An empirical examination of the relationships between Adult Attention Deficit, Personal Task Management Systems and Role Stress

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ABSTRACT

Adult attention deficit disorders (AAD) and stress are pervasive and significant experiences with mostly harmful consequences for both employees and organizations as a whole. This research study proposes a link between AAD and role stress. Adults who are experiencing the core symptoms of AAD (difficulties with task activation, concentration, effort, emotional interference and accessing memory) are less likely to develop an effective task management system. This in turn should lead to higher levels of role stress. Both the association between AAD and total role stress ($r = 0.34$, $p < 0.01$), and the more specific associations between AAD and role overload ($r = 0.26$, $p < 0.01$), role ambiguity ($r = 0.31$, $p < 0.01$) and role conflict ($r = 0.26$, $p < 0.01$), were statistically significant. The associations between the lack of an effective task management system and both AAD ($r = 0.41$, $p < 0.01$) and total role stress ($r = 0.64$, $p < 0.01$) were statistically significant. The Sobel test ($Z = 6.57$, $p < 0.00$) provides support for the hypothesis that the lack of an effective task management system fully mediates the relationship between AAD and role stress. Future research needs to draw samples from a variety of work situations.

Introduction

A recent national survey found that 4.2 percent of US workers had adult attention deficit hyperactivity disorder (ADHD) resulting in $19.5 billion in lost human capital per annum (Kessler, Adler, Ames, Barkley, Birnbuam, Greenberg, Johnstone, Spencer & Ustun, 2005). Recent lifespan research suggests that the majority of children with ADHD continue to experience symptoms as adults (Barkley, Fischer, Smallish & Fletcher, 2002; Biederman, Mick & Faraone, 2000; Mannuzza, Klien, Bessler, Malloy & LaPadula, 1998; Weiss, Hechtman, Milroy & Perlman, 1985; Wilens, Biederman & Spencer, 2002). Prevalence estimates of ADHD among adults in the United States vary according to the measurement criteria used, with estimates ranging from less than 10 percent to as high as 70 percent (Barkley et al., 2002; Mannuzza et al., 1993, 1998; Weiss et al., 1985). A recent population screen of 966 adults in the United States suggests prevalence rates of 2.9 percent for narrowly defined ADHD and 16.4 percent using a more broad definition (Faraone & Biederman, 2005). Kessler et al., (2005) concludes that adult attention deficit disorders are a common and costly problem within the US workforce.

Adult Attention Deficit

The Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV) defines attention deficit and hyperactivity disorder (ADHD) as “a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than is

typically observed in individuals at a comparable level of development" (APA, 1994, pg. 78). A recent national survey by Harris Interactive (2004) found that the majority of adults with ADHD believed that the disorder had constrained them from achieving both short and long term goals. Research has confirmed that adults with ADHD attain lower occupational ranking, socioeconomic status and social class standing when compared with their peers (Biederman, Faraone, Spencer, Mick, Monuteaux, & Aleardi, 2006; Mannuzza, Klien, Bessler, Malloy & LaPadula, 1993). Research by Biederman et al., (2006) found that, on average, adults with ADHD have household incomes that are $10,791 lower for high school graduates and $4,334 lower for college graduates. Annual income loss for adults with ADHD in the United States is estimated at $77 billion, which is similar to income loss estimates for drug abuse ($58 billion) and alcohol abuse ($86 billion). Research has also established a link between ADHD and substance abuse (Biederman et al., 2006).

A recent study using data from Fortune 200 companies found that absenteeism and medical costs for employees diagnosed with ADHD were 48 percent higher (Secnik, Swensen & Lage, 2005). Adults with ADHD were also more likely to change jobs (Goodwin & Corgiat, 1992; Wallis, 1994), engage in part time employment (Biederman et al., 2006) and seek out jobs that don't require concentration over long periods of time (Weinstock, 1993). They also avoid jobs that require close supervision, repetitive tasks and sedentary performance conditions (Mannuzza et al., 1993). The disorder is also associated with higher accident rates and lower productivity (Reynolds, 1996, 1997). Adults with ADHD are perceived by their employers as requiring more supervision and less able to complete assignments (Barkley, 1990).

Adults with ADHD have difficulty focusing on their problem behavior and without help will often fall into a chain of failures (Nadeau, 1997). Barkley (1990) suggests that depression, anxiety and diminished hopes of future success may help to develop and exacerbate the symptoms of adult ADHD. This suggests that without intervention, adults with attention disorders are more likely to find themselves in a debilitating cycle. The chain of failures produced by attention related difficulties may produce depression, anxiety and hopelessness, which in turn exacerbates the symptoms of the disorder and increases the likelihood of ongoing failures.

ADHD may also be associated with positive behaviors like ingenuity, creativity and determination (Mannuzza *et al*.,1993), which may explain why entrepreneurs appear to have relatively higher levels of the disorder (Miller, 1993). In fast paced work environments, adults with ADHD may perform just as well, if not better, than non-ADHD employees (Stuart, 1992). Hartman (1993) encourages a more encompassing view of adult workers with ADHD by suggesting that employers consider both the negative and positive behaviors associated with the condition.

Research on adult ADHD suggests that the hyperactivity/impulsivity component of the disorder may disappear or not exist, (Weiss & Hectman, 1986, 1993), whereas the inattention component and related cognitive symptoms, referred to as adult attention deficit (AAD), are more likely to persist or develop (Brown, 1995). Brown (1995)

suggests that the hyperactivity/impulsivity component should be excluded but also suggests that strict reference to the symptoms of inattention may not capture all of the key symptoms. Brown (1996) proposes five clusters of symptoms all of which seem to commonly occur among persons with AADs. The five symptom clusters include difficulties with activating to work, concentrating, sustaining effort and energy, managing emotional interference, and accessing memory. This suggests that AAD, as opposed to ADHD, may be a more prevalent problem for adult workers and that some of the key symptoms associated with the disorder may have been ignored in previous research. Researchers have also expressed concern about strictly treating attention deficit disorder as a categorical diagnosis, as opposed to a dimensional construct with varying levels of severity (Achenbach, 1991; Blacker & Tsuang, 1992). Categorical diagnosis promotes simplistic use and interpretation of the construct. This research defines adult attention deficit (AAD) as a persistent pattern of inattention and related cognitive symptoms that occur with varying levels of severity and create additional challenges within the academic, work and social life of adults. Although empirical research on the impact of attention deficit disorder and organizational behavior is limited, research to date suggests that attention deficit disorder is having a wide range of negative consequences in the workplace.

Role Stress

Role stress is generally defined as "anything about an organizational role that produces adverse consequences for the individual" (Kahn and Quinn, 1970, p. 41). More specifically, role stress is defined as “a perception indicated by ambiguity, conflict and overload arising from both the characteristics of the individual and the work environment” (Tetrick, 1992, p. 136). Role ambiguity occurs when a person is not sure what their role requires and/or how to do it (Cooper, Dewe & O’Driscoll, 2001; Senatra, 1980), whereas role conflict occurs when the performance requirements of a role are not compatible (Gaertner & Ruhe, 1981; Kahn, Wolfe, Quinn, Snoek and Rosenthal, 1964; Shenkar and Ziera, 1992). Role overload is defined as having too many things to do in a given time period (Bacharach, Bamberger, & Conley, 1991; Peterson & Smith, 1995; Schick, Gordon & Haka, 1990).

Moderate levels of stress, referred to as eustress, may stimulate people to excel and increase performance (Selye, 1976). Bhagat, McQuaid, Lindholm & Segovis (1985) suggest that some workplace stressors are positive because they “produce a state of challenge, coupled with disruptive pleasure” (pg. 203). For example, role conflict has been found to reduce boredom (Sieber, 1974) and help energize employees (Jones, 1993, Marks, 1977). However, when stress levels exceed the coping skills and resources available to the employee, the results are typically harmful to both the employee and the organization (Jamal 1984, 1985; Singh, Goolsby & Rhoads, 1994). A role that becomes overloaded with content may increase productivity in the short term but performance inevitably suffers (Beehr & Walsh 1976).

Surveys conducted over the last two decades suggest that between one third and two thirds of the US labor force experiences high levels of stress at work (Barsade &

Wiesenfeld, 1997; Bond, Galinsky & Swanberg, 1998, Driscoll, 1995; Northwestern National Life Insurance Company, 1992, Schultz & Schultz, 1998). Surveys conducted by the European Foundation and European Commission found that stress is the primary complaint among workers (Paoli & Costa, 1994). Estimates of the organizational costs of workplace stress for US employers during the 1990s ranged from $80 billion (Mann, 1996) to more than $200 billion (DeFrank & Ivancevich,1998). The American Institute of Stress (2001) provided a more recent estimate of $300 billion annually. Research also suggests that the majority of workers believe that levels of stress are rising significantly (Armour, 2003; D'Arcy, Masius, and Bowles, 1996; Cohen, 1997; Princeton Survey Associates, 1997; Spielberger & Reheiser, 1995).

The general view that role stress is detrimental to individuals and organizations has been widely supported and the subject of 300 journal articles (Ortqvist & Wincent, 2006). Organizational and individual problems associated with role stress include absenteeism (Brown, 2001; Goetzel, Anderson, Whitmer, Ozminkowski, Dunn & Wasserman, 1998;) turnover (Lee, 1997; Mann 1996); burnout (Holloway & Wallinga, 1990; Jones, 1993), emotional exhaustion (Posig & Kickul, 2003); deteriorating personal health (O'Driscoll & Cooper, 1996), job dissatisfaction (Keenan & Newton, 1984), reduced organizational commitment (Johnston, Parasuraman, Futrell, & Black, 1990), and lower performance (Abramis, 1994; Babin & Boles, 1996; Jamal,1984; Rebele & Micheals, 1990).

Recent work redesign initiatives may be exacerbating this problem. A significant change is taking place in organization design with greater emphasis on flatter organizations, flexibility, employee empowerment and the use of self-directed teams (Alvesson & Willmott, 1992; Kalleberg, 2001; Smith 1997; Thomas & Velthouse, 1990; Vallas & Beck, 1996). Such organizations rely more on employee self regulation than the tradition forms of external leadership and control (Manz & Sims, 1996). These organizations are also moving away from an emphasis on jobs to an emphasis on roles (Howard, 1995; Ilgen, 1994). Traditionally, organizations placed stable boundaries around specific duties and responsibilities, and assigned them to individuals as jobs (Bridges, 1994). The increasing emphasis on organizational change, employee empowerment and flexible forms of work, has eroded stable job specifications in favor of more loosely defined roles (Applebaum & Berg, 1997; Ilgen, 1994; Ilgen & Pulakos, 1999; Smith, Ford, & Kozlowski, 1997). A role is considered to be more than a job in that it continually evolves to accommodate a stream of projects and includes elements that are generated by the incumbent and other employees (Ilgen & Hollenbeck, 1991). Employees performing a role are more likely to rely on information from others than a specific job description in order to successfully perform their work. The shift from tradition jobs to more fluid roles increases structural flexibility and may also increase the motivating potential of work by offering employees more meaningful and autonomous working conditions. However, the loss of stable job boundaries increases the potential for role ambiguity, conflict and overload, and a general increase in work related stress (Cooper & Dewe, 2004). In addition, the emphasis on self regulation may also contribute to an increase in role stress, especially for those employees who are ill equipped to be more self managing under fluid role conditions.

The harmful and costly consequences of role stress, underscores the importance of understanding individual and organizational antecedents, and developing strategies for reducing these stressors (Lawson, Savery & Luks, 2001). Research has shown that the personal attributes of employees influences their ability to manage role stress which ultimately influences performance (Flynn, Chatman & Spataro, 2001; Howell and Higgins, 1990; Kelly et al., 1981). A recent national survey (Harris Interactive, 2004) found that 64 percent of adults with ADHD reported having difficulties with workplace stress. A search of the popular research databases (ABI-Inform, Business Source Premier and PyscInfo) produced no current empirical research on the relationship between AAD and role stress.

The Relationship between Adult Attention Deficit and Role Stress

Research conducted by the Center for Cognitive and Emotional Health has confirmed that employees with AAD experience higher levels of stress resulting from difficulties with managing tasks considered necessary but uninteresting (Hallowell, 2005). Necessary tasks are defined as those tasks that must be performed in order to successfully manage required work and personal responsibilities. These tasks arise out of necessity rather than preference or interest. Research on the influence of adult attention deficit disorders on marital relations provides further evidence of this task management challenge. Families containing a parent who has an attention deficit disorder often rely on the non-afflicted spouse for planning, organizing, setting limits, time management, problem solving, child rearing, making financial contributions and maintaining family harmony (Dixon, 1995, Wiess, Hechtman and Weiss, 1999).

Hallowell (2005) states that the symptoms of AAD are being amplified by an increasingly hyperkinetic work environment. As cognitive load increases, the frontal lobes of the cortex are increasingly used to maintain a sense of direction and organization. The inhibiting functions within the frontal lobes of the cortex are also used to constrain emotional flooding caused by lower brain responses to increasingly threatening conditions. Research conducted by (Young, Morris, Toone & Tyson, 2007) confirmed that adults with AAD have significantly greater difficulty with planning and problem solving as task difficulty increases. They suggest that limited capacity within the frontal lobes of the cortex to inhibit emotional and cognitive interference reduces the capacity to cope with increasing cognitive load and emotional labor.

The challenges of managing increased cognitive load and emotional labor are exacerbated by the learning disabilities that often accompany attention deficit disorders. The learning process requires paying attention to personal performance relative to a standard, and integrating feedback into behavioral experiments until mastery is achieved (Bell & Kozlowski, 2008; Boyatzis, Leonard, Rhee, Wheeler & Capability, 1996). Adults with AAD are more learning disabled due to difficulties with focusing on problem behavior, establishing clear learning goals and translating feedback into new more effective behavior (Nadeau, 1997). As a result, adults with AAD are unlikely to possess an organized and reliable task management system. In addition, difficulties

with attending to problem behavior and learning from failed attempts to develop such a system blocks personal growth in this competency.

Focus groups conducted with high and low AAD subjects prior to this research study confirmed that adults with AAD have poorly developed systems for executing necessary tasks. The high AAD subjects demonstrated a poor understanding of their own system, and the systems they did describe lacked coherence, integration and structure. The results of the focus groups also suggested that high AAD subjects had difficulty focusing on and improving their problematic systems. All the high AAD subjects reported that their approach to managing important tasks "stressed them out." Most of the high AAD subjects had tried to develop a better system but had failed to finish, implement or continue using the new system. They reported that sudden increases in environmental stressors resulted in a collapse of their system and a return to a more confused, poorly organized and reactive approach.

Hallowell (2005) suggests that behavioral therapy and workplace training can help employees with AAD develop the systems and skills necessary to be more organized. Research conducted by Pater and Bowles (2007) has confirmed that well designed skills training can enhance attention behavior in order to heighten safe actions and performance. Group counseling that focuses on helping adults with AAD examine their difficulties with organizing and completing tasks has helped to improve their organizational skills (Wiggins, Singh, Getz & Hutchins, 1999). The need for intensive training and support is especially important for employees with AAD because of the difficulties they have focusing on their problem behavior.

The general proposition guiding this research study is that AAD and role stress are associated with one another, and may in fact become partners in a mutually reinforcing and debilitating cycle. Adults need to attend to multiple sources of information, integrate this information into a coherent understanding of their role requirements, and shape role requirements in order to prevent conflicts. They also need to shape their role in order to increase the degree of person-job fit. They need to keep up with the pace of work, make quality contributions in a timely manner and adjust as new conditions arise. Accurately monitoring and responding to personal emotions and social dynamics is an important part of this challenge. Adults who experience difficulties activating task work, sustaining concentration, sustaining effort, managing emotional interference, and accessing short term memory, are less likely to manage their role effectively.

***H1**: Adult attention deficit will be positively associated with total role stress.*

Difficulties with organizing and activating to work, sustaining concentration and effort, and managing emotional interference, should constrain personal productivity. A persistent constraint on personal productivity should create a backlog of tasks contributing to role overload.

***H1a**: Adult attention deficit will be positively associated with role overload.*

Difficulties with sustaining attention, managing emotional interference and accessing short term memory should constrain the development of a clear, well integrated and detailed sense of a role. These challenges should also make it more difficult to update understanding of role requirements as conditions change. This situation should contribute to an ongoing sense of confusion about the requirements of a role.

***H1b**: Adult attention deficit will be positively associated with role ambiguity.*

Difficulties with gathering, integrating and updating role information into a detailed and coherent understanding of a role should constrain the ability to shape a role. Difficulties shaping a role should lead to higher levels of role conflict. Managing role conflicts also requires sustained energy and emotional control which is lacking in adults with AAD.

***H1c**: Adult attention deficit will be positively associated with role conflict.*

The role stress experienced by adults with AAD appears to be caused by the inability to develop and maintain an effective task management system, especially for necessary tasks. This suggests that the lack of an effective task management system mediates the relationship between AAD and role stress.

***H2a**: Adult attention deficit will be positively associated with the lack of an effective task management system.*

***H2a**: The lack of an effective task management system will be positively associated with total role stress.*

***H2c**: The lack of an effective task management system will mediate the relationship between AAD and total role stress.*

Methods

Subjects and Procedures

The subjects were two hundred and ninety seven university students enrolled in four business courses. The subjects were commuter students at a satellite campus of a large western US university. The sample contained one hundred and fifty four women and one hundred and forty five men. The age of the subjects ranged from nineteen to forty two, and the average age was twenty three. Over three quarters of the students were engaged in paid employment for at least ten hours per week. The central feature of the course was a significant team project which made up forty percent of the final grade. Each team was expected to design and subsequently reengineer a typical workplace process. The teams were expected to capture this process in a handbook and then present their process to class members at the end of the semester. The course created an opportunity for students to experience a short term self managing

project team. Each of the students was responsible for completing team projects across a variety of courses. Each student needed to gather, integrate and update a variety of role information. They also needed to negotiate with others in order to shape their role requirements and avoid role conflicts. Each of the students completed measures of adult attention deficit, role stress and task management during the course of the semester.

Principle components factor analysis with a varimax rotation was used to confirm the dimensionality of the role stress measure and the contribution of the individual items. Product moment correlations were used to test all the hypotheses regarding associations between the measures. The Sobel (1982) test was used to examine the mediating influence of the inability to develop an effective task management system. The first step in testing the mediating hypothesis was to confirm significant correlations between lack of an effective task management system and both AAD (independent variable) and total role stress (dependent variable).

Measures

Adult Attention Deficit (ADD)

The Brown (1996) attention deficit disorder scales were used to measure adult attention deficit. The instrument has been designed and tested for use with adults eighteen years and older. The forty self-report items on the Brown AAD scales are grouped into five clusters of conceptually related symptoms of AAD. Organizing and activating to work *(cluster 1)* measures difficulty in getting organized and started on tasks. An example item is: I am disorganized; I have excessive difficulty keeping track of plans, money, or time. Sustaining concentration *(cluster2)* measures problems in sustaining attention while performing tasks. An example item is: I listen and try to pay attention (e.g., in a meeting, lecture, or conversation) but my mind often drifts; I miss out on desired information. Sustaining energy and effort *(cluster 3)* measures problems in keeping up consistent energy and effort while performing tasks. An example item is: I "run out of steam" and don't follow through; my effort fades quickly. Managing affective interference *(cluster 4)* measures difficulty with moods and sensitivity to criticism. An example item is: I become irritated easily; I am "short-fused" with sudden outbursts of anger. Utilizing working memory and accessing recall *(cluster 5)* measures forgetfulness in daily routines and problems in recall of learned material. An example item is: I intend to do things but forget (e.g., turn off appliances, get things from store, return phone calls, keep appointments, pay bills, do assignments). Subjects used a four point scale (1=never, 2=once a week, 3=twice a week, 4=almost daily) to rate the frequency with which each item occurred in their own lives. A total score for AAD was derived by adding up the scores for each of the items. The Cronbach alpha coefficient was a=0.89 suggesting good internal reliability.

Role Stress

Items for measuring role ambiguity, conflict and overload were generated after reviewing the Role Stress Inventory (Rizzo, House & Lirtzman, 1970), Occupational Environment Scale (Osipow & Spokane, 1983), Role Clarity Index (Kahn, Wolfe, Quinn, Snoek & Rosenthal, 1964) and the Work Stress Inventory (Barone, Katell, Caddy, Roselione & Hamilton, 1988). The items needed to be worded in a more general manner so as capture role ambiguity, role conflict and role overload as it pertains to the more general context faced by students. Four items were chosen for each of the dimensions of role stress. An example item for role ambiguity is: "I don't have a clear sense of the important tasks that I need to complete." An example item for role conflict is: "The important tasks I need to do often conflict with one another." An example item for role overload is: "I have more tasks that I can effectively manage." The Cronbach coefficients for role overload, conflict and ambiguity were (a=0.94), (a=0.92) and (a=0.90) respectively, suggesting good internal reliability. Subjects used a seven point Likert scale (1=strongly disagree, 2=disagree, 3=slightly disagree, 4=neutral, 5=slightly agree, 6=agree, 7=strongly agree) to rate the extent to which they agreed with each item. Scores for each dimension of role stress were derived by adding up the scores for the associated items. A total score for role stress was derived by adding up the scores for each of the dimensions. The Cronbach coefficient for total role stress was (a=0.93) suggesting good internal reliability.

Lack of a Developed and Effective Task Management System

The items that measured lack of a developed and effective task management system were developed for this study (see appendix A). The measure includes eleven items and a sample items are: "I don't have a well developed method for completing tasks successfully," and "I'm always confused about what method I'm using to complete tasks." The Cronbach coefficient for the measure was (a=0.94) suggesting good internal reliability. Factor analysis confirmed the uni-dimensionality of the measure and the reliability coefficient could not be improved by deleting any of the items.

Results

Descriptives

A principle components factor analysis with an orthogonal rotation (varimax) was conducted to examine the structure of the role stress measure. The factor analysis produced three factors with the items for role overload, role conflict and role ambiguity each forming a separate factor. Factor loadings for role overload (0.81 to 0.87), role ambiguity (0.82 to 0.95) and role conflict (0.71 to 0.82) suggests that each item is making a meaningful contribution to the measure. The Cronbach alpha internal reliability coefficients for each of the factors ranged from (a = 0.90) to (a = 0.94) and none of the internal reliability coefficients could be improved by eliminating items. This suggests that each dimension of the measure has good internal reliability and each item is making a meaningful contribution to the measure.

Means, standard deviations and correlations among the variables appear in table two. All variable distributions were approximately normal and demonstrated reasonable variation across their respective scales. No univariate or bivariate outliers were considered problematic and the product moment correlations revealed significant associations between the variables. Cronbach alpha internal reliability coefficients ranged from (a = 0.78) to (a = 0.94) suggesting good internal reliabilities.

Table 1
Principle Components Factor Analysis of Role Stress Items with a Varimax Rotation

	Component		
	1	2	3
I'm worried that I have more tasks than I can cope with	0.87		
I have more tasks than I can effectively manage	0.85		
I feel concerned about not being able to complete all the tasks I need to get done	0.84		
I constantly feel overwhelmed by the tasks that I need to do	0.81		
I'm not clear about all the tasks that I need to do		0.95	
I don't understanding many of the tasks that I need to do		0.91	
I'm don't have a clear sense of how all the tasks I need to do fit together		0.84	
I'm don't have a clear understanding of the important tasks in my life		0.82	
Many of the important tasks that must be done prevent me from doing other important tasks			0.84
Successful completion of many of my important tasks means poor performance on others			0.82
The important tasks that I need to do often conflict with one another			0.79
I often have difficulty deciding which tasks to do because they conflict with doing other tasks			0.71

Table 2
Means, Standard Deviations, Internal Reliabilities and Correlations

	Mean	Std. Deviation	1	2	3	4	5	6
1. AAD	42.50	19.25	(0.89)					
2. RO	17.16	4.94	0.26**	(0.94)				
3. RA	12.61	4.96	0.31**	0.41**	(0.92)			
4. RC	14.91	4.77	0.26**	0.49**	0.54**	(0.90)		
5. TRS	44.68	11.85	0.34**	0.79**	0.81**	0.83**	(0.93)	
6. LETMS	37.10	12.66	0.41**	0.39**	0.66**	0.49**	0.64**	(0.94)

Note 1: Internal consistency reliabilities are shown in parentheses on the diagonal
*Note 2: ** = correlations statistically significant at the level p < 0.01 (2-tailed)*
Note 3: AAD= adult attention deficit, RO=role overload, RA=role ambiguity, RC=role conflict, TRS=total role stress

Empirical Tests of Hypotheses

Hypothesis 1*:* The correlation between AAD and role stress is statistically significant ($r = 0.34$, $p < 0.01$) which provides support for the hypothesis that AAD is associated with role stress.

Hypothesis 1a*:* The correlation between AAD and role overload is statistically significant ($r = 0.26$, $p < 0.01$) which provides support for the hypothesis that AAD is associated with role overload.

Hypothesis 1b*:* The correlation between AAD and role ambiguity is statistically significant ($r = 0.31$, $p < 0.01$) which provides support for the hypothesis that AAD is associated with role ambiguity.

Hypothesis 1c*:* The correlation between AAD and role conflict is statistically significant ($r = 0.26$, $p < 0.01$) which provides support for the hypothesis that AAD is associated with role conflict.

Hypothesis 2a*:* The correlation between AAD and lack of an effective task management system is statistically significant ($r = 0.41$, $p < 0.01$) which provides support for the hypothesis that AAD is associated with the lack of a developed and effective task management system.

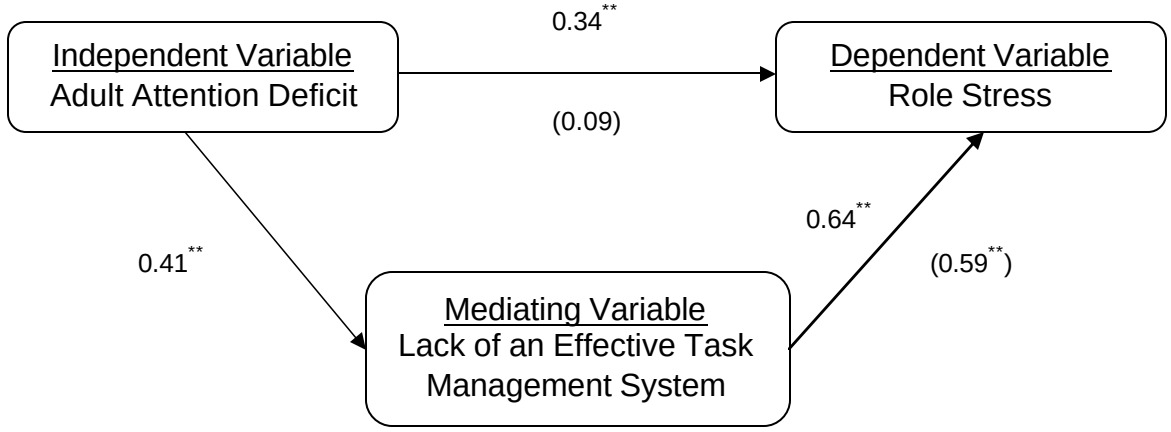
Hypothesis 2b*:* The correlation between lack of an effective task management system and total role stress is statistically significant ($r = 0.64$, $p < 0.01$) which provides support for the hypothesis that the lack of a well developed and effective task management system is associated with higher levels of role stress.

Hypothesis 2c*:* The Sobel test was significant ($Z=6.57$, $p < 0.01$) suggesting that lack of an effective task management system fully mediates the relationship between AAD and role stress. The results of regressing role stress on both AAD and lack of an effective task management system are contained in appendix B.

Discussion

The results of this research confirm that adult attention is associated with role overload, role ambiguity and role conflict. More specifically, the results suggest that adults who are experiencing difficulties with task activation, concentration, effort, emotional interference and accessing short term memory, are less likely to manage their role effectively. Constraints on personal productivity will create a backlog of tasks resulting in role overload. Difficulties with concentration, emotional interference and memory will constrain the ability to generate a clear perception of one's role leading to role ambiguity. Difficulties with concentration, emotional interference and effort will undermine the ability to manage role conflicts. The significant Sobel test confirms that AAD creates increased role stress due to the inability to develop and maintain an effective task management system.

Figure 1
Mediating influence of Personal Task Management System on the Relationship between Adult Attention Deficit and Role Stress



Type of Mediation: Full
Sobel Z value: 6.57, $p<0.01$
Direct Influence: 0.09
Indirect Influence: 0.25
Note 1: ** = correlations significant at the level $p<0.01$
* = correlations significant at the level $p<0.05$
Note 2: Correlations in parentheses indicate beta weights computed after the mediator has been included in the regression equation

Implications for organizations and education institutions.

Organizations wishing to limit the degree of role stress experienced by their employees need to be aware of the influence of AAD. The introduction of more fluid and self managing role conditions will be especially challenging for employees who do not have well developed personal systems for executing necessary tasks. Organizations committed to creating more empowered cultures may end up producing the opposite if employees with attention difficulties are not provided with the support needed to become more self managing. Helping employees with AAD to develop effective desktop and task management systems will help to limit the degree of role stress that they experience. Managers who are responsible for supervising and developing employees with AAD will be required to make relative greater investments in such employees. It is important to provide managers with the support they need when developing such employees, especially during the introduction of more empower work designs. In general, investing resources necessary to support employees with the disorder may help to reduce potential increases in absenteeism, turnover, health care costs and poor performance.

Educating both AAD and non-AAD employees about the effects of the condition may encourage better understanding and responses to struggling members. Increasing coverage of the disorder within the Americans with Disabilities Act may introduce the requirement of providing reasonable accommodation and employers need to be ready

to do so. Making employees and managers more generally aware of the symptoms of AAD and the treatment options available may provide the education necessary to reduce the extent to which the condition remains undiagnosed and untreated.

Education institutions, like management programs within universities, need to assist potential managers to recognize and respond to the symptoms of AAD in both themselves and others. Early diagnoses and treatment may help to prevent the exacerbating cycles of failure that often accompany the condition. An increased emphasis on desktop and task management skills within business programs may be necessary to help potential managers reduce future role stress.

Limitations and suggestions for future research

The instability of the hyperactivity/impulsivity component of ADHD in adults and the traditionally narrow focus on symptoms of inattention (hyperactivity/impulsivity aside) suggests that AAD may be more prevalent and problematic within the US workforce. Studies that determine the prevalence of AAD versus adult ADHD are required to clarify this important issue. AAD appears to have mostly negative outcomes for employees and organizations but there is some evidence that employees with AAD excel with certain tasks and in certain situations. This highlights the importance of identifying the specific tasks and situations that are problematic or a good fit for employees with AAD. Research that examines the influence of AAD on a wide range of typical work tasks and situations is required. Research that identifies the variety of personal and organizational characteristics, strategies and supporting resources that mitigate the negative influence of AAD on stress and task performance will help to provide clues about possible interventions.

The question of whether AAD is a cause or consequence of role stress, or whether they are mutually reinforcing is a question that needs to be answered by future research. Pre-post experiments in which a treatment group is exposed to higher levels of role stress may help answer the question of direction and task specific effects. Significant increases in AAD for members of the treatment group may suggest that role stress is in fact creating or exacerbating the symptoms of AAD. The challenge with this type of experiment is determining the appropriate length of exposure to increased role stress in order to create sufficient opportunity for an increase in AAD. The ethical challenges of creating such controlled experiments may restrict such research to existing workplace redesign initiatives. Testing for significant differences in role stress across clinical vs. non clinical AAD groups while holding the role requirements constant will help to provide evidence that AAD is contributing to role stress. Considerable sample size may be required in order to generate a clinical sub group with a sufficient number of subjects. Personal case histories of employees who rate high on both role stress and AAD will provide insight into the progression of this relationship, and the personal and organizational factors that influence this progression.

The external validity of this study is limited by the use of adult students. If the working conditions of the subjects in this research study involve higher levels of support and

structure, then variability within the dependent variable may have been restricted. If so, the extent of the relationship between AAD and role stress may have been underestimated. Future research needs to draw samples from a variety of work situations in order to capture the full range of role stress. Use of both self report and observation measures for both AAD, effectiveness of personal task management systems, and role stress will help to partial out any part of the results that are due to common method bias. This research study adds to the limited information about the influence of AAD on role stress.

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Appendix A

Items for Lack of an Effective Task Management System

1. I just don't know how to complete necessary tasks effectively and efficiently
2. I couldn't tell you what method I use for getting things done
3. I don't have a well developed method for completing tasks successfully
4. If someone asked, I would not be able to describe my method for completing important tasks
5. I'm always confused about what method I'm using to complete tasks
6. I never have a clear sense of how I'm doing things
7. I lack an organized process for completing many of the necessary tasks in my life
8. No matter how hard I try, I never seem to be able to develop an organized process for completing necessary tasks
9. I just can't wait to get my system for completing necessary tasks in place
10. I have an extremely disorganized system for managing the tasks that I'm required to do
11. I just can't seem to get my approach for completing necessary tasks organized

Scale anchors: 1=strongly disagree; 2=disagree; 3=slightly disagree; 4=neutral; 5=slightly agree; 6=agree; 7=strongly agree

Appendix B

Results of regressing ADD and Lack of an Effective Task Management System on Role Stress

R	R Square	Adjusted R Square	Std. Error Estimate				
.64	0.42	0.41	9.10				
	Sum of Squares	df	Mean Square	F	Sig.		
Regression	17324.70	2.00	8662.35	104.4	0.00		
Residual	24470.99	295.00	82.95				
Total	41795.70	297.00					
	Beta	Sig	Lower Bound	Upper Bound	Zero order	Partial	Part
1. AAD	0.09	0.054	-0.003	0.11	0.34	0.11	0.09
2. LETMS	0.59	0.00	0.47	0.65	0.64	0.58	0.54

Note 1: AAD= adult attention deficit, LETD=lack of effective task management system