# Empirical Examination of the Moderating influence of Dogmatism on the relationship between Adult Attention Deficit and the Operational Effectiveness of Project Managers

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**Abstract**

**Purpose:** Empirical examination of the moderating influence of dogmatism (DG) on the relationship between adult attention deficit (AAD) and operational (traditional) project manager effectiveness (OPME).

**Design/methodology/approach:** 160 actively employed business graduate students participated in a business courses where they were assigned to 4-person project teams responsible for completing a major business project. The project contained 4 sub-projects each of which was managed by a different team member. At the end of semester each team member rated the others on their project management effectiveness. Each subject completed a self-report measure of dogmatism and identified a close associate who completed an observer version of the Brown Attention Deficit Scale. Linear regression was used to test the hypothesis that DG moderates the relationship between AAD and OPME.

**Findings:** DG is a statistically significant moderator of the relationship between AAD and OPME. The negative relationship between AAD and OPME significantly declines as DG increases.

**Research limitations/implications:** Future research requires use of samples that are more directly associated with the workplace. Further investigation of the impact of AAD symptoms, including potentially positive manifestations like entre/intrapreneurial cognition and creativity, is needed to fully understand the impact of the disorder within the project management nomological network.

**Practical implications:** Organizations need to be aware of the impact of AAD and DG on OPME. The provision of adapted project management training, productivity tools, a workspace free of unnecessary distractions and both professional and peer coaching is suggested for disordered project managers and participants. Organizations need to help disordered employees find substitutes for dogmatic thinking processes that possess similar protective and decision-making benefits but avoid the related inflexibility and social challenges. Employee assistance programs that raise awareness and provide access to assessment are an important part of multimodal management of the disorder in the workplace.

**Social implications:** Employers are facing increasing social, legal and economic pressures to support and make effective use of functional but disordered employees. This research provides constructive suggestions for how to accommodate and support disordered project managers.

**Originality/value:** This is the first empirical examination of the relationships between AAD, DG and OPME and is of value to researchers, organizational development specialists, human resource management specialists, managers and employees who are seeking effective multimodal management of attention related disorders in the workplace.

Keywords: Attention deficit disorder; Adult attention deficit; Adult attention deficit disorder; Attention deficit hyperactivity-impulsivity disorder; Adult attention deficit hyperactivity-impulsivity disorder; Project management; Project manager performance; Project manager effectiveness; Dogmatism

## Introduction

At least 5% of the adult global population have clinical levels of attention deficit disorders [1] costing the global economy approximately 144 million days of lost production per annum [2]. Changing role requirements for many workers is delegating and distributing increasingly complex responsibilities and associated competencies throughout organizations [3]. These new role requirements are dependent on higher order cognitive processes often disrupted by adult attention deficit disorders (AADDs)

[4,5]. Managing this challenge requires research on how AADDs influence individual and team performance [6].

Working conditions that engage more complex higher order cognitive processes intensifies the need for coping responses among disordered adults [7]. Recent research suggests that disordered adults develop rigid attachments to particular sets of beliefs in order to constrain the extent to which self-directing (higher order) cognitive processes are disrupted by external or internal stimulus [8].

This research study examines the moderating influence of dogmatism on the relationship between adult attention deficit (AAD) and the operational effectiveness of project managers (OEPM), the component of project management most dependent on the higher order cognitive processes typically disrupted by AAD.

## The independent variable - adult attention deficit

### Definition

Research conducted by Brown [9] on symptoms that commonly occur among adults with attention deficits produced the following 5 symptom clusters (factors):

a)   difficulty activating and organizing to work (difficulty getting organized and started on tasks predominantly caused by a relative higher arousal threshold and/or chronic anxiety).

b)   difficulty sustaining attention and concentration (difficulties staying focused on priority tasks that are not of high personal interest, receiving and organizing information and resisting distraction).

c)   difficulty sustaining energy and effort (insufficient and/or inconsistent levels of general energy and difficulty sustaining effort required to complete important tasks).

d)   difficulty managing emotional interference (difficulty with intense, negative and disruptive mood states; relatively high and sustained levels of irritability and emotional reactivity; difficulty managing emotions that constrain the development of constructive relationships).

e)   difficulty utilizing working memory and accessing/recalling learned material (episodic or consistent chronic forgetfulness, difficulty organizing, sequencing and retaining information in short term memory, and problems accessing and using learned material).

Brown [9] uses dimensional (gradations of severity) as opposed categorical (non-disordered vs disordered) measurement of the symptom clusters to determine the overall level of AAD. This is consistent with evidence that AAD symptoms and associated impairment fall along a continuum [10,11]. AAD is defined as a persistent pattern of inattention and related cognitive, emotional and effort related symptoms that occur with varying levels of severity and creates progressively greater challenges within the personal, academic and work life of adults as severity increases

[9,12]. The use of dimensional measurement and correlational analysis helps to reveal the influence of AAD within nomological networks that influence organizational behavior [12,13].

### Impact of AAD on organizational behavior and management

Research studies using dimensional measurement of AAD has identified associations with difficulty with teamwork [14-16]; greater reliance on co-workers [17] difficulty managing conflict [16], increased stress [18], lower self-efficacy [18] and less effective task management systems [15].

Attention related disorders are also associated with positive behaviors like the ability to work in a fast paced environment, ingenuity, innovation, creativity, determination, perseverance, risk taking and intense focus on things of interest [19,20] which may explain why entrepreneurs appear to have significantly higher prevalence rates [19]. Recent research by White & Shah [21] suggests that the disorder is associated with higher overall levels of creative achievement across a variety of occupational and task domains.

The ability of an organization to foster employee innovativeness, creativity and an entre/intrapreneurial orientation may be one of the most significant contributors to sustained organizational success within an increasingly globalized economy [22]. Research by Zhou [23] suggests that employees with low creativity benefit from working closely with highly creative employees. Organizational innovation, creativity and success is therefore potentially influenced by the manner in which highly creative employees, many of whom may be disordered to varying degrees, are distributed and deployed throughout the organization.

Managerial strategies that appropriately leverage the potential strengths of the disorder while removing, reducing or mitigating the deficits are needed to ensure successful deployment of disordered employees. Most researchers and practitioners agree that multimodal management of the disorder involving a combination of medicinal and non-medicinal support (counseling, coaching, training, supportive conditions and conditions aligned with strengths) has the greatest potential for success [24]. This requires a comprehensive understanding of the impact of the disorder on personal performance capacity (core workplace competencies, motivation and other performance supporting personal states); performance behavior including key mediators and moderators; and performance outcomes at the individual and team level [17].

## Dependent variable - project management

### Definition and impact

Project management is defined as the application of knowledge, skills and techniques for executing a temporary endeavor undertaken to create a unique product, service or result [25]. The project management process (cycle) includes a variety of phases or stages that are often dependent on the type of project

but typically include the stages of initiating, planning, executing, monitoring and controlling, handing off and closing the project [26].

There are a wide variety of project types determined by the nature of the output (e.g. building a skyscraper, developing a new engine, designing and delivering a training service, producing a software update etc.), the size of the project (e.g. scope, number of stakeholders etc.), the execution culture (numerous stakeholder checks due to security issues, established and standardized processes, high level of execution autonomy etc.) and the conditions within which project execution occurs (e.g. industry, sector, organizational culture, time pressures, resource constraints etc.). Projects are also completed by either individuals or teams. In an attempt to identify the key differentiating features of projects, Shanhar & Dvir [27] and others have suggested the following general differentiating dimensions:

a)     complexity (extent of scope, number of elements that must be considered when making project decisions, project organization requirements, number and nature of constraints that must be addressed, number of participants and stakeholders, diversity of output requirements and success criteria).

b)     uncertainty (degree of clarity about project goals and execution requirements, rate and degree of change influencing project goals and execution requirements).

c)     technology (level of technology required to support the project).

d)     novelty (the level of originality in project goal, processes and/or output).

e)     pace (the criticality and rigidity of the project time frame).

f)     Obeng (1994) provided a simple classification of project types based on two dimensions - the level of clarity and detail at the outset of the project about what needs to be done and how to do it. These dimensions are used to create the following classification:

i.     closed (stakeholders know what to do and how to do it at the outset).

ii.     semi-open (stakeholders are unsure of what needs to be done but are sure about how things will be done).

iii.     semi-closed (stakeholders are given a reasonable level of clarity about what needs to be done, although often somewhat general, but still need to figure out how to do it).

iv.     open (stakeholders are unsure of what needs to be done and unsure of how things will be done when the project is initiated and in some cases at various points along the way).

Closed conditions are generally associated with low levels of complexity, uncertainty, technology, novelty and pace. Contemporary conditions have elevated all of the key differentiating factors resulting in a shift away from closed conditions toward more semi-closed and open conditions [28].

Measurement of project success has traditionally focused on what is referred to as the golden triangle – meets the deadline, within budget and addresses the established scope [29]. This approach has been criticized for being too narrow [30] especially when considering the broader impact of key projects like Microsoft Windows which was considered a significant failure relative to the original deadlines, budget and scope. Criteria used to measure project performance has expanded to include the following levels [27,31]:

a)     process (optimal identification, selection, implementation and management of project processes).

b)     project management (meets time, budget, scope requirements).

c)     customer/deliverable (quality, quantity, specifications, acceptance, use, impact, satisfaction).

d)     business success (impact on business goals and performance).

e)     strategic success (impact on market, competitors, investors and other key stakeholders).

f)     preparation for the future (extend to which project supports the future success of the organization).

g)     team impact (extend to which the execution of the project supports the capacity of project team members to continue working together in an efficient and effective manner).

The clarification and expansion of performance criteria has improved the ability to identify the key determinants, mediators and moderators of project performance, including the contribution of the personality, management/leadership style and associated competencies of project managers and participants [32].

Research on the influence of the project management competencies suggests a contingent relationship and the need for alignment with project type, conditions and stage [33,34]. In an attempt to categorize the expanding domain of project management competencies, Shenhar & Div [27] suggest that project management competencies be organized into 4 groups:

a)     traditional/operational excellence (planning and executing a sequence of project activities to ensure completion of the project scope on time and within budget).

b)     dynamic adaption (management of change within the project).

c)     strategic focus (strategic alignment of the project, creating a competitive advantage for the organization and adding value at the strategic level of the organization).

d) inspired leadership (motivating and managing project team members and other stakeholders to evoke and maintain their support and commitment to the project, creating project spirit through supporting vision, values and artifacts) [35].

They suggest that the profile of required project management competencies depends on the complexity, uncertainty, technology, pace and novelty of the project. Traditional (operational excellence) competencies may be both necessary and sufficient within closed project conditions that are relatively stable, simple, low tech and do require high levels of novelty. Although the traditional competencies remain necessary, they become increasingly insufficient as the complexity, uncertainty, technology, novelty and pace increase (project conditions become more open). Increasingly open project conditions requires the addition and integration of dynamic adaptation, strategic focus and inspired leadership with the traditional (operational excellence) competencies.

Although the failure rate of projects remains a concern [32], research suggests that effective project management is a contributor to business success in a variety of industries and sectors [36,37] and that project performance is influenced by the personality, management/leadership style and competencies of the project manager [38-42].

Many of the core project manager competencies rely on higher order cognitive processes which are typically disrupted by attention related disorders [43,44]. The significant reliance of traditional (operational excellence) competencies on higher order processes like impulse inhibition, planning, modeling, prediction, goal and priority setting, sequencing and problem solving suggests that operational effectiveness may be particularly impacted by the disorder. These are also referred to as the process competencies. The ongoing necessity and foundational nature of traditional competencies (operational excellence) in spite of growing insufficiency as project conditions become more open, suggests that AAD may have an important influence within the nomological network that determines both project manager, team member and project performance. A search of multiple databases (medline, psyc-info, academic source premier, business source premier etc.) produced no empirical studies on the relationship between attention related disorders/conditions and project management.

## Moderating variable - dogmatism

### Definition and impact

Belief and disbelief systems satisfy the need for a cognitive framework that defines situations and provides protection from threats [45]. Dogmatism is generally defined as a closed belief system resulting from a rigid attachment to particular beliefs that are resistant to opposing beliefs. Rokeach [45] suggests that dogmatism is defensive in nature and encompasses a constellation of psychoanalytic defenses that help to shield a vulnerable mind. More recently, Altemeyer [46] defined dogmatism as "an unjustified and unchangeable certainty in one's beliefs, reflecting conviction beyond the reach of evidence to the contrary" (p. 201). Rigid attachment to a particular set of beliefs helps to protect self-directing processes that are relatively more vulnerable to disruptive external and internal stimulus [47]. Defensive cognitive closure, rigid certainty and isolating (compartmentalizing) contradictory beliefs is a way to protect higher order cognitive processes from complex external stimulus that may create the experience of cognitive chaos, confusion, vulnerability and anxiety. Rigid cognitive structures are also a way to defend against the disruptive impact of emotions like anxiety, fear or anger that have reached a level of intensity that disrupts self-directing cognitive processes.

Developmental psychologists have consistently identified early psychosocial conditions in the parenting process and a biological vulnerability for hyper-arousal, environmental stressors and disrupted socio-culture learning as the distal causes [47]. Anxiety that arises in childhood and persists through adolescence and into adulthood will help to rigidify the belief system as a means of personal defense. Recent research by Brown [44] identified an association between disrupted functioning of short-term memory and dogmatism suggesting a link between rigid (defensive) thinking and adult attention deficit.

Research on the impact of dogmatism on mental health and general functioning has identified mostly detrimental but some beneficial effects [48-50]. Research on the occupational impact of dogmatism has revealed an association with both high and low performance [51,52]. Dogmatic workers are likely to struggle in situations that are dynamic, uncertain, and complex, and require high levels of reflection, flexibility and cooperation with others [7]. However, a dogmatic thinking style may be useful when performance supporting cognitive and emotional states are particularly vulnerable to external and internal stimuli that may produce disruptive cognitive dissonance [53]. The impact of dogmatism on health and performance appears to be moderated by personal vulnerability to disruptive dissonance. For workers who are prone to confusion and indecision as the complexity and intensity of external and internal stimulus increases, the benefits of a dogmatic style may outweigh the costs.

## The Relationship between AAD, dogmatism and the operational project management

### Hypotheses

The proposition guiding this research study is that dogmatism moderates the negative relationship between AAD and the operational effectiveness of project managers (referred to as operational effectiveness). Project managers who use a more dogmatic orientation toward managing the operational aspects of a project, especially under closed or semi-closed conditions (low need for dynamic adaption), may be able to generate a higher level of cognitive protection from the disorganizing effects of the disorder.

Employees with operational project management responsibilities who experience difficulties with getting organized and started on tasks, concentration, sustaining effort, managing emotional interference, using short term (working memory) and accessing learned material, will have greater difficulty achieving operational competence. They will be less able to activate and organize the project initiation stage, establish clear and appropriate project goals, map out and schedule the require tasks, organize and integrate the tasks into an efficient project plan, manage project participants and ensure timely completion of the project within scope and budget. Difficulties with attention and concentration will undermine the ability to consistently pay attention to the details of the project plan resulting in inefficient reexamination. Difficulties with energy and effort will constrain the consistency and duration of effort needed to ensure timely completion of critical end-to-end tasks.

Impulsivity and emotional reactivity may be viewed by others as impatience and a lack of confidence in others which may constrain the formation of trusting, constructive and supporting relationships. Disordered adults are often indecisive [54] when facing conflicting goals and disproportionately attentive to tasks that are immediately gratifying and of relatively greater personal interest [13]. This should further constrain operational efficiency and effectiveness.

**H1:** Adult attention deficit is negatively associated with the operational effectiveness of project managers

Disordered project managers may be able to constrain the level of manifest disorganization, indecision and confusion associated with the disorder by using a more dogmatic orientation. This is more likely to be beneficial within closed/semi-closed project conditions that don't require high levels of flexibility and dynamic adaptation. The use of a dogmatic orientation may help to shield a vulnerable mind from internal and/or external stimuli that promotes disorganization, indecision and confusion, and/or constrain the behavioral manifestation of these symptoms resulting in levels of decisiveness expected from the operational role of a project manager.

**H2:** Dogmatism moderates the relationship between adult attention deficit and the operational effectiveness of project managers

## Methods

### Subjects and procedures

The subjects were 160 actively employed business graduate students attending a university in the United States. Subjects participated in business courses that required them to work in 4 person autonomous project teams. Each team was responsible for completing a major business project which required the completion of 4 sub-projects. Each team was required to complete a strategic planning process and produce a strategic plan based on the 4 traditional elements of strategic planning - external opportunities and threats plus internal strengths and weaknesses (SWOT). Each team member was required to manage one part of the SWOT analysis and the other team members were required to work for them on that particular sub-project. Each of the 4 sub-project managers (team members) were expected to integrate their sub-projects into an overall strategic plan and manage the progress of the overall project. The general operational phases of project management, related competencies and tools were briefly reviewed at the beginning of the course.

The project conditions were semi-closed because the project outcomes (scope and timeline) were specified with a reasonable level of clarity and detail from the outset but the process of further defining the outcomes where necessary, and determining the process for achieving the outcomes, was delegated to the project managers. The project conditions represent low to medium complexity, uncertainty, technology, novelty and pace. These conditions mostly emphasize the need for operational project management competence.

At the end of the semester each of the team members completed an assessment of the operational project management effectiveness of the other team members. Each subject was also asked to identify someone who knew them well and would be willing to complete an honest assessment of their behavior. The identified observers completed an observer version of the Brown Adult Attention Deficit Scale (BAADS) under conditions of anonymity. Each of the subjects completed a self-report measure of dogmatism.

Principle components factor analysis with a varimax rotation was used to confirm the dimensionality of the project manager effectiveness measure, and examine the contribution of the individual items to the factors. Product moment correlations were used to test all the hypotheses regarding associations between the measures. Linear regression that included the multiplication of standardized independent and moderator variables (moderator variable) was used to test for a significant moderating effect.

## Measures

### Adult attention deficit (ADD)

The Brown (1996) Adult Attention Deficit Scale (BAADS) contains forty self-report items that measure the five symptom clusters. Organizing and activating to work (cluster 1) measures difficulty in getting organized and started on tasks (e.g., "experiences excessive difficulty getting started on tasks"). Sustaining attention and concentration (cluster 2) measures problems in paying attention and concentrating while performing tasks (e.g., "listens and tries to pay attention but soon becomes distracted"). Sustaining Energy and effort (cluster 3) measures problems in maintaining the required energy and effort while performing tasks (e.g., "runs out of steam and doesn't follow through"). Managing affective interference (cluster 4) measures

difficulty with moods, emotional reactivity and sensitivity to criticism (e.g., "is easily irritated" and "has a short fuse with sudden outbursts of anger"). Utilizing working memory and accessing recall (cluster 5) measures forgetfulness in daily routines and problems with recall of learned material (e.g., "intends to do things but forgets"). The questions are phrased in third person singular to support observer ratings (e.g., "" the person being described is disorganized"). The instrument uses a four-point behavioral frequency scale (0=never, 1=once a week, 2=twice a week, 3=almost daily). A total score for AAD was generated by adding up the scores on all of the questions.

## Dogmatism

The new dogmatism scale (DOG) [46,55] was used to measure dogmatism. The instrument was designed and validated for use with adults and contains 20 items that measure general dogmatism. Example items for the scale include the following: "I am absolutely certain that my ideas about the fundamental issues in life are correct"; "The things I believe in are so completely true, I could never doubt them"; and "I have never discovered a system of beliefs that explains everything to my satisfaction" (reverse coded). 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. Each of the subjects completed the dogmatism measure and a total score was derived by adding up the scores on the individual items (some items needed to be reversed).

## Operational project management effectiveness

Items for measuring the operational effectiveness of project managers were developed after reviewing the core project management competencies outlined by the International Project Management Association [56], the Project Management Institute in the United States (2008) and recent research on the assessment of project managers [57-60]. There was no well-established instrument that focused exclusively on measuring the operational effectiveness of project managers as outlined by [27]. However, most existing instruments and competency profiles contained parts that referenced the operational effectiveness component of project manager performance.

Thirteen items that represent the key operational (traditional/process) project management responsibilities described by Shenhar and Dvir [27] were selected and worded in a general manner that encompassed most project management situations, including the situation that the subjects were embedded in (Table 1). Example items are "mapped out all the key project tasks and milestones", "identified the critical path that determined the duration of the project" and "secured the input and support of project team members." Observers 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 the project manager demonstrated each competency. Each project manager was rated by the other three members of the project team and the scores on each question were averaged and then added to get a total operational effectiveness score.

**Table 1:** Means, Standard Deviations, Correlation, and Internal reliabilities.

|  |  | Mean | Std Dev | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| 1 | Project Manager Effectiveness | 62.12 | 13.08 | 0.89 |  |  |
| 2 | Dogmatism | 3.32 | 1.07 | -0.03 | 0.89 |  |
| 3 | Adult Attention Deficit | 39.24 | 18.34 | -0.35** | -0.04 | 0.93 |

Note 1: Cronvach Alpha internal reliabilities are shown on the diagonal
Note 2: ** Correlation is significant at the 0.01 level (2-tailed).

## Results

### Descriptives, factor analysis, correlations and regression

A principle components factor analysis with an orthogonal rotation (varimax) was conducted to examine the structure of the project manager effectiveness instrument. The factor analysis for the project manager effectiveness items produced a single factor with factor loadings ranging from 0.65 to 0.82 suggesting that each item is making a meaningful contribution to the measure. The Cronbach alpha internal reliability coefficient was $\alpha = 0.89$ and could not be improved by eliminating items. This suggests that the instrument has good internal reliability, and each item is making a meaningful contribution (Table 2).

The average intra-class correlations (two-way mixed effects model with absolute type agreement) among team member ratings of project manager effectiveness ranged from 0.71 to 0.90 suggesting acceptable inter-rater reliability. Means, standard deviations and correlations among the variables appear in Table 1. 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. The mean, standard deviation and maximum score for AAD (avg = 39.24, std dev = 18.34, max score = 104) are not significantly different from the instrument validation samples and previous samples of subjects taken from the same university and a similar university in western Canada.

Cronbach alpha internal reliability coefficients ranged from (α = 0.89) to (α = 0.93) suggesting good internal reliabilities. The linear regression for testing the moderation effect produced no problematic residuals (Table 1).

### Empirical test of hypothesis

The significance threshold for empirical tests was set at α = 0.05 (2 tailed). The correlation between AAD and project manager effectiveness (Hypothesis 1) was statistically significant (r = -0.35, p < 0.01). The linear regression of project manager effectiveness on adult attention deficit, dogmatism and the moderator (multiplication of the standardized dogmatism and adult attention deficit variables) produced a statistically significant moderator effect (β = 0.29 p = 0.000). An examination of the moderator graph (Figure 1) confirms that the negative relationship between adult attention deficit and the operational effectiveness of project managers declines as dogmatism increases (Table 3).

**Table 2:** Principle Components Factor Analysis of Project Manager Effectiveness with a Varimax Rotation.

|  | Component |
| --- | --- |
|  | 1 |
| Established clear and appropriate goals for the project | 0.82 |
| Mapped out all the key project tasks and milestones | 0.81 |
| Sequenced and integrated all the key project tasks into an project plan | 0.8 |
| Kept project on track and ensured successful and timely completion of the project | 0.77 |
| Identified the critical path that determined the duration of the project | 0.76 |
| Secure the necessary resources to complete the key project tasks | 0.76 |
| Used resources efficiently | 0.74 |
| Effectively allocated tasks and resources among project team members | 0.71 |
| Predicted and addressed high risk steps in the project plan | 0.7 |
| Secured the input and support of project team members | 0.69 |
| Monitored progress and addressed problems effectively | 0.68 |
| Promoted cohesion and effective working relationships among project team members | 0.66 |
| Project plan supported achievement of project goals in an efficient manner | 0.65 |

**Table 3:** Regression of Project Manager Effectiveness on Adult Attention Deficit, Dogmatism and the Moderator.

| Model Summary | | | | | |
| --- | --- | --- | --- | --- | --- |
|  | R | R Square | Adjusted R Square | Std Error of Estimate | |
|  | 0.453 | 0.205 | 0.19 | 11.78 | |
| **Analysis of Variance** | | | | | |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | 5614.28 | 3 | 1871.42 | 13.48 | 0 |
| Residuals | 21789.23 | 157 | 138.78 | | |
| Total | 27403.51 | 160 | | | |
| **Coefficients** | | | | | |
|  | Unstandardized Coefficients | | Standardized Coefficients | | |
| Model | B | Std Error | Beta | t | Sig |
| Constant | 78.86 | 4.827 | | 16.337 | 0 |
| Adult Attention deficit | -0.304 | 0.052 | -0.426 | -5.798 | 0 |
| Dogmatism | -0.087 | 0.207 | -0.03 | -0.419 | 0.676 |
| Moderator | 3.605 | 0.918 | 0.288 | 3.928 | 0 |

## Discussion

### General

The results suggest that AAD constrained the operational (traditional/process) effectiveness of project managers and that the negative relationship between AAD and operational effectiveness declines as dogmatism increases. The directionality of this relationship cannot be confirmed from this research study and both opposite and bi-directional effects are possible. The large number of studies confirming the significant contribution of

genetic factors to the manifestation of the disorder [43] provides general support for the hypothesized direction in this study. Recent research suggesting that certain contextual conditions like parental conflict and inconsistent parenting may help manifest a genetic predisposition or strengthen existing symptoms [61] suggests that certain project conditions may contribute to AAD.

## Implications for organizations and education institutions

Organizations wishing to ensure the success of key projects need to be aware of the influence of adult attention deficit and dogmatism on project manager effectiveness. The emergence of more empowered work cultures, tighter deadlines, the need for creativity/innovation and project-oriented work represents both an opportunity and challenge for disordered employees. Disordered employees without the necessary support will not be able to leverage their strengths and may constrain the performance of interdependent others.

The protective influence of dogmatism on the execution of operational project tasks by disordered project managers suggests the need for conditions, tools and competencies that protect higher order cognitive resources from disruptive external and internal stimulus. The provision of project management training/coaching, project management tools and a workspace free of unnecessary distractions may be especially important for project teams containing disordered employees. Although a dogmatic style may be beneficial under relatively simple and stable conditions, it is unlikely that a defensive and rigid cognitive style will support project management effectiveness under increasingly dynamic and open project conditions. Organizations need to help disordered project managers and participants find substitutes for dogmatic thinking processes that possess similar protective benefits but avoid the related inflexibility and social challenges associated with being dogmatic. Helping disordered project managers to better manage anxiety, stress, emotional disruption, and find an appropriate balance between assertiveness and collaboration, is likely to play an important role in developing constructive substitutes for dogmatic thinking.

The increasing availability of effective coaches (life, organizational, task, peer, manager as coach etc.) [62] offers a potential substitute for close supervision and a potentially more accepted and developmental resource for keeping disordered employees oriented toward successful completion of priority tasks and projects. Effective organizational coaches could address a wide range of cognitive, emotional and behavioral deficits, and protect the employee from the reinforcing cycles of failure that many disordered employees experience [63]. Establishing reciprocal peer coaching systems within project teams or the organization as a whole, that addresses challenges at the individual and relational level may add considerable mutual value, especially for disordered employees [64,65]. Coaching processes that contain the necessary structure and content for supporting disordered employees are needed.

The effective use of project teams represents an opportunity for distributing the creative benefits associated with the disorder while managing the deficits. Team members and peer coaches can help disordered employees to activate, organize, stay on track, maintain a balance between organizational citizenship opportunities and priority work tasks, avoid experiences of failure and manage challenging emotions. They can also help disordered employees address the pitfalls of rigid thinking and behavior. In return, team members can benefit from the creativity that disordered employees may offer. This will require the careful design of teams to ensure optimal person-role fit and supportive team development interventions. Team building that educates team members about the disorder and addresses the social and task performance challenges while taking advantage of the benefits is required. Structured collaborative decision-making processes that provide team members with the opportunity to optimally locate themselves within the process should improve person-role fit, avoid the problems of excessive rigidity and ensure timely decisions. Shared management of projects that partner disordered project managers with someone who is flexible and has strong administration and social skills may support both individual and project effectiveness.

The multi-modal approach to managing the disorder in the workplace suggests that sustained improvement will depend on other forms of support like the general education of both managers and employees, establishing supportive organizational cultures and climates, appropriate medication and coaching/training that address key underlying cognitive, emotional and behavior deficits (e.g. retention training to support effective and efficient use of short term memory). The provision of employee assistance programs that provide disordered, potentially disordered and non-disordered employees with information about the disorder and opportunities for assessment is an important part of the constructive management of employee diversity. This will help to create a more inclusive, supportive and responsive organizational culture. This will also increase the likelihood of the employee seeking out other important parts of multimodal treatment, particularly medicinal support.

Education institutions, like management programs within universities, need to assist new project managers to recognize and respond to the symptoms of the disorder in both themselves and others. Early diagnoses and treatment may help to prevent the exacerbating cycles of failure that often accompany the condition. Educating future managers about the condition will help to ensure that they do not become a contributor to the emergence and reinforcement of such cycles through ignorance or the inability to be supportive. Project management training, peer coaching systems and student team interventions that address the disorder in a constructive manner will help prepare all future managers for the challenges of the contemporary workplace. Education and

training that improves self-awareness, emotional intelligence, effective use of working memory and constructive assertiveness may help substitute for the protective use of dogmatic thinking styles.

Increasing social, economic and legal pressures to provide reasonable accommodation for functional but disordered employees and take appropriate advantage of employee diversity underscores the general social value of this research.

**Limitations and suggestions for future research**

Future research requires use of samples that are more directly associated with the workplace. The influence of creativity within the relationship between AAD and project manager effectiveness requires further investigation and may reveal beneficial aspects of the relationship. Measures of project management effectiveness that include items related to the creative dimensions of a project, when such dimensions are required, are needed to support this research. A system for classifying the creative requirements of projects will help develop the moderating variables needed to reveal project management situations within which the disorder may be beneficial. This research supports the general proposition that the disorder has significant influence within the nomological network that determines individual, team and organizational performance.

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