, and increased prevalence of lifetime mood disorders and more diagnoses of Axis I nonsexual and sexual disorders.

Longitudinal and Personality Studies of ADHD in College-Aged Students and Adults

Although there is an absence of longitudinal research on the Inattentive subtype of ADHD (Barkley, 2006), there is an extensive literature for hyperactive and combined subtypes. Barkley (1998) traced the origin of interest in adult ADHD to follow-up studies of MBD/Hyperactive children conducted in the late 1960s (Mendelson et al., 1971; Menkes, Rowe, & Menkes 1967) and Harticollis' (1968) study of 15 adolescent and adult patients whose psychiatric profiles suggested MBD. Harticollis noted that the symptoms these patients exhibited were very similar to those described by Still (1902), and that many of their symptoms had been consistent since childhood. Harticollis speculated in psychodynamic terms that this defect in ego apparatus negatively interacted with action-oriented successful parents. Quitken and Klein (1969) also noted that an early history of

hyperactive-impulsive-inattentive behavior was highly predictive of adult impulsive-destructive behavior in their retrospective studies. The conclusion that hyperactive-impulsive-inattentive behavior continued into adulthood was in direct conflict with the prevailing view at the time that these symptoms gradually disappeared in adolescence and were largely nonexistent by adulthood. Additionally, Quitken and Klein's (1969) participants came from a variety of familial backgrounds a point that argued against a distinct parental style being an etiological factor.

Wood et al. (1976) conducted the first controlled study using stimulant medication and/or antidepressants for the treatment of MBD in adults. They found that 8 of 11 individuals responded favorably to methylphenidate (Ritalin) and 10 out of 15 individuals in an open trial of pemoline, imipramine, or amitryptiline showed positive responses.

By the mid 1990s the possibility of adult ADHD was firmly established in the psychiatric community (Wender, 1995) although the controversy still continues (Spencer et al.m 1998). Although some researchers have argued that the symptoms of ADHD largely remit in late adolescence to early adulthood (e.g., Hill & Schoener, 1996), the current consensus is that many symptoms persist into adulthood (e.g., Spencer, et al., 1998). Even if these adults do not fully meet DSM criteria for the disorder (which are still written for children in DSM-IV-TR), their symptom presentation still causes them significant difficulty in daily life and therefore merits clinical attention (Wender, 1995). Moreover, although hyperactive and impulsive symptoms may decline as individuals mature, inattentive symptoms largely remain. Hart et al. (1995) conducted a 4-year longitudinal study of 106 clinic-referred boys aged 7-12 meeting DSM-III-R criteria for

ADHD. In yearly assessments, inattention declined between years 1 and 2 and thereafter remained constant. Hyperactivity-impulsivity, however declined with increasing age and the rate of change was independent of the amount or type of treatment received. Those boys still meeting criteria for ADHD in years 3 and 4 were younger, more severely hyperactive, and more likely to exhibit conduct disorder from the outset.

Richards, Rosen, and Ramirez (1999) assessed psychological functioning differences among college students with a formal diagnosis of ADHD, students who indicated such symptoms by self-report only, and a control group that did not report significant numbers of ADHD symptoms. Using ANCOVA and MANCOVA statistical analysis, students with a confirmed diagnosis of ADHD were shown to be very similar in terms of overall psychological functioning as assessed by standard measures to those with self-report-only symptoms of the disorder. Interestingly, where parental data was available in the self-report-only group, it largely disagreed with the students' self-report. This finding opens the possibility that other disorders with similar symptom presentations (e.g. depression, adjustment disorders) may account for the disturbances in psychological function.

Faraone, Biederman, Feighner, and Monteaux (2000) attempted to assess the validity of the adult ADHD diagnosis by assessing familial transmission among adult and non-adult relatives of ADHD children. The authors recorded symptom data by structured interview in family members of ADHD and non-ADHD families—282 and 242 families, respectively. Essentially, these authors found that adults with ADHD were more likely to have children who met criteria for the disorder than children with ADHD were likely to have parents who met ADHD criteria. The rate of false-positive diagnoses was greater

among the child relatives than among adult relatives, which lends strong support to the validity of the adult diagnosis. The authors also argued that ADHD should be considered as a dimensional trait rather than a discrete category. This position is similar to Wender's (1995) argument that attention problems occur widely and may be problematic for more than just the minority at the extreme end of the spectrum.

In a review of clinical, family, psychopharmacologic, neurobiological, and outcome studies, Faraone et al. (2000) found strong support for a several assertions concerning adult ADHD. Adults showed all of the core symptoms of the disorder including inattention, impulsivity, and hyperactivity. Hyperactivity tends to diminish with age, but this tendency may be due to socialization and lifestyle changes such as finding jobs where attention is not a vital component. Faraone et al. also found that adults show functional impairments in many domains, including SES, work difficulties (including frequent job changes), psychological maladjustment, marital difficulties, educational difficulties, and moving traffic violations. The authors noted that adults showed many of the same neuropsychological deficits as children with the disorder including impaired vigilance, motoric inhibition deficits, executive function, verbal learning, and memory. Adults also showed positive responses to many of the medications prescribed for children with ADHD.

Faraone et al. (2000) also noted weaker, although still empirically-supported evidence for comorbidity of other psychiatric disorders, particularly substance abuse. Empirical evidence was also noted for family history of ADHD and gender differences in ADHD, though the ratio of males to females with ADHD declined with age. Faraone et

al. observed the persistence of ADHD into adulthood varies considerably (4%-80%), depending on how persistence is defined (as foreshadowed by Wender, 1995).

Friedman et al. (2003) recently investigated social and emotional competence in 31 adults diagnosed with ADHD relative to a like number of non-ADHD controls. They found that adults with ADHD rated themselves as less socially skilled at regulating their behavior than controls and more sensitive to violations of social norms. The ADHD group reported difficulty in engaging others in conversation, problems with self-presentation skills, and difficulty adjusting their behavior to be appropriate to a given situation. Although the ADHD participants did not view themselves as having difficulty recognizing others' emotions or conveying their own emotions, and viewed themselves as particularly sensitive to contempt and disgust, this sensitivity to others' emotions was not seen experimentally. The authors had participants describe the content of emotionally charged film clips. Compared to controls, the ADHD group used more words, on average, to describe the film clips but fewer emotion-words in these descriptions. Skills in general vocabulary, verbal memory, and facial recognition skills were the same for both the ADHD group and for controls, which suggests that individuals with ADHD may be prone to miss or misinterpret affective content in interpersonal interactions. The authors concluded that many individuals with ADHD are acutely aware that they have interpersonal problems and see themselves as highly vigilant in terms of violating social norms, but are nonetheless unable to control their behavior. Thus, the authors argued that individuals with ADHD are acutely aware of their expressive deficits but largely unaware of their receptive deficits, presumably due to a history of punishment or lack of reinforcement for the former, while the latter is largely devoid of such consequences.

Rapport, Friedman, Tzeleis, and VanVoorhis (2002) examined 28 adult patients at an ADHD specialty clinic diagnosed with ADHD-H and compared them to 28 normal controls from a community sample. Participants completed self-report measures of experienced affect and rated affect in others using facial and auditory stimuli. The emotions expressed were happy, sad, fearful, or angry. The authors administered an additional test of facial affect recognition using a computer program that measured response latency as a measure of processing time for affective stimuli. Response latency was compared to a similar task asking the participant to identify different types of animals. Participants also rated their confidence in their assessments of affect in the stimuli presented. On self-report measures of experienced emotional intensity, the ADHD group reported significantly greater trait levels of experienced emotion compared to controls. Overall, the ADHD group took significantly longer to process emotion-based information and was significantly less accurate at identifying such information. Accuracy of the faces task showed no correlation with reaction time. The authors concluded that in normal adults intensity of experienced emotion is positively correlated with accuracy in affect recognition. For individuals with a diagnosis of ADHD who reported greater emotional intensity, overall experienced emotion was inversely related to accurate affect recognition. Thus, the level of experienced emotion may interfere with accuracy in processing emotional cues. Rapport et al. (2002) noted that individuals with the inattentive subtype of ADHD were excluded from this study and, thus generalization of their results should not be applied to this under-researched group.

State of Knowledge

Unlike mood and anxiety disorders, psychoses, and even eating disorders, all of which are mentioned in antiquity, ADHD is a relative newcomer in the psychological literature. There are, of course, frequent references to children with poor behavior in children's stories, but these are morality tales, not descriptions of disorders. Does the recent emergence of concern over hyperactivity, impulsivity, and inattention mean that something in the modern environment is to blame for the emergence of this disorder? Unlikely. The accumulated evidence, as Wender (1995) aptly noted, is that ADHD, in its many and varied forms, is primarily genetic in nature and that its components each occur along a spectrum. It is therefore most likely that the symptoms of ADHD have been part of the human condition since the beginning of time, but they have only come to be considered a disorder, or group of disorders, recently.

Unlike disorders such as Dissociative Identity Disorder, which are extremely rare, ADHD is comparatively common. It is therefore unlikely that the symptoms individuals display have gone completely unnoticed for centuries, although they may have been considered "juvenile delinquency" in the more extreme cases. The cutoff point for considering a disorder to be present is more often a matter of professional agreement rather than obvious natural limit. This idea relates directly to one of the key components of the DSM's (APA, 2000) concept of psychiatric disorder: The symptoms expressed cause significant impairment or distress to the individual or others around them in one or more areas of work, school, or societal functioning. It is likely that, as the developed world has moved from an agriculturally-based economy, through a manufacturing

economy, to an information and service-based economy, hyperactivity and inattention have become more problematic.

Although individuals could support a family without a high school education in the 19th century, by the 21st century a college education has become almost a universal requirement for the best jobs. The evolution of the ADHD construct has paralleled these societal changes. The social ramifications of ADHD, the difficulty keeping friends, parental and teacher dissatisfaction, discipline problems, have certainly become more problematic as universal education has become common and more complex. Thus, ADHD may not be so much caused by today's environment, as something that has been with us all along that is problematic in today's environment. It is interesting to contemplate what the next 100 years will hold.

What is the general state of knowledge about ADHD, especially ADHD in adults at present? There seems little doubt that ADHD is a pervasive mental disorder, rooted in prefrontal brain structures, and possibly other areas as well. It is largely genetic in nature as family and behavioral genetic studies have shown (Todd, 2000; Wender, 1995). Although the symptoms of hyperactivity/impulsivity appear to decline with age, it seems certain that adults exhibit many of the symptoms of the childhood disorder (Weiss & Hechtman, 1993). Adults, especially those currently in their 30s and 40s, may have not been diagnosed with the disorder in childhood due to the intellectual climate and limited conceptualization of the disorder in the late 1960s and early 1970s (Wender, 1995).

The widespread concern that ADHD is overdiagnosed has, at least in children, been proven largely incorrect (Spencer, Biederman, & Wilens, 2000), although anomalies do naturally occur and caution in diagnosis is always warranted. The possibility of

misdiagnosis or over diagnosis of ADHD in adults is more muddied. Diagnostic criteria are still based primarily on children in DSM-IV-TR and what is "developmentally inappropriate" for individuals above age 18 has yet to be determined (Dupaul et al., 2001). As Richards, Rosen, and Ramirez (1999) pointed out, there are frequent discrepancies between an individual's self-report of symptoms and retrospective report by parents. Additionally, the retrospective diagnosis of adults may be particularly problematic among some ethnic groups, such as those who have had to flee their countries of origin as refugees. This frequent disparity in adult versus parental recall is a key diagnostic issue for those working with adults. Numerous disorders in adulthood have similar symptoms. Individuals with OCD, depression, trauma, and adjustment disorders all have difficulty concentrating. Individuals with bipolar disorders or anxiety disorders may exhibit symptoms of hyperactivity. Many of these disorders are also comorbid with ADHD or are the result of behaviors that are symptomatic of ADHD. Unlike many of these disorders, ADHD is pervasive and developmental in nature. Therefore, early evidence of symptoms is crucial.

There is a comparative lack of treatment outcome studies in adults, both for drug studies and psychotherapeutic interventions. At this point, an individual could easily make a career simply out of replicating the literally thousands of studies in the child literature with adult samples. Additionally, little data have been collected on middle to late-life adults with ADHD. Research in this area will likely be delayed for at least another few decades as those individuals in the current longitudinal studies mature. Follow-back studies of the kind advocated by Weiss and Hechtman (1993) may, however, provide useful data in the short term, (although the difficulties of retrospective

data collection are heightened in this group as well). Memories of childhood fade and become distorted as one ages, and unpleasant details drop from recall. Corroborative ratings from parents and teachers may no longer be available.

There is a great need for further research on the cultural and racial factors involved in ADHD, from creating culturally appropriate assessment measures for teachers, students, parents, and adults to researching medication and treatment response in various ethnic contexts. The controversy over the Childhood Medication Safety Act (Honaker, 2003) places these racial and cultural issues in the spotlight. Although these matters are primarily child issues, the potential for later impact on adults should not be discounted. Do schools have the right to require a specific form of psychiatric or psychological treatment be applied in order to allow certain students to attend? Are these requirements applied evenly based on appropriate diagnostic criteria? Are parents adequately informed of the options available for treatment, especially if those parents are from minority groups? Do parents have the right to refuse treatment regimens or treatment altogether if they feel it is in the best interest of their child or against their beliefs?

At a diagnostic level, the concept of ADHD itself is changing. As Milich et al. (2001) asserted, it may be time to consider the ADHD-PI type as a separate but overlapping disorder with hyperactivity-impulsivity. There is certainly diagnostic precedence for this type of overlap—depression and psychosis are considered separately, yet individuals are diagnosed as having depression with psychotic features and schizophrenia with depressed mood. Certainly, as Dupaul et al. (2001) noted, ascertaining what is developmentally inappropriate at adult ages will be an important task in adapting

DSM criteria for use with adults. Assessment measures normed for adults exist, although not in the numbers or quality available for children.

There are at least several promising non-drug adjunctive treatments for ADHD that deserve the attention and evaluation of clinical psychologists. Arnold (2001) noted that treatments such as Interactive Metronome and Meditation training have shown promising results with younger populations. Although drugs may help to sustain attention, and may reduce hyperactivity, they may not address the temporal myopia seen in Barkley's (1998) model of executive functioning. Drugs also can not teach someone how to concentrate, although they may make concentration easier. Drugs may reduce feelings of depression and emotional reactivity but they cannot teach someone to evaluate emotional information. As Moline and Frankenberger (2001) pointed out, the principal perceived benefit to the client of drug therapy is that the drugs seem to make their parents and teachers like them more. Results in terms of academic performance are mixed, which adds fuel to the debate over the Childhood Medication Safety Act.

Interventions for College Students with ADHD

Individuals with a confirmed diagnosis of ADHD are entitled to reasonable accommodations under the Individuals with Disabilities Education Act of 1990 (IDEA) and Section 504 of the Rehabilitation act of 1973 (Mountain Plains Regional Resource Center, 1998). IDEA is a federal funding statute that provides monies to states to ensure appropriate, free, public education to individuals with disabilities. Section 504 is a civil rights law that protects the rights of individuals with disabilities enrolled in programs or activities that receive federal funding from the Department of Education. However, it

does not ensure any funding. In general, IDEA covers individuals with documented disabilities of established types, such as visual impairments, learning disabilities, and ADHD. Section 504 covers individuals who have a physical or mental impairment that limits a major life activity. ADHD qualifies as such an impairment, although, Section 504 leaves the door open for several sub-syndromal difficulties also to be addressed by accommodations. In fact, Section 504 only requires that the individual is "regarded to be disabled by others" in order to qualify. These accommodations are to be provided in the "least restrictive environment possible," which include the general education classroom, special education services, or under specific Section 504 accommodations.

Accommodations for ADD/ADHD can include numerous possibilities (see Appendix A). For adolescents, Robin (2006) recommends a core academic intervention including home-school communication, use of a student planner, breaking long-term assignments into smaller chunks, homework contracts, backpack organization, and modifications in classroom setting and teaching methods, test taking, and level of supervision. Specific classroom accommodations include: access to computers or word processors for written work, extra time on tests and a distraction-free environment in which to take them, possible oral examinations, copies of lecture notes, use of note-takers, and a study skills-oriented resource center. Interestingly Robin did not comment on classroom seating. The college environment is less restrictive than the public school environment in terms of necessary compliance with IDEA and section 504. However, most colleges and universities will develop their own sets of requirements and procedures to address the needs of students with ADHD.

With respect to the efficacy and attitude in the ADHD population toward medication management, Moline and Frankenberger (2001) surveyed 651 students (ages 11-18) enrolled in four public school districts in Wisconsin and Minnesota. Of the survey participants, 51 reported being prescribed stimulant medication at the time they filled out the survey. These students were then asked to fill out questionnaires regarding their experiences while being treated for ADHD. Those students who indicated that they had not been diagnosed with ADHD on the initial survey were asked to fill out surveys about their perceptions of those individuals who took medication for ADHD. The ratio of males to females taking ADHD medication approximated that found in other studies (78% to 22% or roughly 3 to1). Forty-four percent of the medicated students received Ritalin, 13% received Dexadrine, 8% received Wellbutrin, and 21% reported multiple medications for ADHD. Of those taking medication, 35% indicated that they would stop taking their medication if it was up to them; 43% indicated that they wanted to continue taking their medication. Over half (52%) reported that they never needed medication to help them do the things they really liked to do. The largest medication benefit seen by the ADHD students was that their teachers and parents liked them more while taking the medication. The ADHD students were unsure if medication helped them or not. The authors noted that these results parallel findings among teachers, that the principal benefit of medication is social rather than academic. Sixty-four percent of the students reported side-effects from medication including feeling sleepy (56%), difficulty falling asleep (54%), nausea (40%), headaches (48%), loss of appetite (57%), and the occasional presence of previously unrecognized tics (40%) Peer ratings revealed that the bulk of them knew someone taking ADHD medication. Peers thought the medication made those

students act "a little better," but that they thought there was not much difference between those on medication and other students. The non-ADHD students did not feel that they or their teachers treated ADHD students differently. The non-ADHD students did not think medication made ADHD students more friendly or that it made them feel particularly bad or good, or less angry, or better behaved. Thirty-four percent of students taking ADHD medication reported being approached to sell or trade their medication; 11% reported being approached for selling or trading all the time. As the number of adults receiving medication for ADHD increases in coming years, studies of this nature will need to be replicated in that population as well.

ADHD Coaching

As in athletics, music, and business, the concept of coaching is being applied to the day-to-day activities of individuals with ADHD. Ratey (2002, p. 268) identified three core components of ADHD coaching:

(1) Partnership—Client and coach co-engineer a partnership beneficial to the client;

(2) Structure—Client and coach co-create strength-based strategies to provide internal and external structure to the client's life;

(3) Process—Through a process of inquiry, the coach guides the client in self-exploration and learning.

The available literature on ADHD coaching (e.g., Quinn, Ratey, & Maitland, 2000; Ratey, 2002; Ratey & Maitland, 2001) is distinct from the bulk of the ADHD literature in that it is nearly bereft of empirical data. Presumably, this lack of data is due to the highly individualized nature of the client-coach dyad, which is unique in each case. Although

the same can be said for psychotherapy, the coaching profession has not needed to respond to the demands of managed care as psychotherapists have, and as such, coaches have had little impetus to develop manualized treatments or obtain treatment outcome data. As Ratey (2002, p. 272) noted:

> The coach, on the other hand, deals with the ADHD client's complete life plan. A coach would look at the whole person and develop wake-up and bed-time routines, study times, exercise periods, and free time to socialize. The coach will help the student learn how to motivate himself to start a project and follow it through to the finish. All this is beyond the scope of a skills-based academic tutor, who teaches by demonstration.

The coaching relationship is highly variable. Coaches may meet with clients once a week, much like a psychotherapist would. However, the trend is for more frequent contacts via phone or e-mail which may take place on a daily basis in addition to more regularly scheduled sessions. Although coaches are required to possess many of the skills a good psychotherapist would (e.g., listening skills, nonjudgmental nature, and empowering), their practice is highly specific, and goal and task-oriented. Whereas a therapist might concentrate on the underlying fears associated with procrastination, a coach would focus on specific interventions, such as time management, study dates, or accountable goal setting, designed to make procrastination less likely.

Classroom Seating as an Accommodation

Classroom seating is a common intervention for individuals with audio-visual disabilities, learning disabilities, and attention problems. However, the effectiveness of

such interventions, particularly with ADHD college students has not been investigated empirically. In a survey of 300 Illinois special education teachers at the elementary level, Askew (1993) found that seating was a preferred intervention by 68% of survey respondents for their students with an ADHD diagnosis. Because interventions were not mutually exclusive, and each intervention is part of an individually designed set of accommodations, this finding merely indicates that seating adjustment is commonly used. Bonus and Riordan (1988) investigated the role of classroom seating in terms of increasing on-task behavior in elementary school students and found that no seating arrangement (i.e., rows, U-shape, desk cluster) was more effective than others, but that on-task behavior was more easily attained if the seating arrangement matched the goal of the lesson. Wulf (1976), in studying a college population, measured classroom interaction, overall GPA, and grades as a function of classroom seat choice. Wulf showed that high achievers tended to self-congregate in front row-center seating, but that when other students occupied these seats, their graded performance and classroom interaction patterns did not change. Additionally, Daly and Suite (1982) showed that teachers evaluated students sitting forward in the classroom more favorably than those sitting in the rear.

Recently, Perkins and Wieman (2005) randomly assigned college physics students to either a front or rear of room condition. When front and rear groups were exchanged at mid-semester, several trends emerged. First, the farther the original seating from the front of the class, the lower average attendance throughout the class and the larger drop-off in attendance between the first and second half of the semester. Second, those seated close to the front of the class at the beginning of the semester showed less of a drop-off in

attendance even when seated in the rear of the class later on. Third, students who started in the front and did well continued to do well when moved to the rear of the class. Lastly, none of Perkins and Wieman's students who started the semester in the back of the class improved when moved to the front of the class in the last half of the semester.

With respect to students with ADHD, Wallace, Winsler, and NeSmith (1999) used a factor-analytic approach to assess factors associated with college success among students with ADHD. Three factors: age, self-confidence, and basic student responsibilities (e.g. going to class) were identified, although classroom seating was not specifically assessed.

Purpose of this Research

Given that adjusting student seating is a frequent intervention recommended for many students with ADHD (see Appendix B; Askew, 1993), one would expect solid empirical evidence to support this recommendation. However, no such research exists. The available literature is not clear on whether it is the seating location in the classroom, seating location at the beginning of the semester, or some other factor that is related to student success. My own experiences in teaching small and large lecture classes at the university level have shown that there is often competition for preferred seating in the front of a classroom among individuals with documented disabilities and industrious students who prefer those seats. On several occasions, I have had to ask individuals to make room in front rows for individuals with documented disabilities, and on more than one occasion the front two rows—approximately 35 out of 150 seats—of a large college lecture hall have been taken up by those of my students with documented disabilities.

There is limited front row seating available in most classrooms and competition for those seats can be fierce. Thus, two possibilities present themselves regarding seating. First, if preferential seating does in fact make a difference, at least for individuals with ADHD, and given that preferred space is often at a premium, we may need to find ways to re-design our classrooms in order to maximize this positive effect for these individuals. Second, if seating does not in fact make a difference in the performance of individuals diagnosed with ADHD, then those spaces could be freed up for other individuals.

The purpose of this research is to assess the effects of classroom seating using naturalistic classroom observation and experimental manipulation in normal controls, individuals with sub-threshold levels of ADHD symptoms, and in participants identified as having a diagnosis of ADHD. I address several specific questions: First, what is the relationship among attention variables, scholastic attitudes, and classroom seating choice as defined by distance from the center of the front row? Operationally, I address this question by observing correlations among these variables. In like manner, the literature has already shown that good students tend to congregate in the front (Wulf, 1976). Second, does adjustment of classroom seating benefit these individuals academically as well as those with a confirmed ADHD diagnosis? For our purposes, I defined academic performance as performance on quizzes in the laboratory portion of our study. Third, if an effect is noticed, what is the specific mechanism of its action? Is it mere proximity to the front of the classroom, or is it proximity to the instructor?

II. GENERAL METHODS

Participants

Participants were students enrolled in psychology courses at Auburn University. Participation was on a voluntary basis with course extra-credit points and drawings for prizes serving as compensation. Participants were recruited using flyers and in-class announcements.

Assessment Measures

Although assessment instruments for ADHD in adults are few in number compared to those for children, several have been developed in the last decade, largely by modifying existing child-oriented instruments. The Conners Adult ADHD Rating Scales-Long Form (CAARS-S:L: Conners, Erhardt, & Sparrow, 1999) is a 66-item self report form designed to aid in the diagnosis of ADHD in individuals aged 18 and above. The CAARS yields factor-derived subscales for inattention-memory problems, hyperactivity-restlessness, impulsivity-emotional lability, and problems with self-concept. It also yields ADHD symptom subscales for inattentive symptoms, hyperactive-impulsive symptoms as well as total ADHD symptoms and an ADHD Index that attempts to identify individuals likely to be diagnosed with ADHD. Lastly, there is an inconsistency index that assesses random responding and noncompliance with testing procedures.

The CAARS-S:L has the advantage of being keyed to current DSM-IV criteria for ADHD and provides norms for individuals aged 18-50 years of age. The normative sample for the self-report forms consisted of 1,026 adults in the U.S. and Canada and the DSM-IV subscales were gathered from 144 clinical cases. The authors reported acceptable internal consistency, test-retest reliability, and correlations with other established measures of ADHD in adults. Although the authors reported an overall classification of 73% of ADHD cases with the ADHD Index, they caution that this inventory should be a screening tool only and not a primary diagnostic tool. Although a short form containing 26 items and a screening form containing 30 items are available, the additional information contained on the long form's factor derived subscales is useful in assessing ADHD symptoms on a continuum rather than strictly in terms of diagnostic thresholds.

The Learning and Study Strategies Inventory (LASSI; Weinstein, 1987) is a norm-referenced self-report instrument that examines learning and study practices and attitudes including attitude and interest, motivation, time management, anxiety over school performance, concentration and attention to tasks, information processing and reasoning, selecting main ideas and recognizing information, use of support techniques and support materials, self testing and reviewing/preparing for class, and test taking strategies and preparing for tests. Results of the LASSI are reported in terms of percentile ranks. The LASSI provides information on where participants rank on covered dimensions as compared to a national sample. As such, it provides additional data concerning seating choice of those two groups of students. It also aids in controlling for the effect of student habits and attitudes as opposed to attention problems.

Studies

Study-I: Naturalistic Classroom Observation

Students in an introductory psychology class were administered the CAARS-S:S rating scale, along with the Learning and Study Skills Inventory (LASSI) at the beginning of the semester. A demographic questionnaire was also given that provided data on gender, age, class, and also asked if the student has ever been diagnosed with ADHD by a psychologist, psychiatrist, or family physician. Students were also asked if they are currently taking any ADHD medications. Students were allowed to choose their own seats at the beginning of the semester. They were required to occupy the same seat throughout the semester. Seating choice was made prior to introducing the study in order to avoid potential observer effects. Classroom attendance was recorded by use of seating charts. Correlations among grades (as defined by total course points earned excluding extra credit), scale scores, diagnosis, attendance, and seating distance were performed at the end of the semester. Those individuals who identified themselves as having an ADHD diagnosis and who were receiving seating accommodations as well as those receiving preferential seating for other reasons were removed from the data set before analysis.

A total of 350 students participated in two classes (rooms 112 and 3195) during the naturalistic observation part of this project, 138 men and 212 women (see Table 1). There was no significant correlation between gender and grade. Women had a tendency to sit closer to the front ($r = .174$, $p < .05$) and this result was identical for both classes. There was no significant difference in grade by age or class. Both classes had roughly the same distribution of freshmen, sophomores, juniors, and seniors. There was a problem with Class 112 in that there were a large number of participants providing unusable data

such as duplicate, incomplete, or missing seat numbers. This group included two individuals self-disclosing a diagnosis of ADHD. These data were excluded from correlational analysis, however, they likely skewed the results for Class 112.

Table 1

Student Demographics for Two Classes

	112 (n = 168)	3195 (n = 182)
Mean Grade	2.78	2.87
Mean Absences	3.43	2.77
Males	68	70
Females	100	112
Mean Age	18.84	18.76
Freshmen	107	113
Sophomores	34	49
Juniors	23	15
Seniors	3	4
Other	1	1
Mean GPA	3.19	3.23

(table continues)

Table 1 (continued)

	112 (n = 168)	3195 (n = 182)
Unusable data	26	2
Students w/ADHD withdrawing	4	2
Accommodations	1	2
ADHD Diagnosis	23	20
ADHD Medication	12	13

Study II: Artificial Lecture

To control for variables present in large-lecture classes, such as instructor illness, or cohort effects, Study II took place in a laboratory setting initially using a series of equivalent scripted lectures. The laboratory approximated conditions in a large 150 seat university classroom. This manipulation increased experimental control and narrowed the focus more closely to the independent variable of seating. All participants were asked to complete the same assessment measures as in Study I regardless of prior participation in that study. Quizzes based on the information presented were used as a dependent measure to assess learning. Quizzes were first given to a control group of students (n = 14) in a different class not exposed to the mini-lecture material. Means for this group are reported in Table 2. This testing was repeated with individuals assigned to near, middle or far distances from the front of the classroom using a Latin-square. Testing took place during a single 2 hr session in such a way that all participants were exposed to each distance.

Participants were shown an unrelated cartoon video as a distraction between sessions. Thus, for example, a participant might be placed in the middle condition for the first lecture, see a cartoon for 20 minutes, take a quiz on the first lecture, then move to the rear of the classroom and repeat the procedure and so on until all three conditions were filled. The administration protocol is detailed in Appendix C.

There were 27 male and 51 female participants aged between 18 and 24 (mean 19.4 years). Four individuals self-disclosed a diagnosis of ADHD. Additionally, one individual was identified by the CAARS as likely having ADHD. Two of the individuals self-reporting ADHD provided inconsistent responses on the CAARS. Two individuals had sought accommodations for seating in their regular classes. However, neither of these individuals reported a diagnosis of ADHD.

IV. RESULTS

Study 1

Intercorrelations between distance, grade received, number of absences, and cumulative GPA are reported for both classes and combined overall in Table 2.

Table 2

Intercorrelations between Distance, Grade, Number of Absences, and Cumulative GPA for Two Classes [Combined (N = 350), Class 112 (n = 168), Class 3195 (n = 182)]

	Grade	Absences	GPA	Grade	Absences	GPA	Grade	Absences	GPA
Distance	-.140**	.162**	-.179**	-.045	.033	-.170*	-.216*	.282**	-.189**
Grade	—	-.401**	.460**	—	-.305**	.477**	—	-.500**	.445**
Absences		—	-.332**		—	-.258**		—	-.407**

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed).

Overall, there was not a substantial correlation between distance and grade received. The correlation between number of absences and grade received was significant

across classes and was considerably stronger than that for distance and grade. GPA was also negatively correlated with number of absences.

Of the 350 participants, 43 self-disclosed a diagnosis of ADHD. Interestingly, only three of these individuals sought accommodations for it. Seven of the individuals self-disclosing an ADHD diagnosis were identified by the CAARS ADHD Index (Cutoff score = 22) as likely having ADHD. However, three of these participants gave inconsistent responses which invalidated the CAARS. Of those individuals not self-disclosing an ADHD diagnosis, a further 10 were identified by the CAARS as likely having ADHD, five of these CAARS revealed inconsistent responses, which resulted in a total of 47 individuals who either self-disclosed an ADHD diagnosis or scored positive on the CAARS ADHD index in a valid administration. Intercorrelations among distance, grade, number of absences, and cumulative GPA for ADHD and probable ADHD participants are reported in Table 3. The same correlations are repeated for the remainder of the participants (Controls) in Table 4.

Table 3

Intercorrelations Between Distance, Grade, Number of Absences, and Cumulative GPA for ADHD and Probable ADHD Participants (N = 47)

	Grade	Absences	GPA
Distance	-.318*	.098	-.302**
Grade	—	-.442**	.179
Absences		—	-.212

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

Note: Only 2 participants sought accommodations for ADHD.

Table 4

Intercorrelations between Distance, Grade, Number of Absences, and Cumulative GPA for Non-ADHD Controls (N = 303)

	Grade	Absences	GPA
Distance	-.107	.173**	-.157
Grade	—	-.386**	.481**
Absences		—	-.333**

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

Thus, the correlation between distance and grade was considerably greater for those individuals with a confirmed or probable diagnosis of ADHD than for the rest of the participants. When ADHD individuals are removed from the calculation, the correlation between distance and grade drops below statistical significance (there were roughly equal numbers of ADHD participants in both classes). Distance and number of absences correlated significantly for the controls only, while distance and GPA were significantly correlated for the ADHD group only. Correlations between grade and absences were strong for both groups, though slightly higher for those with ADHD. GPA correlated significantly with grade and number of absences for the controls only.

A regression analysis was performed regressing distance and absence on grade received for both the ADHD group and for controls. Distance and absence together predicted 22.1% of the variance in the ADHD group while those two variables together predicted 15% of the variance in the control group.

None of the CAARS subscales correlated significantly with distance in either class. Intercorrelations between Study I variables and CAARS subscales are reported in Appendix A (see Tables 9-13).

Overall, distance did not correlate significantly with the LASSI subscales. One of the classes (3195) reported significant correlations between distance and SFT-self-testing, reviewing and preparing for class ($r = -.208$, $p < .01$); STA-use of support techniques and materials ($r = -.274$, $p < .01$); and TMT-use of time management principles for academic tasks ($r = -.203$, $p < 01$). Intercorrelations between Study I variables and LASSI subscales are reported in Appendix A (see Tables 9-13).

Study 2

A total of 78 individuals participated in the classroom experiment portion of this study. Two individuals did not provide complete information, leaving 76 participants providing useable data. Participant performance compared to non-participant pilot data indicated that participants evidenced learning as measured by quiz scores (see Table 5).

Table 5

Comparison of Quiz Scores for Pilot and Post-Test

(95% Confidence; Interval of the Difference)

	t	df	Sig. (2 tailed)	Mean Difference	Lower	Upper
ARCTIC Pilot Mean = 2.5	17.18	77	.000	4.17	3.68	4.65
Windigo Pilot Mean = 2.71	16.39	77	.000	3.61	3.17	4.05
Latah Pilot Mean = 2.64	21.90	77	.000	4.54	4.12	4.95

There was a slight trend for individuals to do better the closer they sat to the front of the classroom (see Table 6). However, this trend did not approach statistical significance when analyzed using a within subjects ANOVA (see Table 7). Individuals self-identified as having been diagnosed with ADHD or identified by the CAARS actually did about .75 points better on average than their non-ADHD peers in each of the distance conditions. However, these results were not significant when tested using a one-

way ANOVA. Likewise there were no significant gender differences between conditions. Performance in all conditions was highly correlated with performance in the other conditions (see Table 8).

Table 6

Comparison of Means by Distance

	N	Minimum	Maximum	Mean	SD	Variance
Near	76	1	10	6.91	2.03	4.11
Mid	76	2	10	6.79	1.91	3.66
Far	76	1	10	6.53	2.04	4.15
Valid N (listwise)	76					

Table 7

ANOVA for Within Subjects Distances

Source	Score	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Score	Near vs. Mid	1.066	1	1.066	.230	.633	.003
	Mid vs. Far	5.263	1	5.263	.884	.884	.012
Error (Score)	Near vs. Mid	347.934	75	4.639			
	Mid vs. Far	446.737	75	5.956			

Table 8

Intercorrelations between Near, Middle and Far Conditions

	Mid	Far
Near	.404**	.390**
Mid	—	.238*
Far		—

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

There were no significant correlations between CAARS measures of attention variables and performance in any of the distance conditions. In terms of LASSI variables there were several significant correlations. As ANX- a lack of test anxiety, increased, performance in the near and mid distance conditions improved ($r = .289$, $p < .05$; $r = .244$, $p < .05$ respectively). As SMI-the ability to select main ideas increased, performance in the near and middle distances increased ($r = .309$, $p < .01$; $r = .207$, $p < .05$ respectively). Lastly, as test taking skills increased, performance in the near and middle conditions improved ($r = .330$, $p < .01$; $r = .304$, $p < .01$ respectively).

IV. DISCUSSION

Overview

At this point it is beneficial to recall the three questions that originated this research. First, what is the relationship among attention variables, scholastic attitudes, and classroom seating choice as defined by distance from the center of the front row? Second, will adjustment of classroom seating benefit these individuals academically as well as those with a confirmed ADHD diagnosis? Third, if an effect is noticed, what is the specific mechanism of its action? Is it mere proximity to the front of the classroom, or is it proximity to a live instructor?

Distance and Class Grade

The results of Study 1 show a small negative correlation between distance and overall class grade. For those with a confirmed or possible diagnosis of ADHD, however, this correlation is rather more significant. Although we were only able to keep anecdotal data on the reasons for student seat choice, several individuals mentioned that sitting near the front helped them pay attention. These results would seem to confirm this self-estimate. Additionally, when the 47 individuals self-identified with ADHD were removed from the analysis the correlation between distance and grade dropped below statistical significance. Suggesting a disproportionately large effect for these individuals.

There were no statistically significant correlations between distance and any of the attention measures on the CAARS. One of the two classes showed modest correlations between distance and inattention as well as between hyperactivity and distance. Although not of the magnitude expected, this result is in the direction expected which invites future replication. Distance from the front of the classroom was, however, more strongly correlated with number of absences. Number of absences was in turn strongly correlated with grade. Several of the LASSI scales dropped off as one sits farther away from the front, particularly those for motivation and time management. Thus, it would seem that it is good study skills and student habits rather than attention variables that decline with distance. This possibility fits with Wulf's (1976) findings that higher scholastic achievers tended to congregate closer to the front of the class. When one considers GPA along with distance and number of absences, students with higher GPAs indeed tended to sit near the front of the classroom which was correlated significantly with fewer absences and higher grades. In sum, those students with ADHD or probable ADHD who sat closer to the front of the classroom tended to have higher grades than those seated more to the rear. All students regardless of diagnosis did better if they (a) showed up for class and (b) sat closer to the front. Students with higher GPAs overall tended to do well in our classroom, success seems to breed success.

Seating Manipulation

With respect to Question 2 regarding the effect of manipulating seating, with a limited sample size, there was a slight improvement the closer one was placed to the front, regardless of the order in which one's distance changed. This finding was not a statistically significant effect, and certainly invites replication in a larger sample. Scores

in each of the distance conditions correlated significantly with GPA suggesting that good students again tended to do better regardless of condition. The limited number of ADHD participants in Study 2 do not allow for strong conclusions from that group. However, the trend observed combined with the information already noted from Study 1, suggests that, at the very least preferential seating may not do any harm and is certainly associated with improved academic performance. The effect of class attendance is much greater than distance and thus may bear closer scrutiny in future research.

Mechanism of Action

In terms of Question 3, the specific mechanism of the action, only limited conclusions can be drawn given the limited sample size and slight trend observed. Certainly using a series of videotaped lectures and comparing them with performance in a live classroom would be of interest. In particular, this effect should be investigated for those individuals with a diagnosis of ADHD if sufficient numbers of participants with such a diagnosis can be recruited.

Relation to Existing Research

Although there are a limited number of pharmacological studies involving adults with ADHD (Prince, Wilens, Spencer, & Biederman, 2006), the literature on non-medication interventions and therapy for adult ADHD is still very small and largely anecdotal (Murphy, 2006). As such, the results of this study forge a bridge between the limited adult ADHD literature and the somewhat larger, though still limited literature on college student seating reviewed above.

Wulf's (1976) observation that high achieving students tend to congregate naturally towards the front of a class was borne out by study one's results. Although we

did not specifically code for it, many students noted that they wanted to sit near the front in order to be able to pay attention better to the teacher and visual aids. A number of these students self-identified as having ADHD. Wulf's observation is also supported by the significant correlation between distance and number of absences shown in class 3195.

Study 2's results seem to contradict Perkins and Wieman's (2005) finding that those college physics students seated in the front half of the classroom in the first half of the semester did better than those in the back, even when their positions were reversed, and that those in the back in the first half of the semester did not improve if moved to the front. In our study, the improvement as one approached the front, though not statistically significant, was a continuous trend regardless of where the participant began. Admittedly, we are comparing a semester long physics course with multiple exams to a 20 min lecture on an obscure psychological disorder with a 10-point quiz.

In describing the implications of his model, Barkley (2006, p. 326) stated that "... the most useful treatments are those in place in natural settings at the point of performance, where the desired behavior is to occur." The essential idea is that ADHD is a disorder of performance in the moment rather than lacking the skills to perform well. As such, the idea is to maximize the ADHD individual's capacity for success in the moment they need to perform rather than teaching them new behaviors or encouraging them to gain new insights. Environmental reconfigurations such as preferential seating certainly fall into this category. Barkley also argued (p. 329) that artificial sources of motivation, such as rewards or consequences should also be arranged at the point of performance. For college students Barkley's assertion means that giving a student points on an exam at the end of the semester for what he or she learned in a given class is not

nearly as effective, in terms of increasing attention, as giving the student some form of positive reinforcement while they are in the actual classroom session.

Interestingly, one of the few LASSI scales to demonstrate a significant negative correlation with distance was that of utilization of time management skills, as one might predict using Barkley's "temporal myopia" theory. However, this was more significant for the non-ADHD participants than the limited number of ADHD participants. The difference is approximately r = .02, and it is possible this value reflects a source of error or sample size.

What form does reinforcement take in a classroom setting such as Study 2? As noted above, we conducted the classroom analogue portion of this research using limited length vignettes and a live instructor reading from a prepared script. Thus positive reinforcement in this study, where the students did not choose their seating for any presumed advantage, was likely limited to eye contact and facial expressions. In a study very similar to the present study, Rennels and Chaudhari (1988) arranged students in art appreciation classes either alphabetically, by social security number, or by allowing the students free choice. They found that the students in the middle and front sections performed considerably better on the two tests (reading and lecture) given in the class than those in the rear. The authors attributed this result to a difference in instructor-student eye contact and suggested that the closer students gained a sense of personalization of the material as a result. It should be noted that there was no reversal of condition in the Rennels and Chaudhari study as there was in the current study. Their study also rested on two assessments of student learning during a semester, which invites

a large number of possible confounds with respect to being able to draw conclusions regarding distance.

In addition to eye contact, having a personalizing effect for students with regard to the subject material, increased teacher interaction can serve to minimize distractions and verbally reward attention. Although as Douglas (1972) noted, the possibility for inattention exists often despite a lack of distraction in the environment.

Limitations of this Research

Study 1 was limited in particular by administration difficulties in one of the sections, which resulted in a potentially significant number of participants' data being unusable. This problem may have been due to either a confusing numbering system for the classroom seats or in the administration of the instructions. Also, in a freshman level class, there are likely to have been many individuals who added the class after the observational period began and who thus did not receive exactly the same administration of instructions as everyone else, although this presumably would apply to both classes. The results of the other classroom observation section are more in line with the expected results and the trends noticed would likely prove robust given further replication. Additionally the instructor in both classroom sections tended to move around the front third of the room thus deviating from the traditional paradigm of a relatively stationary instructor. This may have decreased the magnitude of the distance correlations.

Given the fact that number of absences overshadowed by far the effect of seating, several possible refinements to our procedure present themselves. The reason for the absence may bear investigating. Do individuals who tend to miss class for one reason, for

example for athletic participation, earn lower grades than those who miss class for other reasons? Are "excused" absences (e.g. athletics, illness, bereavement) less problematic in terms of grade performance than "unexcused" absences (e.g. going to a concert, taking a long weekend) and what can be learned about those individuals that tend to have more unexcused absences, in terms of study skills and attention variables? These questions might be researched in the laboratory by having students read one or more lectures or possibly even look at summaries as opposed to viewing lectures directly.

In Study 2, the lectures were of limited duration and concerned fairly engaging subject matter (see Appendix C). In terms of external validity, a stronger correlation between distance and performance might be shown with longer lectures, for instance of normal class duration, across multiple days. Additionally, if multiple lectures on a balanced, but more mundane, series of topics were presented, might a more realistic picture of classroom performance emerge? Any expected gains in terms of external validity must, of course be balanced with the likelihood of participant attrition during a longer study. Again, a larger number of participants, particularly individuals with attention problems might provide more significant and material results.

Means of measuring attention do not necessarily need to include a lecture format. An alternative experimental paradigm might be to abandon lectures altogether and ask participants to memorize simple word lists spoken aloud. Additionally, one could use a modified version of a continuous performance task (CPT) such as the TOVA (Greenberg & Kindschi, 1996) while varying distance from the stimulus. A CPT, particularly one that incorporates response time variability, would yield a direct measure of attention as

opposed to retention as seen on quizzes. Using a CPT in auditory mode might also prove valuable in this regard as it could compare visual to auditory stimuli over distance.

Replication of Study 2 in additional conditions might also prove illuminating. Certainly replacing the live instructor with a videotape would help shed light on whether social interaction was an important factor in Study 2's results. Likewise, a live instructor could be used in various "modes" to determine the influence of social interaction. In one condition the instructor could maximize eye contact with those in the room, while in another he or she could read directly from the script or gaze at a specific target on the wall in an attempt to minimize social interaction. One could also compare the effects of lecturing from behind a podium with a style that involved moving about the room.

It bears remembering that the idea that the closer one sits to the front of the class the better one's grade is not exactly a state secret. Indeed many of our participants in Study 1 cited this reason for their seating choice. Thus, it is entirely possible that some or much of the trend seen in Study 2 may be due to placebo effects. Still, regardless of the explanation, improvement is improvement.

V. CONCLUSION

The results of these two studies offer partial support for preferential seating as a classroom intervention. At the same time, the data supports the notion that greater gains might be made through increasing student attendance. This result lends itself to the growing field of ADHD coaching. The old adage that history is made by those who show up seems appropriate.

In terms of classroom accommodations, the odds are that a slight improvement in grades is associated with moving to the front of the class. Fewer distractions, better view of visual aids, and possibly more interaction with the teacher are all likely benefits. Because individuals with better academic skills do tend to congregate near the front of the class (Wulf, 1976), perhaps some benefit might be accrued by ADHD students associating with them.

A more subtle argument might also be made for getting teachers out from behind the podium and making them more mobile. As Nance and Nance (1990) argued, teachers who use more classroom discussion and more visual aids are perceived as having greater control over the learning process, which is seen as facilitating student attention and helping students achieve maximum performance. This style of teaching is clearly not for everyone: I am, after all, talking about academics and not thespians. Wherever possible though, and in particular in the training of new teachers, the results of this study seem to

support the idea that if we can not bring the students to the teacher, we should endeavor to bring the teacher to the students. Pfifner, Barkley, and Dupaul (2006) suggested that "strategic teacher attention" can be very useful for helping students remain on task and for redirecting those that are off task. This strategy can include praise, as well as nonverbal smiles and nods all of which are more easily facilitated by proximity to the teacher. Although praise, and even pats on the back, are easy in an elementary setting, strategic teacher attention requires more creativity in a large college lecture. For example, a student who likes to read the newspaper in the back of class as opposed to taking notes will often stop and pay attention if the instructor walks around the room and pauses nearby. Additionally, the opportunities to make eye contact, and accrue the benefits noted above, likely decrease as distance increases.

As part of a total disability program for college students with ADHD there is certainly a role for seating accommodations. This accommodation should be coupled with other interventions such as note taking, taped lectures, verbal exams, and so on in a manner that best fits the individual's needs. Thorough assessment, including learning skills and achievement testing, should be used to develop a specific program for each individual. As seen from the incidental assessment of the influence of attendance found in this study, means to encourage class attendance should also be included in individual accommodation plans.

A friend of mine, a high school biology teacher of some 20 years experience, remarked to me once that, what with visual disabilities, ADHD, behavioral problems, and a myriad of Section 504 plans confronting him every semester, he was tempted to design a classroom 3 rows deep and 70 feet wide. This comment was one of the things that

sparked my interest in this subject. Based on what I have discovered during the course of this research I think he has a point, although a small one. My advice to him now would be to tear up the classroom only to the extent of removing physical barriers to his freedom of movement, find ways to motivate student attendance, use strategic teacher attention, and get out from behind the podium.

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APPENDICES

APPENDIX A

ADDITIONAL CORRELATION TABLES FOR STUDY I

Table 9

Intercorrelations between Study I Variables and CAARS Subscales (Data Combined from Both Classes)

	Grade	Absent	ADHD Diagnosis	Meds	Inattention Memory	Hyper Restless	Impulsive Emotional Lability	Problems with Self Concept	ADHD Index
Distance	-.140*	.162**	.027	-.120	.081	.074	.044	.028	.089
Grade	—	.401**	-.111*	.027	-.176**	-.155**	-.134	-.110*	-.210**
Absent		—	.114*	.083	.180**	.099	.097	-.051	.123*
ADHD Diagnosis			—	.465**	.224**	.250**	.150**	.050	.236**
Meds				—	.042	.230	.294*	.313*	.388*
Inattention Memory					—	.356**	.312**	.444*	.684*
Hyper Restless						—	.399**	.308**	.653**
Impulsive Emotional Lability							—	.388**	.660**
Problems with Self Concept								—	.687**

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

Table 10

Intercorrelations between Study I Variables and CAARS Subscales (Class 112)

	Grade	Absent	ADHD Diagnosis	Meds	Inattention Memory	Hyper Restless	Impulsivity Emotional Lability	Problems with Self Concept	ADHD Index
Distance	-.045	.033	.046	.195	.023	.001	.057	.040	.060
Grade	—	-.305**	-.073	-.068	-.205	-.089	-.217**	-.288**	-.328**
Absent		—	.029	.135	.147	.022	.011	.050	.055
ADHD Diagnosis			—	.522**	.297**	.348**	.183*	.066	.294**
Meds				—	.246	.214	.224	.233	.437**
Inattention Memory					—	.317**	.256**	.449**	.668**
Hyper Restless						—	.381**	.247**	.638**
Impulsivity Emotional Lability							—	.349**	.630**
Problems with Self Concept								—	.691**

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

Table 11

Intercorrelations between Study I Variables and CAARS Subscales (Class 3195)

	Grade	Absent	ADHD Diagnosis	Meds	Inattention Memory	Hyper Restless	Impulsivity Emotional Lability	Problems with Self Concept	ADHD Index
Distance	-.216**	.282**	.011	.466*	.126	.140	.033	.018	.113
Grade	—	-.500**	-.143	.286	-.151**	-.223**	-.072	.025	-.123
Absent		—	.197**	.007	.209**	.238**	.199**	-.028	.202**
ADHD Diagnosis			—	a	.148*	.141	.126	.043	.185
Meds				—	-.222	.331	.335	.404	.271
Inattention Memory					—	.400**	.370**	.452**	.706**
Hyper Restless						—	.418**	.370**	.669**
Impulsivity Emotional Lability							—	.416**	.685**
Problems with Self Concept								—	.684**

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

a = could not be computed

Table 12

Intercorrelations between Study I Variables and LASSI Subscales (Data Combined From Both Classes)

	Grade	Absent	ADHD Diag.	Meds.	GPA	ANX	ATT	CON	INP	MOT	SFT	SMI	STA	TMT	TST
Distance	-.140*	.162**	.027	-.120	-.179**	-.009	-.056	-.074	-.058	-.119	-.079	-.011	-.200**	-.157**	-.052
Grade	—	-.401**	-.111*	.027	.460**	.175**	.150**	.207**	.095	.298**	.078	.218**	.089	.092	.265**
Absent		—	.114*	.083	-.332**	-.006	-.078	-.074	-.074	-.240**	-.230**	.028	-.161**	-.133*	-.045
ADHD Diagnosis			—	.465	-.149**	-.024	-.067	-.093	.077	-.171**	-.005	-.083	.047	-.011	-.167**
Medication				—	-.052	-.434**	.066	.194	-.087	-.150	.264	-.040	.336*	.266*	.032
GPA					—	.137*	.208**	.176**	.190**	.415**	.164**	.156**	.133*	.222**	.253**

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

Table 13

Intercorrelations between Study I variables and LASSI Subscales (Class 112)

	Grade	Absent	ADHD Diag.	Meds.	GPA	ANX	ATT	CON	INP	MOT	SFT	SMI	STA	TMT	TST
Distance	-.045	.033	.046	.195	-.170*	.067	-.019	.106	-.049	-.064	.083	.116	-.113	-.072	.035
Grade	—	-.305**	-.073	-.068	.477**	.099	.120	.166*	.108	.289**	.092	.234	.002	.020	.301**
Absent		—	.029	.135	.258**	.027	.044	-.008	-.067	-.180**	-.230**	.141	-.115	-.048	.065
ADHD Diagnosis			—	.522**	-.067	.064	.002	-.023	.114	-.146	-.036	-.064	.121	-.040	-.140
Medication				—	-.030	-.328	-.065	.117	-.219	-.329	.152	-.182	.200	..087	-.085
GPA					—	.105	.246**	.195*	.156*	.405**	.152	.184	.173	.265**	.347**

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

Table 14

Intercorrelations between Study I variables and LASSI Subscales (Class 3195)

	Grade	Absent	ADHD Diag.	Meds.	GPA	ANX	ATT	CON	INP	MOT	SFT	SMI	STA	TMT	TST
Distance	-.216**	.282**	.011	-.466*	-.189*	-.058	-.106	-.187*	-.065	-.166*	-.208**	-.101	-.274**	-.203**	-.140
Grade	—	-.500**	-.143	.286	.445**	.233**	.176*	.232**	.088	.302**	.060	.206**	.154*	.140	.266**
Absent		—	.197**	.007	-.407**	-.039	-.088	-.084	-.091	-.288**	-.217**	.005	-.186	-.200**	-.054
ADHD Diagnosis			—	a	-.236**	-.097	-.106	-.138	.038	-.190*	.031	-.086	-.013	.014	-.205**
Medication				—	.024	-.453**	-.067	.271	.183	.123	.381	-.111	.598**	.430	.044
GPA					—	.168*	.203**	.161*	.228**	.423**	.170*	.131	.087	.193*	.203**

* = Significant at .05 level (2-tailed)

** = Significant at .01 level (2-tailed)

a = could not be computed

APPENDIX B

POSSIBLE ACADEMIC ACCOMMODATIONS FOR STUDENTS WITH ADD/ADHD

Possible Academic Accommodations for Students with ADD/ADHD

1. Adjust student seating
2. Use simple, concise instructions
3. Provide a peer tutor/helper
4. Teach compensatory strategies
5. Administer medication
6. Monitor stress and fatigue; adjust activities
7. Modify assignments
8. Change instructional pace
9. Provide supervision during transitions, disruptions, field trips
10. Use study guides, organizing tools
11. Modify testing procedures
12. Provide counseling
13. Initiate frequent parent communication
14. Establish a school/home behavior management program
15. Provide training for staff and parents
16. Have student use an organizer-train in organizational skills
17. Establish a cue between teacher and student
18. Assign chores/duties around room/school
19. Modify environment to avoid distractions
20. Have child work alone or in study carrel
21. Highlight important information/directions
22. Place assignments/directions on tape for auditory learner

23. Provide a checklist for student, parents, and/or teacher to record assignments or completed tasks
24. Use a time to assist student to focus on given task or number of problems in time allotted – stress that they need to be done correctly
25. Have student re-state or write directions/instructions
26. Allow student to respond in a variety of different modes, i.e., may place answers for tests on tape instead of paper
27. Give student opportunity to stand while working
28. Provide additional supervision to and from school
29. Furnish an FM system
30. Modify students work area with barriers
31. Inservice other students and staff with parent permission
32. Develop a behavior modification plan
33. Supply treats and rewards to motivate behavior change
34. Prescribe physical activity, exercise, etc.
35. Determine trigger points and prevent action leading to trigger points
36. Provide a sociometric/sociogram design, such as a circle of friends

Source: Mountain Plains Regional Resource Center. (1998). Students with Attention Deficit Disorders ADD/ADHD: Eligibility Issuesand Service Options Under the Individuals with Disabilities Education Act (IDEA) and Section 504. Utah State University: Logan Sponsored by Special Education Programs (ED/OSERS), Washington, DC.

APPENDIX C

STUDY II ADMINISTRATION PROTOCOL

Study II Administration Protocol

Equipment needed:

- Survey packets including Demographic survey, LASSI, and CAARS. These should be numbered sequentially. Quizzes for Arctic Hysteria, Windigo Psychosis, and Latah should be included with a blank page between them and the survey data.
- VCR or DVD cartoon, TV set and player.
- Microphone if necessary
- Signs for near middle and far conditions taped to end of rows of chairs
- ADHD Referral information

Group assignments for 30 participants

	Arctic Hysteria	Windigo Psychosis	Latah
Near	(Group 1) 1,4,7,10,13,16,19,22, 25,28	(Group 3) 3,6,9,12,15,18,21,24, 27,30	(Group 2) 2,5,8,11,14,17,20,23, 26,29
Middle	(Group 2) 2,5,8,11,14,17,20,23, 26,29	(Group 1) 1,4,7,10,13,16,19,22, 25,28	(Group 3) 3,6,9,12,15,18,21,24, 27,30
Far	(Group 3) 3,6,9,12,15,18,21,24, 27,30	(Group 2) 2,5,8,11,14,17,20,23, 26,29	(Group 1) 1,4,7,10,13,16,19,22, 25,28

As participants enter, assign them to one of three groups based on when they walk through the door as shown above. Please ask them to sit in near, middle, or far seats as marked out above. If there are more than 30 participants available begin again at #1. If less than 30 show for a given section use as many as are present and continue with the number you left off for the next session.

Introduction: Welcome and thanks for participating in our study today. My name is (your name here) and I will be your instructor. We are attempting to understand the relationship between seating and classroom performance. To begin with I would like those of you in the front of the room to mark one on the top of your survey booklets like this (hold up example), those of you in the middle of the room should mark group 2, and those of you in the far end of the room should mark group 3. Does everybody know which group they are in? The first part of our study involves giving us some information about your self, your study habits and how well you feel you can concentrate. Please take a few moments to fill out the surveys you have been given now. Please stop at the blank page in the booklet and do not read any further.

Wait for participants to finish (15 min?)

Does anyone need a few more minutes?

Good, lets move on. As part of this investigation, we are going to ask you to sit in three different sections of this classroom, near, middle, and far from the front and listen to three different lectures. At the end of each lecture there will be a short break during which you will see a cartoon. Just sit back and enjoy the cartoon. If you need to use the restroom we ask that you do it during the cartoon. After the cartoon we will ask you to complete a short quiz on the material you have just heard in lecture. We will then ask you to change seats and the process will repeat twice more.

Read Arctic Hysteria---Show Cartoon---Give test
Now Would those of you in group one move to the middle of the room , those of you in group two move to the far end of the room and those of you in group three come up to the front.

Read Windigo Psychosis---Show Cartoon---Give test
Now Would those of you in group one move to the far end of the room , those of you in group two come to the front of the room and those of you in group three move to the middle of the room.

Read Latah---Show Cartoon---Give test
After test- I would like to thank you all for your participation today we hope it has been an interesting and enjoyable experience for you. If you have any questions or concerns about anything that occurred today please ask me at the end of today's session.

Arctic Hysteria

Robert E. Peary, the obsessive 19th century polar explorer, witnessed a bizarre and disturbing sight in the winter of 1898. His ship, the Windward, was in winter quarters at Cape D'Urville on Ellesmere Island. In the middle of one bitterly cold night, a member of his crew, an Inuit woman from Greenland named Inalu, got up, stripped off her clothes and walked the deck of the ship. Then, she jumped the rail onto the frozen snow and ice. "It was some time before we missed her," Peary wrote in his journal, "and when she was finally discovered, it was at a distance of half-a-mile, where she was still pawing and shouting to the best of her abilities." Crew members captured Inalu and brought her back to the ship, where she recreated "every conceivable cry of local bird and mammal," Peary wrote.

In 1908, Harry Whitney, a wealthy sportsman who travelled to Etah, Greenland, with Peary, noted a similar phenomenon. One evening, a local woman named Tongwe rushed out of the igloo, tore off her clothing and threw herself into a snowdrift. Whitney and another man tried to bring her back in, but had trouble holding her. "A strong north wind was blowing, with a temperature eight degrees below zero and I thought she would surely be severely frozen before we could get her into the igloo again," Whitney wrote, "but in some miraculous manner, she escaped even the strongest frost bite."

Among the Inuit, such scenes of extreme behaviour, were called pibloktoq, a kind of sudden madness. To the turn-of-the-century Arctic explorers who witnessed and recorded the episodes — among them Peary's wife Josephine, who was the first to describe pibloktoq in a journal from her own 1892 Arctic expedition — the Inuit, women in particular, were vulnerable to something they called Arctic hysteria.

Their descriptions of wild and erratic behaviour among the people of a mysterious and exotic locale also fascinated the pioneers of the then-new field of psychoanalysis. A proliferation of papers speculated on the possible causes of Arctic hysteria —a cry for attention, the emotional effects of extreme cold and darkness, a lack of nutrients in the Inuit diet.

Pibloktoq retains a place in the psychiatry textbooks to this day, where it is described as a short attack that occurs among the Inuit, usually women. People will scream and tear off their clothes while imitating the cry of some animal or bird, possibly running wildly about the ice. Categorized with other so-called culture bound syndromes such as amok (the origin of the English phrase "to run amok"), which describes a sudden, violent rampage among the people of South East Asia and Malaysia.

But even though pibloktoq has a place in the historical record and official medical canons, a number of Arctic researchers and Arctic residents doubt its existence. The phenomena, they suggest, may be more rooted in the experience and behaviour of the early European explorers than the Inuit themselves.

One of the most thorough challenges to the concept of pibloktoq comes from Lyle Dick, a historian with Parks Canada based in Vancouver. Dick came across references to Arctic hysteria in 1988 while researching the history of Ellesmere Island during the creation of Ellesmere Island National Park. Like many academics before him, Dick was drawn to the subject. Dick began to investigate accounts of the malady. He traveled to

Washington D.C. for a firsthand look at the journals of the Arctic explorers. He delved into ethnographic accounts of the Polar Eskimos (Inuhuit) and the orthography of their dialect. In the end, he concluded that Arctic hysteria might be a phantom phenomenon. "I found out that much of this literature was based on very little evidence. From what I could see, it just didn't all add up."

Dick published his findings first in a 1995 article the journal Arctic Anthropology and later in his 2001 book about Ellesmere Island called Muskox Land. He found that there was no such term as pibloktoq in the language of the Polar Inuit. European explorers wrote down terms phonetically, so it's not clear if the Inuit were using the word pivdlerortoq, ("a mad or delirious person"), or the related word pivdlerorneq, ("drum dance fits"), or the term pibloktuk ("something bad"). There are various other similar sounding words that could have given rise to the term.

Furthermore, Dick found that most of the writing and speculation about Arctic hysteria was based on only eight cases. And calling them cases is being generous, he says. Most examples are simply a short paragraph in the jottings of European or American adventurers. Dick managed to uncover further references to Arctic hysteria to increase the number of reported cases to 40, but most of these accounts were sketchy and incomplete.

As he studied the issue, Dick began to doubt that Arctic hysteria was a natural part of traditional Inuit culture at all. In fact, he proposed it was most likely an anxiety reaction caused largely by the explorers themselves.

"Peary was obsessed with reaching the North Pole and he forced his crew and assistants to take risks they would not normally do," Dick explains. "The Inuit crew members were separated from their family members. They were placed in dangerous and difficult conditions. There was always risk with hunting in an environment like the Arctic, but the Inuhuit generally took steps to minimize risks. Peary was engaging them to participate in this grand foray over the Arctic ice pack with the ever-present danger of leads opening up and people drowning, and there were many other dangers."

Dick points to the extreme power imbalance between the Inuhuit and the explorers that would have created stressful situations where people might be prone to sudden psychotic episodes. With the explorers and their seemingly limitless supplies of wood, metal and other materials, the Inuhuit were eager to maintain positive relationships. Dick also notes that while there were consensual sexual relationships between Inuhuit women and explorers, there is also evidence of sexual abuse. This, too, may have contributed to pressures that led to irrational behaviour or assaults resulting in post-traumatic dissociative events.

Dick likens the idea of pibloktoq to the popular 19th century notion of "female hysteria," thought to be endemic amongst American middle class women at the time. It was widely believed that women had a natural tendency to be hysterical, which was treated by administrating opium, bleeding, or blistering by applying caustic substances to the skin. It would be easy for Europeans and Americans to view a traditional Inuhuit activity, such as a trance state, which was part of a spiritual practice, and label it hysteria.

For Dick, the study of Arctic hysteria has more to do with the relationship between the Inuhuit and the southern explorers, than it has to do with any truths of pre-

contact Inuit culture. "Maybe the study of pibloktoq will lead as much to understanding the cultures that are writing about it as it does the cultures that are being written about," he says.

Robert E. Peary may have been a legendary explorer. But he was driven more by lust for fame and fortune than by the pursuit of knowledge. As Pierre Burton writes in The Arctic Grail, Peary's obsession separated him from his family for much of his life, permanently crippled his feet due to frostbite and sent him on numerous life threatening missions across the polar ice cap.

Single-minded in his pursuit of reaching the North Pole, Peary was not a keen scientific observer. His observations were sometimes grossly inaccurate. For example, his 1892 discovery of Peary Channel in northern Greenland was later discredited and his 1899 find of Jesup Land west of Ellesmere Island turned out to be wishful thinking. In 1906 he announced his discovery of Crocker Land, northwest of Axel Heiberg Island. On a subsequent expedition Donald MacMillan and his crew found Crocker Land didn't exist.

Peary, his crewmates, and his peers were no more reliable ethnographers than they were cartographers in their day. Researchers today don't cite Peary as an accurate source for information on the Arctic as they do other of his contemporary explorers, such as Vilhjalmur Stephansson, for example.

Indeed, the descriptions of pibloktoq that emerged from his expeditions ring hollow with some of the people who populate today's Arctic. Lucy Evo - a teacher with Nunavut Arctic College from Baker Lake and a former curator with the Inuit Heritage Centre - says she doesn't even recognize the word as part of her language. She also doubts pibloktoq exists, although she imagines Inuit women would experience great stress when separated from their partner, as happened during the early contact period when some men were taken from their families to be guides and hunters for explorers. "When I read this word pibloktoq... I started thinking that at certain times, a woman might go into this hysteria because the hunter will be leaving," Evo says. "In the old days, you needed to have a hunter or partner who has the skills in hunting. Otherwise, you don't have anyone to support you any longer and you're under great pressure."

Sam Law, a psychiatrist at Baffin Regional Hospital in Iqaluit, Nunavut recognizes the term Arctic hysteria from the official reference book used by psychiatrists in North America, the American Psychiatric Association's DSM IV (Diagnostic and Statistical Manual of Mental Disorders). But he calls it an antiquated term. "If someone experienced that type of behaviour now, we would call it a brief psychotic disorder."

In fact, Law says if anyone experiences extreme reactions to living through the cold, dark Arctic winters, it tends to be the newcomers to the North. "The Inuit don't talk much about the change in seasons. They recognize it as normal. It's the southern people who come up who talk about how difficult winter is. They tend to feel moody, they think winter will never end, they get depressed and lose hope."

If the concept of pibloktoq is being challenged in the Arctic and academic circles, the medical community is not about to make quick changes to its records and definitions. Dr. Benjamin Sadock, the author of the reference Kaplan and Sadock's Synopsis of Psychiatry, was intrigued when told of Dick's research. But, after reviewing the

arguments, he said that the 40 examples cited by Dick served as a reasonable basis for keeping the term on the record.

"At this point, the definition of pibloktoq is widespread," Sadock said. "It's in all official nomenclature and in the American Psychiatric Association materials. When you read that stuff, you assume you're reading the Bible —in fact, it is a bible of some kind."

If he's not removing the term just yet, Sadock does say he'd be willing to add a note to his book noting that Arctic hysteria has not been seen in recent years —but only if he can be sure no new similar cases have been reported. "Someone would need to survey all the circumpolar people. They would have to cover everybody before we would say a case doesn't exist," Sadock said.

For now, Arctic hysteria remains a documented culture bound syndrome in the reference textbooks. Some people say it's a garden-variety psychotic episode with a fancy label arising from the exoticization of the Inuit by early 20th century outsiders. They say that it tells more about the culture bestowing the term than the one affected by it. But is there a name for the strange fixation with legendary mental illnesses of the Inuit? Whatever it is, Lyle Dick figures it will crop up again. "I'm sure it will become an obsession for some other scholar and I wish them well with it."

Arctic Hysteria Quiz:

1. What is the most likely explanation for arctic hysteria
    a. It is a cry for attention,
    b. some type of sexual or emotional trauma
    c. the emotional effects of extreme cold and darkness,
    d. a lack of nutrients in the Inuit diet

2. Which is NOT a symptom of pibloktoq
    a. Attacks lasting over 24 hours
    b. Imitating the cries of wild animals
    c. Tearing off ones clothes
    d. Running wildly around even in freezing weather

3. How common is Arctic hysteria
    a. It is a common malady among Inhuit people even today
    b. It was a major problem before the arrival of modern nutrition
    c. Rare, at most 40 cases
    d. It was all made up as a hoax by early explorers

4. If someone experienced pibloktoq today it would most likely be called
    a. Manic-depressive disorder
    b. A brief psychotic episode
    c. Schizophrenia
    d. Post-Traumatic Stress Disorder

5. Arctic hysteria will most likely be_____ the psychiatric manuals because_____
    a. Retained in…one would need to survey all the arctic peoples to make sure there hasn't been a recent case.
    b. Dropped from... it has not been seen in many years
    c. Dropped from…it never existed
    d. Retained in…people find it interesting

6. Which of these was NOT a 19th century treatment for "female hysteria."
    a. opium
    b. bleeding
    c. applying caustic materials to the skin
    d. Electric shock

7. Robert Peary
    a. Is famous psychiatrist
    b. Is a member of the Canadian parliament concerned with native peoples health
    c. A famous explorer
    d. Was a student of Freud's

8. Early arctic explorers
    a. Were entirely dependent on native peoples
    b. Treated the Inhuit with dignity and equality
    c. Died frequently from diseases such as malaria
    d. Had significant power over the inhuit because of their supplies of wood and metals

9. In the modern Inhuit language pibloktoq means
    a. noting, the early explorers probably wrote it down wrong
    b. a mad or delirious person
    c. drum dance fits
    d. something bad

10. Compared to people from the US and Europe, when winter comes the Inhuit
    a. Become very depressed
    b. Recognize it as normal
    c. Constantly talk about the weather
    d. Celebrate it

Key:1-b,2-a,3-c,4-b,5-a,6-d,7-c,8-d,9-a,10-b

Windigo Psychosis:

In the depths of the forest, deep down into no man's-land, are tales of terror that would make the boldest of men shiver. Tales of inhuman things, supernatural things, *savage* things. Strange creatures dwell in the deepest, darkest forests in the world, but stranger still are the ones that live *inside* of man, inner beasts more fearsome than anything else. One such creature is the ***Windigo.***

The word used to describe the creature is not a proper noun because it has no name. Windigo is only a kind of "reference". The word itself is just one of the many ways to spell it. The term derives from the Algonquian root word "witiku", though throughout the tribes and times the term's spelling varies: Wendigo, Windego, Wetiko, Windago, Windikouk, and so on.

The legend of the Windigo is well known among the Algonquian speaking tribes in America, from the Maritimes to the Prairies, from central to north-eastern US. No "monster" or "evil spirit" evokes so much fear in these people. Windigo is usually associated with winter, especially due to the fact that most "cases" of windigoes are heard of during these cold months, probably because the lack of food is felt the most during these times, bringing cannibalism along with them. Most tales say that the Windigo rides with the winter wind, howling inhuman screams, others that the Windigo is made of ice and cold, or at least that its heart is. The same would happen to its host: his heart would turn to ice, incapable of feeling human emotions.

Though most tales recount the Windigo as being cannibalistic, dangerous and violent, the "host" can still try to live far from civilization, deep into the woods, to prevent anybody from being its next victim. Some Windigo-inhabited people would even commit suicide to prevent hurting anyone else.

As with the witch and werewolf trials in Europe, Canada had its share of "Windigo trials" in the settler days. These accounts were often well recorded. Explorer David Thompson witnessed such a trial in the Lake of the Woods region in the late 1700s. A young Indian hunter announced to everyone's surprise that he had a strong inclination to eat his sister, and that he would do anything he must to have human flesh. Alarmed, the band council came to the decision that the man must die, executed by his father. When informed of the resolution that was chosen, the Indian hunter was willing to die. He was later strangled by rope. A few hours later he was burnt to ashes in a large bonfire, not the least bone remaining, so that the evil spirit could not return to this world.

Most people nowadays would believe that these cases either never existed, or that they no longer do. Actually, "windigo psychosis", as it is called, is well known by psychologists. This is when patients show signs of cannibalistic tendencies, are violent, and have an extreme antisocial behavior. There was an outbreak of such cases in the 1970s.

But should the Windigo be classified as a cryptid, an animal not recognized by science such as Bigfoot or the Loch Ness Monster? It seems so. According to everything we know on the subject, there would happen to be three categories of Windigo; we have

seen two up to now: an evil spirit that stalks mostly the subarctic woods in search of a host to help it satisfy its physical craving for human flesh, and a psychosis of which patients show signs of cannibalism and are antisocial. The third type is a kind of tall hominid creature, somewhat like Sasquatch or bigfoot. Unlike it, though, this beast seems to relish itself in violence and preying upon anything it can get its hands on, *humans included*. It seems to be nocturnal, for it is said that it seeks out its victims during dawn and eating them when darkness falls. Flesh might be its chiefly diet, but it is said that it eats rotten wood, swamp mosses and mushrooms.

There is also an account by American president Theodore Roosevelt of such savageries. In his book *Wilderness Hunter*, he tells of a tale that was told to him by an old mountain hunter, named Bauman, about how his friend was killed by a creature half-man half-beast during one of his hunting trips. Four distinct fang marks were found on his companion's neck. Except for a few stories like this and reports or Sasquatch eating deer and small animals, it is usually considered a rather peaceful creature.

Almost all regions in North America are hosts to ape-like creatures: in the Florida Everglades, this type of creature is called *Skunk Ape*, in western Canada, it is called *Sasquatch*, and so the list goes on and on. What is peculiar is that these regions seem to each have a different type of creature from the others: some are more slender, others are taller, others are short and stubby, some are more commonly seen than others, etc. So the question to ask happens to be: can the Windigo simply be another variation of "The American Apes", or is it the same species as the Sasquatch, only extended up to the east? Only direct comparison between these creatures will tell.

But what if the feared beast is really within us? While mental illness is found in most, if not all, societies, there are unique culture influenced forms that these illnesses can take. They are culture bound syndromes. Windigo psychosis is a condition reported among the Northern Algonkian language group of Indians (Chippewa, Ojibwa, and Cree) living around the Great Lakes of Canada and the United States. Windigo psychosis usually developed in the winter when families were isolated by heavy snow for months in their cabins and had inadequate food supplies. The initial symptoms of this form of mental illness were usually poor appetite, nausea, and vomiting. Subsequently, the individual would develop a characteristic delusion of being transformed into a Windigo monster. These supernatural beings eat human flesh. People who have Windigo psychosis increasingly see others around them as being edible. At the same time, they have an exaggerated fear of becoming cannibals. A modern medical diagnosis of this condition might label it paranoia because of the irrational perceptions of being persecuted. In this case, it is the Windigo monsters who are the persecutors--they are trying to turn people into Windigo monsters like themselves. In contemporary North American culture, the perceived persecutors of paranoids are more likely to be other people or, perhaps, extra terrestrial visitors. Victims of Windigo psychosis experienced extreme anxiety and sometimes attempted suicide to prevent themselves from becoming Windigo monsters.

In a research project he refers to as “two parts Native Studies and one part X-Files,” Nathan Carlson, an honors student at the University of Alberta, has spent the last two years unearthing and reviewing literature about the Windigo legend. He is exploring the dynamics behind several violent incidents attributed to ‘Windigo psychosis’ and is

contesting conclusions made by researchers who either dismissed it as a type of culture-bound mental disorder, or rejected the legend altogether.

"This designation of mental illness does not account for the historic cases where two or more people apparently became affected by Windigo disorder at the same time in the same place," Carlson said. "It also doesn't explain why in some cases these victims were cured by Catholic priests, usually by suggestion alone. It seems to have been more a product of a spiritual belief in possession by a cannibal spirit than actual mental disease. By no means does this explain away the mystery. Many people still believe in Windigo."

According to northern Cree and Métis legend, Windigo hexed his victims through nightmares or sorcery and cursed starving villagers or hunters who had committed cannibalism, eventually turning them into human Windigos that craved human flesh. Carlson has unearthed references to 35 such incidents, including possibly two recent cases in Alberta, by reviewing old newspapers, archival records and interviewing native elders.

"There was some kind of phenomenon that actually happened," Carlson said. "Modern-day textbooks say that this condition was caused by a universal clinical disorder like paranoid schizophrenia, while others say the historic reports mentioning Windigo executions were actually rationalizations made up by a community in order to eliminate its sick or troublesome members."

The main contention of skeptics was that there were no reliable non-native eyewitness reports describing anyone with the strange condition that the native people

feared. With the help of past research, Carlson was able to uncover new evidence to suggest that the Windigo reports were more than just folk-tales or hearsay. “When you look at the evidence, these previous theories don't stand up. Something else was happening.” His research included visiting a village six months ago at Trout Lake, 600 km north of Edmonton, where his grandmother had told him one of the most infamous incidents of ‘Windigo psychosis’ occurred. The story made the front page of the Edmonton Bulletin, the city’s first newspaper, in April of that year.

At Trout Lake, Carlson knocked on doors, asking about Windigo, but was turned away by people who didn't recall anything about it, refused to speak on the subject. “They weren’t comfortable talking about it.” Eventually a friend of his grandmother’s introduced Carlson to an elderly man who had an account from an eyewitness who was just 12 when the incident occurred. While visiting the village, Carlson believes he also found the grave of the afflicted man. “I found an area in a ditch that was fenced off and there were still some sticks and logs piled there. His grave is still up there...it sent a chill down my spine for sure.”

Carlson was able to find only one actual case of Windigo cannibalism: Swift Runner, a Cree man who was convicted of killing and eating his wife and five children near Athabasca Landing, was hanged at the Fort Saskatchewan prison in 1879.

His research has implications for the fields of psychology and psychiatry, Carlson said. “They should rewrite their definitions of Windigo psychosis. Textbooks call this a clinical condition, but the old people still say Windigo is an evil spirit.” While Carlson is

not out to convince people of the existence of monsters, he says that this phenomenon should be taken seriously. “Cultural beliefs play a large role in how people perceive the world around them, and a lot of people believed in the Windigo monster in northern Alberta in the 1800s. While we tend to dismiss these sorts of things today, beliefs need to be taken into consideration with this subject. In some cultures, disorders are caused by spirits or monsters, whether they are real or only perceived to be real.”

Marano Lou, of the U Florida, Gainesville, Contends that there is no documentation for windigo psychosis. She spent dive years doing fieldwork among the Northern Algonkians and conducted an extensive archival search and a critical examination of the anthropological literature before concluding that there probably never were any windigo psychotics in an etic/behavioral sense. When the windigo phenomenon is considered with respect to group sociodynamics rather than individual psychodynamics, the question becomes not what causes a person to become a cannibal, but under what circumstances a Northern Algonkian is likely to be accused of having become a cannibal and thus risk being executed as such. It is argued that those so executed were victims of triage homicide or witch hunts, events common in societies under stress. The term “psychosis” is an artifact of research imposed on the phenomenon by outsiders.

Windigo Psychosis Quiz

1. Windigo Psychosis usually develops in the
    a. Winter
    b. Spring
    c. Summer
    d. Fall

2. Which of the following is NOT a symptom of Windigo Psychosis
    a. Poor appetite
    b. Nausea
    c. Fear of becoming a cannibal
    d. Seizures

3. People suffering from Windigo Psychosis sometimes tried to kill themselves
    a. Because of extreme hunger
    b. In order not to become a Windigo monster
    c. Because of extreme depression
    d. In order to become one with the Windigo

4. A Windigo may be
    a. An animal not recognized by science like Bigfoot
    b. A witch
    c. A werewolf
    d. An unburied corpse

5. Which of the following was NOT a "cure" for those thought to be Windigoes?
    a. Execution
    b. Treatment for a mental disorder
    c. Exorcism by catholic priests
    d. Self-exile into remote parts of the forest

6. The last reported "outbreak" of Windigo psychosis was in the
    a. 1700s
    b. 1870s
    c. 1900s
    d. 1970s

7. One famous individual who related a story about Windigoes was
    a. Ernest Hemingway
    b. Henry Ford
    c. Thomas Edison
    d. Theodore Roosevelt

8. Which of the following is NOT a proposed explanation for Windigo Psychosis?
    a. A mental disorder like schizophrenia
    b. A "witch hunt" or means to get rid of troublesome members of a community
    c. A lack of vitamin A in the native diet
    d. Fear of a real, though scientifically unknown animal

9. Windigo Psychosis is reported among native people living in what area
    a. The Great Lakes area
    b. The Pacific Northwest
    c. The Southwest
    d. New England

10. A modern medical diagnosis of Windigo Psychosis might be
    a. Paranoia
    b. Seasonal Affective Disorder
    c. Depression
    d. Alcoholism

Key: 1-c,2-d,3-b,4-a,5-b,6-d,7-d,8-c,9-a,10-a

Latah:

For the past one hundred years anthropologists and psychiatrists have debated the origin and nature of a curious behavior confined almost exclusively to the Southeast Asian neighboring cultures of Malaysia and Indonesia: Upon being startled, ordinarily timid, exceedingly polite women sometimes respond with vulgarities, obscenities, and outrageous sexual gestures. In severe cases, the women experience "automatic obedience," doing whatever they are told. Afterward they claim amnesia and are not held responsible for their actions. Episodes of this type last from a few minutes to several hours.

Victims of latah are almost always middle-aged women of Malay and Javanese descent. I first observed a severe case while attending my brother-in-law's wedding in the home of the bride's parents. I was astounded to observe my wife's shy, decrepit aunt, who had considerable difficulty even walking, intentionally startled by her elderly uncle. "S" suddenly leapt to her feet, lost all inhibition, and for the next 10 minutes followed each of her teaser's commands, mimicking his every gesture. During the episode, she was made to cry like a baby, perform silat (Malay self-defense), dance vigorously, and partially disrobe, all to the hilarity of the entire wedding party which crowded around her. She would occasionally improvise gestures, such as lifting her sarong in a sexually suggestive manner and utter the most repulsive words and phrases. Throughout the episode, after some outrageous display, she would immediately and profusely apologize for her vulgarity, then launch into another series of behaviors,

apologizing more than 30 times during this particular "fit." The next day at a crowded wedding reception at the groom's home, I was able to tease her into a similar, less dramatic episode by suddenly slapping my hands onto the floor next to her. She responded with a 10-minute display, mimicking my every action, from dancing to slapping her face repeatedly. Other family members also joined in the teasing.

A few days later I visited "S" at her residence in the presence of two relatives. I startled her and she responded with a short vulgar phrase. Immediately thereafter, I slapped my hands on the floor next to her, exactly as I had done at the wedding reception, but there was no response. I slapped the floor, then my face, hard, but again there was no response. I was perplexed. Just a few days earlier in the presence of about 60 people, even minor startles would send her into prolonged "fits." At both parties she was sitting on the floor next to me, and I executed the same sequence — startling her, slapping the floor, then my face. Family elders later explained emphatically that unless there is a large social gathering, "severes" never exhibit anything beyond "mild" symptoms, responding only with an offensive word or phrase. They also report that "teasers" are always close relatives — ensuring that the "victim" does not do anything too outrageous, such as responding to a request to stab someone with a knife.

I was surprised to learn that "S," who would commonly drop and throw objects while in a state of latah, was frequently allowed to cradle babies in her arms, with a perfect record of holding onto them! Since there are many "severe" cases in Malaysia, one wonders why there are no newspaper headlines: "Another Malay Drops Baby!" or "Latah Claims Two in Yet Another Car Mishap." While claiming to hate being

"teased," the "victim" and onlookers seem to heartily enjoy it. This denial of self-control is necessary for the perpetration of the latah deception since it "sets the stage" for the ensuing performance which allows for the violation of Malay norms. The subject enjoys complete immunity from blame. What "victim" can willingly invite the latah condition since it would be tantamount to admitting that they enjoy violating strict taboos? If her protestations were genuine, mothers, sons and grandchildren would certainly not torment their elder loved ones, who are always treated with the utmost dignity and respect in Malayo-Indonesian culture. From this perspective, the latah startler unwittingly serves as a coach, orchestrating and dictating the subject's responses.

This ritual also allows for the release of individual expressions. While the subject is required to perform the coach's choreography, the foul language and obscene body gestures are improvisations by the latah performer. The performance is almost always terminated by both physical and verbal cues that the subject is tired. In this ritual of deception, family members recognize the latah subject is not ill. But they do believe they have temporary and complete control over the subject's mind, and are careful to keep knives and other sharp objects away from subjects during latah episodes.

Exhibitionism best fits the evidence, explaining why latah is not considered an illness by participants and their families, the reluctance of informants to provide detailed information, observations that most subjects are described as clever (Fitzgerald 1923; Murphy 1973), and the conspicuous absence of any sign of mental abnormality

outside of episodes. It explains latah's almost exclusive restriction to lower-class women and servants, and their conspicuous tendency to startle in the presence of higher status peers (Geertz 1968; Murphy 1976; Kessler 1977).

It has been observed that "severe" subjects typically lead solitary and reclusive lives to avoid being teased (Langness 1967:149). Yet, it is equally plausible that these subjects become performers because they are lonely and desire attention. Previous observers have presented primarily anecdotal evidence that the onset of severe symptoms coincides with depression, financial dependence, and loneliness following the death of a close family member (Chiu, Tong & Schmidt, 1972; Kenny, 1978, p. 210; Yap 1952). Some anthropologists even argue that latah symbolizes the plight of such people and is a means of conveying to others that something is amiss (Kenny, 1978).

"S" first exhibited severe symptoms at public gatherings within a few months after the death of her daughter, followed in close succession by the death of her husband. She was unemployed, in social isolation, and dependent on her surviving children for support. Researchers have focused their attention on the conditions likely to prompt latah, largely ignoring the question of the conditions under which people are likely to feign or exaggerate latah for attention. It is notable that two other family members were in virtually the exact social circumstances as "S" following the deaths of their husbands. Both of these "mild" subjects experienced latah slightly longer than usual. They explained latah as an unconscious means of relieving emotional stress and perhaps an unconscious means of getting attention. Yet, neither became "severe."

It cannot be overemphasized that "severe" latah behavior is exceedingly rare, even in Malayo-Indonesia. Colson (1971) identified five cases in a Malay village of more than 400 residents; Resner and Hartog (1970) stated that traditional Malay villages usually have but one case, while Chiu et al. (1972) located only 69 cases out of a sample of 13,219 East Malaysians. One reason researchers have chosen to downplay the obvious exhibitionistic nature of "severe" cases are reports that it once affected the majority of the populations of Malaya and parts of Indonesia (Van Brero 1895; Clifford 1898). Scientists reasoned that large numbers of inhabitants could not be feigning; therefore it must possess some unconscious ritualistic or symbolic quality. Hence, while Yap (1952:537) was convinced that latah is a mental disease of hysterical dimensions, he remarked, "It is often difficult to separate the genuine cases from those which are basically histrionic and exhibitionist in nature." Malaysian psychiatrist Eng-Seng Tan made a similar observation. Like Yap, Kiev (1972) and Murphy (1976), each assumed that this behavior characterizes hysterical and dissociative aspects of latah, especially since most "victims" are female:

> Although there has not yet been any systematic scientific study of the latah phenomenon from a psychological viewpoint, the hysterical nature of the condition is inescapable to the psychiatric observer. The condition invariably occurs in the presence of an audience, the behavior of the subject has a marked theatrical quality about it, often provoking spasms of laughter among the audience, and the subject pleads amnesia for her buffoonery when she comes out of her altered state of consciousness. (Tan 1980:380)

Upon closer scrutiny, the argument dissolves that latah cannot be fraud due to its pervasiveness. “Milds” do not consider themselves to be suffering from a disorder. Upon explaining to family members the common psychiatric definition of “mild,” I was told “everyone is a little latah.” There is no evidence that “severe” cases were any more common in the previous century than they are today. Its habitual form persists in certain families, although it has no major social significance, except as a prerequisite for performers to emulate and elaborate.

“Mild” latahs simply respond to startle in a manner comparable to Western swearing. There is no exaggeration, mimicking, amnesia, or involuntary expression. Then how is its appearance in women explained? In its “mild” form, latah is an infrequent habit formed almost exclusively by post-pubescent females in certain Malay households with cultural traditions of emulating behavior of elders. Since it is considered a feminine trait, most males do not engage in the habit, but if they do, it is infrequent and typically denied. In a similar vein, smoking cigarettes once was considered a solely masculine trait in Western society, and women who smoked usually denied it. The view of “mild” latah as habit is consistent with Murphy’s (1976) observations of enigmatic behavior: The condition was extremely rare in Malayo-Indonesia during the first half of the seventeenth century; reported on every street and common among men by the 1890s; scarce during the 1920s; and diminishing in frequency today and almost exclusive to women.

Similar phenomena have been reported in other cultures around the world. New York neurologist George Beard (1839–1883), was also among the first to describe in

detail a condition apparently identical to latah in non-Malay cultures. He found it in Northern Maine. Having heard mention of an unusual neurological disorder around Moosehead Lake, he visited the area in 1880. Cases were not hard to find; two afflicted individuals worked at his hotel. Never having heard of latah, he referred to these cases as the "jumping Frenchmen of Maine". Based on observations of 50 cases, including 14 in 4 families, the syndrome struck mostly lumberjacks of French-Canadian descent. One of his subjects, for example, was sitting, cutting his tobacco with a knife and Beard startled him by striking his shoulder and shouting "throw it." Beard described his reaction: "Almost as quick as the explosion of a pistol, he threw the knife, and it struck the beam opposite; at the same time he repeated the order, 'throw it' with a certain cry as of terror or alarm." This behaviour and that of other subjects described in his papers indicate the jumpers to be highly similar or identical to latah cases.

During the next few years, Beard's publications on jumpers echoed around the world. Gilles de la Tourette, a student of Charcot, was at the time collecting cases of what would become known as Tourette syndrome (TS). He erroneously considered Beard's jumpers to be the same as the patients he was investigating. (Although, like the jumpers, TS patients often suffered swore and sometimes mimicked others, their symptoms were not triggered by startle. The major feature of TS patients—repeated, involuntary motor tics—was not part of the "jumping" picture.) Beard's paper was followed by other descriptions of cases that appeared to be similar to the jumpers: *myriachit* in Siberia and the previously described latah of Malaysia and Indonesia. Tourette's 1884 article on "jumping, latah and myriachit.", which claimed that these three conditions were the same

as his cases of "convulsive tics," led to sometimes acrimonious debate about whether they really were the same and who it was who first described these conditions. Today, most transcultural psychiatrists would see TS as a distinct entity but jumping, myriachit and latah as the same illness with different labels.

Latah Quiz:

1. Latah Sufferers, when NOT showing symptoms
    a. Are usually thought of as eccentric
    b. Are societal outcasts
    c. Are usually confined to mental hospitals
    d. Are otherwise considered perfectly normal

2. Latah episodes begin with
    a. Some type of trauma
    b. A period of unconsciousness
    c. A startle or sudden fright
    d. Drinking Kava

3. Which of the following is NOT a symptom of Latah?
    a. Muscle ticks and twitches
    b. Automatic obedience
    c. Obscene or vulgar speech
    d. Sexual gestures

4. Victims of Latah are usually
    a. Children
    b. Middle-aged women
    c. Adult males
    d. New mothers

5. Latah is more common
    a. In the upper class
    b. In the lower classes
    c. Among artists
    d. In the middle class

6. Latah "teasers" are usually
    a. Children
    b. Women
    c. Stage performers
    d. Close relatives

7. Latah Sufferers frequently
    a. Are unaware of there behavior after an episode
    b. Remain delirious for some time following an episode
    c. Apologize for their behavior while doing it
    d. Sleep for several hours after an episode

8. "Severe" Latah's
    a. Are usually lonely and desire attention
    b. Usually become worse over time
    c. Require medication
    d. Cannot drive

9. Conditions similar to Latah have been reported
    a. In Ghana and Sierra Leone
    b. In Tahiti and Fiji
    c. Guatemala and Honduras
    d. In Maine and French Canada

10. Latah was once considered to be the same type of disorder as
    a. ADHD
    b. Paranoia
    c. Tourettes Syndrome
    d. Schizophrenia

Key:1-d,2-c,3-a,4-b,5-b,6-d,7-c,8-a,9-d,10-c

APPENDIX D

DEMOGRAPHIC SURVEY

Demographic Survey

Participant demographic survey—Classroom Seating

1. Participant Number:_____
2. Seat:_____
3. Name:_____
4. M:___ F:___
5. Age:____
6. Class: (Check One) Fr:__ Soph:__ JR:__ SR:__ Grad:__ Other:__
7. Estimate your GPA Prior to beginning this semester:_____
8. What influenced your choice of seat for this class (be honest!)?
9. Is your seating due to an accommodation through the program for students with disabilities? Yes:___ No:___
10. Have you ever been diagnosed as having Attention Deficit Disorder (ADHD)? Yes:___ No:___ If No you have completed this survey.
11. Who diagnosed you with ADHD?
12. Psychologist:__ Psychiatrist:__ Pediatrician:__ Other M.D.___ Other:___
13. Are you currently taking medication for your ADHD? Yes:___ No:___